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APPENDIX TO THE JOURNALS

OF THE

SENATE AND ASSEMBLY

OF THE

THIRTY-EIGHTH SESSION

OF THE

LEGISLATURE OF THE STATE OF CALIFORNIA.

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VOLUME II.

SACRAMENTO:
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1909

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THIRD BIENNIAL REPORT

OF THE

COMMISSIONER OF HORTICULTURE

OF THE

STATE OF CALIFORNIA

FOR

1907-1908.

J. W. JEFFREY, Commissioner.

SACRAMENTO:
W. W. SHANNON - - - - - - - - - - - - Superintendent State Printing
1909

CALIFORNIA STATE COMMISSION OF HORTICULTURE.

MAIN OFFICE:

Capitol Building, Sacramento, Cal.

J. W. JEFFREY, *Commissioner*	Sacramento
O. E. BREMNER, *Secretary*	Sacramento
MISS A. G. BIRD, *Clerk*	Sacramento
GEORGE COMPERE, *Special Field Agent*	Sacramento
E. J. BRANIGAN, *Field Agent*	Sacramento

QUARANTINE DIVISION:

Room 11, Ferry Building, San Francisco.

EDWARD M. EHRHORN, *Deputy Commissioner*	San Francisco
F. X. WILLIAMS, *Inspector*	San Francisco

STATE INSECTARY:

Capitol Park, Sacramento.

E. K. CARNES, *Superintendent*	Sacramento
B. B. WHITNEY, *Assistant Superintendent*	Sacramento

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REPORT

OF THE

COMMISSIONER OF HORTICULTURE,

FOR 1908.

To the Honorable Senate and Assembly of the State of California, in Legislature assembled:

GENTLEMEN: In accordance with Section 10 of the law under which the Commission was created, and which provides that "it shall be the duty of said Commissioner to report in the month of January in each even-numbered year to the Governor, and in each odd-numbered year to the Legislature of this State, such matters as he may deem expedient or as may be required either by the Governor or the Legislature, and to include a statement of all the persons employed and of moneys expended under this Act, by itemized statement thereof," I have the honor to present the following annual report:

The work of the Commission of Horticulture is necessarily divided into three departments: the main office, State Capitol, Sacramento; Branch Office and Quarantine Station, Ferry Building, San Francisco, and State Insectary, Capitol Park, Sacramento.

Employed in the main office, including the Commissioner, is a secretary and clerk. John Isaac, the former secretary, resigned on July 1, 1908, since which time there has been no appointment, O. E. Bremner, Assistant Deputy at San Francisco, having been called to the main office to carry on this work. Miss A. G. Bird is clerk.

Branch Office, San Francisco:

Edwd. M. Ehrhorn, Deputy Commissioner and Quarantine Officer.

F. X. Williams, Assistant Deputy.

State Insectary, Sacramento, Capitol Grounds:

E. K. Carnes, Superintendent.

B. B. Whitney, Assistant. Geo. Compere, Special Field Agent.

Besides these, we have been obliged to employ for short periods assistant deputies to help carry out various quarantine orders. Those employed were Stephen Strong, C. F. Butler, E. J. Branigan.

The work of the main office is necessarily varied—the answering of inquiries that represent every phase of every subject relating to horticulture, which include in their heterogeneous assortment everything from a technical entomological description to the broadest economic problems of the day; the programming, carrying out and printing of the State Fruit Growers' Conventions; the compiling and printing of bulletins on subjects most suited to the needs of the growers, and as an advisory head to all the County Horticultural Commissions.

The duties performed by the Deputy Commissioner and Quarantine Officer at San Francisco are essentially those of a horticultural police officer, having charge of the inspection of all nursery stock, fruit, seeds, etc., from any point outside the State of California. His work is first essentially technical, having almost solely to do with the insect pests and diseases found on such trees, plants, fruits, etc., intended for planting or consumption in California, which would prove a serious menace to our horticultural industry should they gain admission; and, secondly, as police officer, being vested with all the necessary powers to destroy or otherwise eliminate such insects or diseases in the way best suited to protect the California growers.

The State Insectary has been separated from the Quarantine Department, where it has been up to the present year, and is now formally installed in a new building in the Capitol Park, expressly built and equipped for this purpose. It is here that we rear, and from here distribute, the beneficial insects that prey upon different types of orchard and field insect pests that are so heavily taxing the growers. The success of this work in the past warrants keen expectations for the future.

REVIEW OF THE FRUIT SEASON.

The fruit season, for the past year, has, in some respects, been very satisfactory, while in others nearly the opposite. Crops in general, as regards quantity, have been far above the average, but prices have been correspondingly low. This condition applies only to our deciduous fruits, and may be due to several causes; in fact, each product may have had its own peculiar conditions that have worked to its disadvantage. This can best be explained by some typical examples.

The asparagus crop was all that could be asked for as to quality and quantity, yet canners would not handle the product, presumably on account of their inability to contend with the financial stringency. The only growers realizing a good profit were the early shippers to Eastern markets. During the height of the season, 1,500 to 2,000 boxes went begging some days on the sidewalks of our San Francisco commission district even at a price of 25 cents per 40-pound box. The fault in this case seems to partly lay with the general distribution to our local markets, for in outlying towns, where the freight or express rates would not exceed from ½ to 1 cent per pound, asparagus never sold below 12½ cents, and seldom under 15 cents per pound. It would certainly appear that somewhere between the cost in this case, not to exceed 1 to 2 cents per pound, and a retail price of 15 cents, there is a reasonable figure at which the product could be disposed of at a little more profit to the grower and a little less expense to the consumer. To go further with this example, because the two avenues of distribution, viz.: canned and green asparagus, need never come into competition, and because of its necessarily restricted production, and because this product is so universally accepted under any reasonable conditions, there should be no difficulty in so systematizing the distribution through the medium of our local markets alone that there need never be the same conditions arising that confronted us the past season.

Our peach crop presented nearly the same conditions as that described for the asparagus. The early peaches sold comparatively well, but as the season advanced prices gradually dropped, until the growers of late peaches offered to give their product away if the consumers would merely pay the cost of handling and transportation, yet these same peaches could not be bought through the retail channels in our Capital City at any but prices ranging from 50 to 65 cents per 20-pound box. These two examples are sufficient to convey our idea, for a discussion of practically all our products, with few exceptions, from table grapes and Bartlett pears to prunes and raisins, would take us over the same field. There is certainly no fear of overproduction of these products when our own home markets are so inadequately supplied both as to quality and quantity and are sold at prices which stamps them as luxuries rather than staples, which they should be.

The prune crop was very light, ranging from a full crop in a very few localities to only ten per cent, or practically nothing, in others. Prices on dried prunes began comparatively high, but gradually fell to the lowest mark for the past three or four years.

Our pear crop was the largest and best for many years, with fair prices generally. It is safe to say that we shipped more Bartlett pears this year than in any one year in California.

The apple crop was very large in some districts, and a total failure in others, but, fortunately, in the large sections the output was fully up to the average. Prices ranged fair and quality good. In spite of the discontinuance of the mail line to New Zealand and Australia, shipments were unusually heavy to these markets. Judging from the satisfactory results so far obtained, there certainly appears to be an opening for much of our fruit in these oceanic markets if we were afforded proper shipping facilities.

A full crop of apricots is reported; something we have not had for years, and a fair price.

Of grapes, a full crop of table varieties, but, we are sorry to say, many red ink returns, resulting from a poor distribution in the Eastern markets and the competition of a full crop of Eastern fruit.

The crop of wine grapes was below the average, with prices ranging from fair to poor.

The berry crop (blackberries, loganberries, and raspberries) was good, as it always is, but prices were the lowest they have been for years, probably due to so much other canning products. Strawberries are evidently suffering from a foreign invasion, and when the Japanese have gained full control we may expect the same results that have marked their domination of the potato industry.

Our citrus shipments were not in excess of last year, and the prices did not average quite as high, but it would be unfair to judge any year's crop by such a successful season as 1907, both as to quantity and price. The season of 1908 was certainly all that could be desired from the standpoint of a citrus grower.

The past season has been very propitious for the nut industry, there being no late, cold rains or frosts. Orchards of both walnuts and almonds which have not borne a full crop for years produced an excellent yield of very good quality nuts.

PLANTING.

As to new areas being planted to trees and vines, probably no one year has been so marked by an increase along certain lines, and surely such intelligence has never been manifested previously among our growers as to variety, care, and selection of both stock and location.

As to acreage, grapes have probably led in this increase of area, with perhaps a little in excess of 15,000,000 vines. This includes, of course, table and wine grape varieties. Of this amount nearly one third have been resistant vines, and of these fully 2,000,000 have been imported from France. Of the other fruit plantings, it would be only a wild guess to state which is next, but it is noteworthy that in practically every deciduous section in the State the increase has been large. In some of the newer citrus sections the same tendency to enlarge the acreage has been fully as pronounced. This enlarged handling of nursery stock has necessarily increased the labor of the County Commissioners, and has, in connection with the regular orchard inspection, brought out conditions in the several counties requiring attention.

First, counties amply protected by County Commissioners and Inspectors are jeopardized by neighboring counties without such quarantine protection, thus allowing the introduction and spread of pernicious insect pests and diseases, as well as noxious weeds.

Secondly, the steadily increasing requirement of qualification to meet the conditions imposed on the County Commissioners and Inspectors makes some legislation necessary to increase the pay of these officers in order that more efficient service may be given.

DISEASES AND PESTS.

In considering the prevalence of insect or disease foes to the different branches of our industry, we must first consider the external conditions making for an increase or decrease in these agencies. We had a dry, warm spring; even some of our coast counties suffered from a want of late rains; less fog in all sections; less snow in the mountains, and more drying north winds than usual. The general result has been a marked decrease of both insects and diseases, with but few exceptions.

To have conditions well adapted for the rapid germination and development of fungoid and bacterial diseases we need warm, moist weather. Cold dry, hot dry, or even cold moist, but particularly the two former, are conducive to the limited spread of these diseases. We, therefore, find that the terrible pear blight (*Bacillus amylŏvorus*), which has so rapidly and completely devastated the pear orchards of our great interior valleys, and has spread to our coast valleys and foothill sections, has not only been checked, but has been less in evidence than for years in practically every section. Another season like the past, with the aid of careful pruning methods, would see a very marked decrease, if not almost total elimination of this blight from many of the orchards. We are, however, emphatic in our stand for the assisting process, and not for risking the job to chance elements.

The same factors which have brought about the conditions cited in the case of the pear blight have acted similarly, but perhaps in not so pronounced a manner, with regard to walnut blight, peach blight (*Coryneum beyerinkii*), pear and apple scab (*Fusicladium dendriticum*) and other similar diseases, for never have our apples, pears, and apricots been so free from scab as this year.

The codling moth (*Carpocapsa pomonella*) in many sections has not been so scarce for many years, but whether this is due to climatic conditions or the work of parasitic foes would be hard to determine. Grasshoppers have been very numerous in many foothill sections, as they always are in dry seasons, for when their natural food is lacking they are forced to migrate to other feeding grounds. The growers in the worst infested sections have successfully fought them by means of large flocks of turkeys.

The pear thrips (*Euthrips pyri*) is at present the worst enemy of our pear, prune, and cherry crops, and seems to be spreading. The United States Bureau of Entomology has been working on this problem for the past few years, and has three men at present in the field here in California. We are anxiously waiting to enforce any or all measures they may discover to either check or control this pest. The orange thrip (*Euthrips citri*) is another insect, very similar to the pear thrip, which is doing no small amount of damage to our orange crop.

The vinehopper (*Typhlocoba comes*) has not been so troublesome the past year in most of the grape sections, although very bad in some. We were fortunate in locating at Sonoma, in the infested district there, a parasite working on this hopper. As the hoppers in this locality have been gradually diminishing, particularly in the past three years, we are in great hopes that the cause of this disappearance lies with this new parasite, and we will thoroughly test this matter to the fullest extent this coming season.

The grape-root worm or flea beetle (*Adoxis vitis*) still continues to be a very troublesome pest in some of our table grape sections.

The red spiders and mites (*Tetranychidae* and *Phytoptidae*) have been particularly troublesome owing to the nature of their attack, and the depleted condition of the trees, due to the dry season, which is also favorable to this class of pests.

The scale insects (*Coccidae*) were perhaps less abundant, yet the aggregate damage done was as great, owing to the condition of the trees so infested. The control of this group will be treated to greater extent in the report of the Insectary following.

The plant lice (*Aphidae*) were much less abundant the past season in many sections, as, for example, the melon growing district of the Coachella Valley. This, however, may be due to the fact that in this special location we introduced thousands of parasites the year previous, which practically saved the crop of melons that season, and would undoubtedly account for the comparatively few numbers of the lice there this year. Shade trees throughout northern California suffered badly from this agency, particularly elms and black walnuts.

QUARANTINE SUBJECTS.

During the past year we have had one occasion to pass a quarantine order. This was in reference to the introduction of cotton seed into the new county of Imperial for the purpose of planting near El Centro. Realizing the very grave danger of introducing the boll weevil, we immediately took steps to prevent this by means of the following quarantine order:

State of California,
Office of the State Commissioner of Horticulture,
State Capitol, Sacramento, Cal., April 23, 1908.

Whereas, Information has been received by this Commission to the effect that cotton seed is about to be imported into this State from sections affected with the cotton boll weevil (*Anthonomus grandis* Boh.), and that the same is a serious pest in such sections where it prevails; and

Whereas, The said cotton boll weevil (*Anthonomus grandis*) does not, nor ever has, existed in this State, and that, if introduced, the same would become a serious and dangerous pest, probably spreading to other food plants; and

Whereas, The cotton boll weevil (*Anthonomus grandis*), while not attacking the seed of the cotton plant, may hibernate in the hulls or be carried in the mass, and thus become established in new locations; therefore, acting upon information received from and a request made by the Bureau of Plant Industry, of the Department of Agriculture, of the United States, it is hereby

Ordered, That no cotton seed shall be admitted into this State, and a horticultural quarantine is hereby established against the same, except under the conditions herein set forth:

First, that in addition to the offices of the State Commission of Horticulture, Capitol Building, Sacramento, and Room 11, Ferry Building, San Francisco; El Centro in Imperial County, San Bernardino in San Bernardino County; Riverside in Riverside County; Los Angeles in Los Angeles County, and San Diego in San Diego County, are hereby declared horticultural quarantine stations for the inspection of all cotton seed coming or being imported into this State.

Second, the Board of Horticultural Commissioners of each of said counties, and each of them, is hereby declared a special Deputy Commissioner of Horticulture for the purpose of enforcing this order. And it is further,

Ordered, That all cotton seed brought or imported into this State shall be inspected in the county into which it is brought by one of the deputy commissioners above named. It shall then be subjected to fumigation, in a closed vessel, with bisulphide of carbon gas for a period of twenty-four hours, and shall then be held by the deputy commissioner for a sufficient time to satisfy said deputy commissioner that all possibility of infestation is removed. For the purpose of more effectively enforcing the quarantine against the cotton boll weevil, it is further

Ordered, That all cotton seed shipped or imported into this State shall be consigned to the Horticultural Commission of one of the above named counties, to be by them delivered to the consignee when they are fully assured that there is no danger of infestation.

This quarantine shall go into effect immediately upon its approval by the Governor.

....
State Commissioner of Horticulture.

Approved by

....
Governor of the State of California.

NOTICE TO THE COUNTY BOARDS OF HORTICULTURAL COMMISSIONERS.

OFFICE OF THE STATE COMMISSION OF HORTICULTURE,
CAPITOL BUILDING, SACRAMENTO, October 8, 1907.

WHEREAS, The Florida white fly (*Aleyrodes citri*) has appeared on citrus and other forms of vegetation in the city of Oroville, Butte County, and the same is a threatening danger to the citrus industry of California;

Notice is hereby given to the various County Boards of Horticulture, that they take all necessary measures to prevent the spread of this pest, and also that they take all necessary means to eradicate it in the districts in which it has appeared, and to prevent its introduction in those counties where it does not now exist. Owing to the location of the present infestation and the season of the year, the manner in which the present outbreak must be handled will differ in some respects from the orders issued covering previous cases of infestation by the same insect pest.

IN THE CASE OF OROVILLE, BUTTE COUNTY.

Notice is hereby given that all citrus trees, plants, shrubs, or other forms of vegetation found infested with either the Florida white fly (*Aleyrodes citri*), or yellow scale (*Chrysomphalus aurantii* var. *citrinus*), within the following boundaries: Starting at the corner of Pine and Robinson streets, a line running north on Pine to Montgomery; thence west on Montgomery to the dividing line between Lots 6 and 7, Block 34; thence in a northerly direction to Broderick street; west on Broderick to First avenue; south on First avenue to Safford; west on Safford to Second avenue; south on Second avenue to Montgomery; west on Montgomery to Third avenue; south on Third avenue to Robinson; east on Robinson to starting point, in the city of Oroville, county of Butte, State of California, are hereby condemned.

It is further ordered, That between the dates of February 1, 1908, and February 15, 1908, all infested citrus trees, plants, shrubs, or other forms of vegetation within the above-given boundaries are hereby ordered defoliated by the removal of all portions liable to infestation. In the case of trees, the entire foliage-bearing surface must be removed, as per illustration, leaving only the bare trunks, and these trunks must be treated with a coating of whitewash, composed of quicklime slaked with water. It is recommended that the stubs of such trees from which the limbs have been removed be protected with an application of grafting wax or paint, to prevent the entrance of air, and to save the trees for the growth of the new top; in the case of shrubs or small plants that are infested, the total destruction of their tops at the ground. The tops, together with all leaves, must be carefully gathered up and destroyed by burning.

Owing to the fact that the trees can not, with safety to them, be defoliated before February 1st, and that there is danger of the over-wintering brood of flies issuing about the first of March, the time for action, when this pest can be successfully fought, is, therefore, very short, and there can be no delay when the time for active work arrives. Therefore, it will be necessary for owners of infested trees to make previous arrangements for having their trees defoliated promptly, and to have all the work completed on time.

As the work of fumigation will require more time, it will be necessary to commence this work in advance of the defoliation, and this work will have to be done between the dates of December 1, 1907, and February 1, 1908, and will be planned by the County Board of Horticultural Commissioners. Notice to eradicate will be served on owners outside the defoliation area when the fumigating outfit is available to do the work, which has to be done at night, and consists of placing a gas-tight tent over the tree, and the generation of hydrocyanic acid gas within, by the combination of certain chemicals in sufficient strength—the amount used being governed by the size and width of the tree—to kill, by being subjected to the fumes of the gas, all the larvæ and pupæ of the pest on said trees.

It is further ordered, That all remaining citrus trees, shrubs, or plants not included in the districts heretofore mentioned that are found infested with either the white fly (*Aleyrodes citri*) or yellow scale (*Chrysomphalus aurantii* var. *citrinus*), in the city of Oroville, or county of Butte, shall be fumigated with hydrocyanic acid gas, at such time and in such manner as shall be prescribed by the County Board of Horticultural Commissioners of Butte County, or all the foliage-bearing surface of the same removed and burned, at the option of the owner or owners, or agent, of the property where the infestation occurs. This measure is absolutely necessary to rid the trees of the yellow scale and overcome any danger of eggs or larvæ of the white fly that may have spread to other trees and escaped detection. Those owners or agents outside the boundary districts, who prefer to defoliate instead of fumigate their trees, must have the work completed between February 1 and February 15, 1908.

It is further ordered, That all infested trees, plants, shrubs, or other forms of vegetation must be treated as indicated in this notice, and that all the work must be completed by February 20, 1908.

Following is a list of the plants known to harbor the *Aleyrodes citri*, and which will have to be destroyed: All varieties of citrus trees, including oranges, lemons, and limes; the China berry tree (*Melia azederach*); Viburnum nudum; Cape jessamine (*Gardenia florida*); Japanese persimmon (*Diospores kaki*); California privet (*Ligustrum amurense*); Golden privet (*Ligustrum* sp.); mock orange (*Prunus caroliniana*); Osage orange (*Toxylon pomiferum*); lilac (*Syringa vulgari*); together with any other host plants upon which the white fly may hereafter be found.

Section 11 of an Act to create a State Commission of Horticulture, approved March 25, 1903, provides: "Any person willfully refusing to comply with orders lawfully made under and pursuant to this Act shall be guilty of a misdemeanor, and upon conviction shall be fined not to exceed five hundred dollars.

ELWOOD COOPER,
Commissioner of Horticulture of the State of California.

WHITE FLY CAMPAIGN AT OROVILLE.

In our report to his Excellency, Governor J. N. Gillett, for the fifty-eighth fiscal year (1907), the subject of the white fly (*Aleyrodes citri*) campaign was mentioned as being in progress, which, in fact, it was, as the notices for eradication had been served October 8, 1907; but these notices ordered that the work outlined was to be performed between the dates of February 1 and 15, 1908, and therefore properly falls in the year for which this report is made.

The work was energetically carried on for the State by E. K. Carnes, F. K. Maskew, S. Strong, B. B. Whitney, and for the county of Butte by County Commissioner C. J. Dreher and Inspector E. Mills.

An outline of the work as actually carried on included, first, a careful and systematic inspection in the fall of every yard in the city of Oroville, and a plot of the same showing the exact location of every food plant of the white fly (*Aleyrodes citri*), and also designating those trees actually infested with the insect. This was done so that a careful compliance with the working orders of the eradication notice (which is herein contained) might be carried out. After this inspection was completed, each tree (host plant of *A. citri*) was tagged with a sealed weather-proof tag, stating thereon the system of treatment for every case. The total infestation was found to be contained in twelve and one half city blocks of the ninety-nine within the city limits. Those food plants, therefore, (within this area, 12½ blocks), of the white fly (*A. citri*) were defoliated according to the order, and all other food plants outside of this area were fumigated with hydrocyanic acid gas, as per the order. This work was all carefully and skillfully performed, and as to the success of the treatment, I need only to refer to the inspection made of the entire territory, during the months of May and June following, at which time it was impossible to find a single trace of a live white fly (*A. citri*) in any of its stages.

It is necessary in viewing the complete success of this campaign as compared with the partial one at Marysville, to consider the conditions and how these made possible the complete eradication in one place and not in the other. We must, therefore, take into consideration the life and habits of this insect we are dealing with. In the early spring the adult winged forms emerge from their winter resting pupal state and lay their eggs on the leaves of the host plant. These eggs hatching, go through their several stages (larval and pupa), and finally come forth in about forty days as the next winged brood. This continues throughout the summer until the late fall, the length of this life cycle depending and varying on and with the conditions encountered by each individual. It is therefore easily seen that it is impossible to catch all of the insects in any one stage, which must be done, to completely eradicate them, in the spring, summer, or fall seasons; for, should all the trees be completely defoliated, the winged adults are able to live long enough in a sheltered portion to allow a tree to put forth new leaves and then reinfest the tree by laying its eggs on these new leaves. As the trees could not all be defoliated in a single day or week, there were always new leaves for the reception of the eggs. But in the winter, for about five months, they pass the time in a practically dormant state on the leaves, in which form they are most susceptible to the defoliation or fumigation methods, as they are in a condition of absolute helplessness, being without legs or wings to aid them in escaping from the leaves of the host plant. As these larvæ (of the white fly) are found only on the leaves of a food plant, it is seen that the destruction of all the leaves means the extermination of the insects. At this season, also, the deciduous host plants are absolutely free from the insects, so that only the evergreen forms require treatment.

It is, therefore, very evident why we undertook the winter treatment, for it embraced all the destructive features of the Marysville campaign, and eliminated all danger of establishing new deciduous host plants, as was the case in that place. It accomplished at one defoliation what we were unable to do in Marysville by repeated treatments.

WHITE FLY (*ALEYRODES CITRI*) IN MARYSVILLE DURING 1908.

In the city of Marysville the white fly campaign has been continued from last year under extenuating circumstances. Our first fight at Marysville, and some of the reverses there, as I have already shown, which aided us so materially at Oroville, made it necessary to continue the work along slightly different lines. The work of the first campaign was to a great extent nullified, owing to the fact that we depended on the people fulfilling the mandatory orders of the County Commission, and, failing to act as a unit, they allowed by dilatory tactics the insect avenues of escape in the form of new food plants, which up to this time had not been known to harbor the pest. It was, therefore, necessary to keep inspectors continually in the field, making a house to house canvass, determining and destroying such infestations as they found. The work has been disagreeable, laborious, and expensive. So much so of the latter that before our fiscal year was finished we found ourselves hopelessly in debt. An emergency appropriation of $2,500 was granted us, of which we used $1,693.85. As to the success of our efforts in this city, we would not assert that the insect has been exterminated, but we do hold that it has been kept so carefully under control that all possibilities of further spread has been reduced to practically zero. While the financial side may appeal to some as being quite an expense to the State, we must stop to consider what would happen should this insect continue to spread. In one of our sister states, where the "let alone" policy has been followed, the white fly has now reduced their citrus industry forty per cent. As our California citrus industry amounts to $30,000,000 annually, this loss would mean to us $12,000,000. One cent on every $100 of this anticipated loss would support our quarantine division for two years. It is, therefore, very evident that a very little spent in prevention or eradication saves much of losses.

THE CONVENTIONS.

During the past year we have held two State Fruit-Growers' Conventions, the first, at Riverside from April 28th to May 1st, was fairly attended. As this was held in a distinctly citrus section, the principal topics presented were of this nature. After printing the report, so great was the demand for the publication that our issue of 2,000 was soon exhausted; a second edition of 1,000 copies was struck off. and of this only about 200 remain.

We have been greatly handicapped the past year in the matter of needed publications, resulting from the very meager sum at our disposal for this work. The $2,500 allowed for all our printing needs having been used, we were obliged to procure the necessary money for this second edition from a special fund. So insistent were the growers for this work, they agreed to raise the necessary amount for publishing should the State funds prove inadequate.

Our second convention was held in Sacramento, December 1st to 4th. There was certainly no lack of enthusiasm at the meetings, and the consensus of opinion seemed to be that this was the best State Fruit-Growers' Convention ever held in California. Judging from the requests in advance, we shall have to issue a large edition of the report of this convention, or a condition similar to that which has already been cited for the previous convention will confront us.

DEMONSTRATION TRAIN.

Some six months ago the proposition of a demonstration train was discussed between the head of our Commission and a Southern Pacific Railroad official. The meritorious success of such expeditions in the East gave us every confidence in the ultimate result of such a tour through our State. We, therefore, entered into the proposition with alacrity when the opportunity came, and after some very hard work, but with very little expense, we fitted up an exhibition car, which we are told made a very creditable showing. In this car we united the work of all our departments. We dispensed spray remedies, legal and scientific knowledge, demonstrated the work of parasites, and emphasized the value of our quarantine methods. All this was exemplified in the specimens which we had on exhibition. We believe that the greatest amount of good accruing from this trip is directly responsible to the work in the demonstration cars, rather than the lectures which we gave in the halls or assembly car.

We feel much indebted to the railroad company for this opportunity of meeting the horticulturists of the different sections of the State, and in such a manner as to leave some impressions that we hope may prove of no small benefit to this industry.

Respectfully submitted.

J. W. JEFFREY,
State Commissioner of Horticulture.

By O. E. BREMNER, Deputy.

QUARANTINE DIVISION.

State Commission of Horticulture,
San Francisco, Cal., October 31, 1908.

Hon. J. W. Jeffrey, *State Commissioner of Horticulture, Sacramento, Cal.*

Dear Sir: I have the honor to submit to you herewith my report of the work of the Quarantine Division at San Francisco for ten months of this year, 1908.

During this period there arrived at the port of San Francisco 218 steamers which required our attention, as well as many shipments arriving by rail, and a number of packages by mail, which were examined at the Customs Bureau of the United States postoffice.

The total of all these shipments is as follows:

Number of boxes, crates, barrels, etc., of fruit and vegetables as freight by steamers and sailing vessels	48,012
Of plants, trees, and bulbs by the same carrier	942
Of small lots of fruits and plants by passengers and crew	894
Of plants and fruit as freight by rail and mail	594
Of plants, fruit, and vegetables destroyed or refused landing	1,900

I desire to call your attention to some of the more important shipments which were condemned, and either destroyed or refused a landing.

On January 1st there arrived per steamer "Buckman" 1,000 boxes of Japanese oranges. This fruit arrived at Seattle by an Oriental steamer, and was reshipped on a local steamer to this port. The fruit was badly infested with *Cladosporium citri*, a very serious fungus, which causes injury, not only to the fruit, but also to the foliage of citrus trees. This pest exists in Florida, where it was imported years ago from Japan, and where it does great damage to both oranges and lemons.

Owing to the continued arrival of Mexican oranges in small lots, from one to a couple of dozen, and which are in the possession of passengers and crew touching at Mexican ports, we exercise constant watch, lest some of the maggot-infested fruit should gain entrance into the State. Every orange and sweet-lime seized is cut open and then thrown overboard. During the past season quite a number of these were found, and many of the oranges were concealed among clothing in the baggage.

On account of the dreaded melon fly (*Dacus cucurbitae*), which has taken such hold on all melons, cucumbers, squashes, etc., in Hawaii, we have been very alert in the examination of all vegetables arriving from these islands. During the ten months past we have had occasion to destroy four boxes of cucumbers, which were swarming with the larvæ and pupæ of *Dacus cucurbitae.* These cucumbers were first cut into small pieces, and then thrown into the bay, with all the boxes and packing. Our reason for first cutting up the cucumbers is to prevent any one from picking up the vegetable out of the water, which would be done if left whole.

Several lots of *Gardenia florida,* infested with white fly (*Aleyrodes citri*), were found among the plant shipments coming from the Orient. All the plants were promptly destroyed, the whole shipment first being fumigated with a strong dose of hydrocyanic acid gas. We have also found individual plants in the possession of passengers and crew infested with this dreaded pest, and these were seized and destroyed. The roots and stems of these plants are at times attacked by a bark borer belonging to the *Tineidae,* and the roots are very often infested with *Nematode* galls.

We are, therefore, very careful when such plants arrive to go over the lot in detail.

During the month of February there arrived at this port from Japan 800 cases of onions, which were infested with a fungus (*Sterigmatocystis phaeocephala*), Dur. & Mont. Sacc. This is the second shipment of this kind which has come under our jurisdiction. The disease has only been reported from Algiers, and is considered very serious. As our onion industry is quite extensive, such a fungus would prove quite a menace to it, if ever allowed to gain a foothold. The shipment was condemned and ordered returned to the point of shipment.

On June 1st a lot of yams were found on the steamer "Acapulco," which were badly infested with an *Aspidiotus* species, probably *Aspidiotus hartii,* one yam being simply covered with the scale. Mr. Compere reports that he has noticed yams in the Orient infested in the same manner and by probably the same scale insect. On the same yam we discovered a small miner, belonging to the *Tineidae.* The larvæ of this insect does considerable injury to the tuber, and apparently lives on the outside of it in a tube made of grass. This pest would no doubt also prove a great pest and would probably attack the sweet and Irish potato. The damage resembles that of the potato moth (*Gelechia operculella*).

On June 12th there arrived, per steamer "Ashtabula," from China, a large shipment of plants, which were in charge of Mr. F. N. Meyer, agent of the Bureau of Plant Industry. The shipment consisted mostly of bamboos, but many conifers and other plants were among them, and all were destined to the Plant Introduction Garden at Chico, Cal. We made a thorough inspection of all the bamboos, and we cut out all infested ortions, which consisted mostly of old growth. We then subjected the hole shipment to a strong fumigation of hydrocyanic acid gas for one our and a quarter, using 2 ounces of cyanide, 2⅓ ounces sulphuric acid, nd 6 ounces water to each 100 cubic feet of space. After fumigation e reinspected the shipment, and all plants which showed any infestaion were cut off and destroyed. We found no less than thirteen species f scale insects, one *Aleyrodes* species, and one bag worm on the plants. pecimens of all insects were forwarded to Dr. L. O. Howard of the ureau of Entomology, United States Department of Agriculture, Washngton, D. C., as per his request, but as yet we have not received any eport on the sending. I will state that the gas penetrated the soil in he tubs and boxes to such an extent as to drive out earthworms, which e found dead on the surface.

Your ruling on the requirement of fumigation of all scale infested pineapples at Honolulu and other Hawaiian ports before shipment to California, taking effect June 1st of this year, has been carried out. Official notices were sent to all shippers of this fruit, as well as to all transportation companies and consignees. The result of this ruling has been very gratifying. The fruit has not only been up to requirements regarding the scale insects, excepting a few lots, which were held and ordered refumigated on account of finding live insects, but, on the whole, the fruit has been of much better quality and condition. Rumor to the effect that the State Commission of Horticulture had destroyed pineapples and had also refused owners to refumigate their fruit arriving here with live insects, as well as the uncalled for accusation of our boycott on pineapples, has been proven ill founded, and our action is approved of by the larger growers, and satisfaction seems to prevail in the islands.

I am pleased to report that a great decrease of scale infested plants is being brought by passengers and ship's crew, and can be attributed to the firm stand taken by us in destroying all such objects instead of fumigating these, as in the past. Biotas infested with *Aphis;* dwarf maples, with *Parlatoria* species; double flowering plums, cherry, and peach trees infested generally with *Aulacaspis pentagona;* sprouting cocoanuts from Central America, Tahiti, and other islands, generally infested with *Pseudococcus nipae, Aspidiotus lataniae, Aspidiotus destructor, Aulacaspis boisduvali, and Icerya seychellarum;* Sapodillas (*Achras sapota*) infested with *Howardia biclavis,* and Anonas with *Pseudococcus pandani* and *Pseudococcus virgatus,* have all been condemned and destroyed whenever found infested with any of these pests.

The correspondence of this office has been quite extensive; upwards of 525 letters have been answered. Many of these were in regard to the identification of and remedies for insects doing damage to various crops.

This is a very important phase of our work, and I should like to have all of the County Boards of Horticulture send in such specimens as are found doing damage in their districts, for we should know what pests exist in the different sections of our State. The Argentine ant, of which several lots were received from various sections, apparently has been in this State for six or eight years, and yet no record of its appearance has been recorded until this season. Early in May I discovered the pistol-case bearer (*Coleophora malivorella*) in two localities about twelve miles apart in the Santa Clara Valley. This is the first record made of the appearance of this pest in our State, and it was no doubt brought in on some Eastern nursery stock. Whether this pest exists in other localities or not remains to be seen, and the only hope of ascertaining this is through coöperation with those in charge of the inspection work in the various counties, and goes to show that the identification work as started by us will do much towards getting a good knowledge of the distribution of our pests. From the lot of material of the pistol-case bearers which I collected I am pleased to report that about 90 per cent were badly parasitized by a *Eurydinota* species, and from each pupa case from six to ten parasites issued. In the Eastern States this pest does considerable damage. With us, however, thus far it is apparently kept in check by parasites, but further investigations will be necessary.

Many additions have been made to our working library, a feature of much importance in our work, and one which should be encouraged. It is most important to have the necessary publications at hand, so as to be able when necessity arises to make use of these in the identification of the various insects submitted to this office, instead of having to send specimens for identification to Government specialists, which takes time and causes much delay. We have endeavored to do this work here, and whenever we have been in doubt about our work on account of the lack of literature or references, we have had our work verified by the proper authorities.

The office has been well patronized, and daily visitors have sought information on nearly every phase of horticulture, from the tilling of the soil to the harvesting of the crop.

Respectfully submitted.

EDWD. M. EHRHORN,
Deputy Commissioner.

STATE INSECTARY, CAPITOL PARK.

INSECT BREEDING ROOMS, STATE INSECTARY.

MUSEUM, STATE INSECTARY.

INTERIOR COURT, STATE INSECTARY.

INSECTARY DIVISION.

OFFICE OF STATE INSECTARY, CAPITOL PARK.

To HON J. W. JEFFREY, *State Commissioner of Horticulture, Sacramento, Cal.*

SIR: I herewith submit a brief report of the work of the Insectary Division, accomplished since its completion, and covering the time since last report in a general way.

During the last year the time of your superintendent has been largely taken up with field work, covering the eradication of the white fly (*Aleyrodes citri*), which made its appearance at three different points in this State, and which has occupied practically all of our attention, to the exclusion of all other work, deeming this of the utmost importance for the general interests of the State.

The Insectary Department was practically put out of commission by the earthquake at San Francisco, and nearly all the stock destroyed; only a few specimens of a very few species of parasites were saved by catching them on the broken window glass. These were carefully preserved, and later transferred to Sacramento and temporarily housed in a glass house especially erected for that purpose. Soon after this a shipment of plants infested with purple and red scale was received from Mr. Compere, our entomological explorer, and as they were heavily parasitized, it was thought advisable to immediately take them into the open fields where the scale was plentiful. San Diego was chosen as the desired spot, and about 25 plants were removed to Melrose, San Diego County, and housed in a building kindly provided by Mr. Heman Copeland, of the National City Land and Town Company, who furnished not only the house, but provided every assistance possible to aid in the work. As fast as the parasites issued they were liberated in the infested trees. From this point they were moved to different infested areas and distributed, and recent examination shows that the two species are establishing themselves and will, we hope, materially assist in controlling these very troublesome and expensive pests.

For some time plans had been completed for an insectary that would prove adequate for the proper handling of these importations, and after much figuring and consultation, through the good offices of Governor Gillett and the Capitol Park Commission, we were permitted to erect a good building on the Capitol grounds, Sacramento, consisting of twelve rooms, museum and laboratory, and constructed along certain lines that would be of greatest use for this special work. The inside equipment we were compelled to build ourselves, on account of lack of funds, and have added to it gradually, until at the present time we are able to report that we have everything on a working basis and are prepared to handle any sized shipments, and at the same time guard against the possible introduction of secondary forms or the escape of anything undesirable.

On March 18th the writer personally broke the ground for the erection of the State Insectary, and June 29th moved into the Insectary. On December 2d the Insectary was formally dedicated, while the building was packed with people who were in attendance at the Fruit-Growers' Convention.

The following importations have been received from Mr. Compere since June 1, 1908 (Mr. Compere personally brought a case from China containing several hundred live internal parasites for *Pseudococcus* sp. (mealy bug). Some of these were taken directly to San Diego County and liberated in a badly infested orchard):

From Denver, Colo.

1 box *Coccinellidae, Hippodamia convergens, Coccinella prolongata* Cr., and several sp. *Symnus.*

1 box *Coccinellidae,* duplicating the above shipment.

From New Jersey.

2 boxes *Coccinellidae, Adalia bipunctata* Linn.; *Magilla maculata* Le C.

From New York.

Ichneumon parasite on white tussock moth (*Notolophus leucastigma*).

From New York.

3 boxes *Coccinellidae.*
Scymnus manus Le C.
Adalia bipunctata Linn.
Magilla maculata Le C.
Coccinella monticola Muls.
Cocinella 9-notata Hbst.
Coccinella transverseguatata.
Brachyacantha 10-pustulata.

From Germany.

Internal chalcid parasite on *Eulecanium* sp. (wild plant).
Egg parasite on *Eulecanium* sp. On plum.
Coccinellidae, feeds on prune aphis and elm leaf aphis.

Coccinellidae, feeds on woolly aphis.
Coccinellidae, feeds on red spider.
Internal chalcid parasite on *Gossyparia spuria* (elm scale.)
Internal chalcid parasite on *Kermes* sp. On pine.
Egg parasite on *Eulecanium* sp. On gooseberry.
Internal parasite on *Eulecanium.* On peach.

(These parasites were bred out and placed on *Saissetia oleae,* and an attempt made to see if they will attack that scale.)

From Italy.

Shipment of *Coccinellidae.*

General scale feeders, several species, as yet unidentified.

From China. (Sub-station California Insectary.)

Monthly shipments of sago palms and other plants infested with purple scale (*Lepidosaphes beckii*) and red scale (*Chrysomphalus aurantii*), and containing parasites, have been received at the Insectary, until we now have 23 parasitized plants, and they have commenced to show signs of giving us a good start of the parasites for these pests. At present there have issued three species of internal chalcid parasites; these are liberated in cases containing green lemons that are heavily parasitized with purple and red scale (each species separate); time is allowed for the parasites to oviposit in the scale, and then the lemons are sent to infested groves and fastened in the trees, and the parasites allowed to escape directly into the trees. Some of these parasites will be taken directly into infested groves and adult parasites bred and liberated, as this is by far the best lot of parasites ever received for these scale pests from China.

Two species, 4 shipments, of chalcid parasites on the half-grown black scale (*Saissetia oleae*), have been received from China.

About a dozen adults have issued, and these have been liberated in cases containing half-grown black scale on oleander. The *Scutellista cyanea* of South Africa has done excellent work on the black scale, but it does not commercially clean the orchards, for it is an egg parasite, and leaves a very few scale in the groves, sufficient to smut the fruit somewhat, therefore it is necessary to introduce a species of parasite that will work on the half-grown black scale to overcome this difficulty.

The following list of *Coccinellidae* from China indicates the species received, covering several shipments arriving at different times:

Syonycha grandis Thumb.
Coelophora pupilata Schorn.
Chilocorus circumdata Gallb.
Scymnus lepidulus Matsch.

Chilomenis quadriplagiata Schorn.
Cryptogomis orbicutus Gallb.
Sospita chinensis Muls.
Clauis albidula Mots.
Caria dilata Fabr.
Thea galbula Muls.
Coleophora biplagiata Schorn.

Parasite on Lepidoptera chrysalis.

A shipment of chrysalis of the commonly called orange dog of Florida, heavily parasitized, was received, and from this shipment 312 parasites were bred and liberated against the chrysalis of the brown day moth (*Pseudohazis eglanterina nutalli*).

Shipment of Wild Pear Seed.

A shipment of wild pear seed that was collected by Mr. Compere was received. This will be used in experimenting along the lines of a resistant root for pear blight. Additional shipments will follow, the same to be distributed to different propagators throughout the State.

Parasite on Pulvinaria from China.

A shipment of *Pulvinaria* from China has been received, from which we have bred internal chalcid parasites. These were liberated against *Pulvinaria camelicola*, which is to be found outside in Sacramento.

Parasite on Pseudococcus.

A shipment of mealy bugs has been received which contains adult parasites. These are liberated in confinement on *Pseudococcus citri*.

Additional shipments of red scale (*Chrysomphalus aurantii*) and purple scale (*Lepidosaphes beckii*), black scale (*Saissetia oleae*), and hemispherical scale (*Eulecanium hemisphaericum*), containing internal parasites, have been received, as well as duplicate shipments of scale feeding ladybirds.

Cottony-cushion Scale from China, and Ladybird.

An interesting shipment was received from China, consisting of a plant which contains *Icerya purchasi* (cottony-cushion scale) and a new *Coccinellid* enemy that seems to be as proficient as *Vedalia cardinalis*. This would indicate that possibly Australia is not the original home of that pest, and that China may prove to be the home, for we find practically all the pests known to attack the citrus in China, and none of them are troublesome, being all controlled by parasitic insects. In fact, red and purple scale are extremely hard to find, and only obtainable in sufficient quantities to make a sending on plants that have been kept indoors and away from the influence of the parasites.

To prove conclusively to the citrus industry the above statement, and also that practically every pest known to attack the citrus is to be found there and controlled by parasites, and that China is the home of citrus pests, I urge that a representative grower be sent to China to make such an investigation on behalf of the growers, and that, if possible, his expenses be defrayed by the State, for in this manner, through his influence, I feel that the great possibilities of controlling the pests affecting the citrus in California would be brought home more forcibly to the growers than through any other source. It would awaken their interest in this matter, enlisting their support in a cause for their own personal benefit, which at the present time is not understood sufficiently well, or its possibilities known. If some grower is planning a trip abroad for recreation, no better service could be rendered to the industry than by that party taking this matter upon himself, and every possible assistance being granted him by this department.

The following beneficial insects have been distributed the past year:

Hippodamia convergens	50,000
Coccinella californica	
Lestophonus iceryæ	500
Vedalia cardinalis	2,700
Scutellista cyanea	3,500
Comys fusca	3,000
Aspidiotophagus citrinus	4,000
Coccophagus lecani	150
Encyrtus flavus	
Calliephialtes messor	300
Rhizobius ventralis	500
Aphelinus fuscipennis (estimated)	1,000
Cryptolæmus montrouzieri	625
Chilocorus bivulnerus	200
Internal parasite, mealy bug	250
Adalia bipunctata	75
Magilla maculata	25
Scymnus manus	25
Coccinella maculata	22
9-notata	50
transverseguatata	25
Ichneumon parasite on the tussock moth	84
Internal parasite, (Chrysalis) Lepidoptera	312
Coccinella prolongata	25
Chilomenus quadriplagiata	22
Thea galbula	18
Chilomenus biplagiata	36
Parasite half-grown black scale (Aphicus lounsburi), South Africa	12
Parasite half-grown black scale (China)	10
Scymnus monticola	10
Scymnus lepidulis	26
Total	67,502

Many hundred parasites collected all over the State, bred from native *Aspidiotus, Chionaspis, Lecanium,* etc., at the Insectary, have been liberated on commercial pests to note effect of adaptation to new species of host.

A great deal of attention to the utilization of native parasitic and predaceous insects will be given the coming season.

This department can be made of the greatest assistance to the growers of California by the hearty coöperation of that body of producers, and it is earnestly requested that the growers induce the younger members of their respective families to study insect conditions on their places, for it is becoming more and more necessary each year to have a working knowledge of insects and insect pests in order to successfully grow and market profitable crops.

As a suggestion, let every grower or producer *individualize* on insect pests. By this, I mean, make a careful study of the pests that affect or are liable to affect your particular industry. Learn to know them on sight, and the remedies and parasites for the same. A day spent at the museum of the State Insectary will teach you practically all the pests, for you will find in this museum nearly every pest that is troublesome in California, and many that are liable to get here. The museum is always open to the public, and an attendant will be glad to take you through and give you all the information desired.

The popular part of the museum and its educational feature has proven eminently satisfactory, as evidenced by the hundreds of interested visitors who have come to this institution since its doors were thrown open to the public. Especially is this true in regard to the school children, who take a great interest in the study, and this, combined with the heavy mail received containing specimens for identification and requests for information, proves that the Insectary is certainly filling a long-felt want.

Respectfully submitted.

EDWD. K. CARNES,
Superintendent State Insectary.

PROCEEDINGS

OF THE

THIRTY-FIFTH CONVENTION OF THE CALIFORNIA STATE FRUIT-GROWERS

HELD UNDER THE AUSPICES OF THE

State Commission of Horticulture, at Sacramento,
December 1, 2, 3, and 4, 1908

PROCEEDINGS

OF THE

THIRTY-FIFTH CONVENTION OF THE CALIFORNIA STATE FRUIT-GROWERS,

HELD UNDER THE AUSPICES OF THE

STATE COMMISSION OF HORTICULTURE, AT SACRAMENTO,

DECEMBER 1, 2, 3, AND 4, 1908.

TUESDAY, December 1, 1908.

Pursuant to call, the Convention met in Pythian Castle, Sacramento, Cal., at 9:30 o'clock A. M.

The meeting was called to order by President J. W. JEFFREY, State Commissioner of Horticulture.

REV. F. K. BAKER, of Sacramento, opened the Convention with an invocation.

PRESIDENT JEFFREY: The Convention will now hear an address of welcome by Hon. Clinton L. White, Mayor of Sacramento. I now have the pleasure of introducing Mayor White. (Applause.)

ADDRESS OF WELCOME.

BY CLINTON L. WHITE, MAYOR OF SACRAMENTO.

Mr. Chairman, Ladies and Gentlemen: The city of Sacramento, by reason of its central location and by reason of what we believe to be a fairly well-deserved reputation for hospitality, has come to be to a considerable extent a convention city. During the present year many conventions of different kinds have assembled. held their meetings in this city—conventions for political, for religious, for fraternal, for civic, and other purposes. Some of these conventions, particularly political conventions, have been attended perhaps by thousands, and all of these conventions have been considered by the State at large and by the people here as important, and they were important. It gives me pleasure to say to you that in my judgment, while they say comparisons are odious, the Fruit-Growers' Convention is the most important one that has assembled in Sacramento during the present year. There are reasons for this. You have objects to accomplish, and by meeting together, comparing ideas, getting from those best able to give instruction new ideas, you can forward the great fruit industry to a considerable extent, and in so doing each of you individually forwards his own interests.

It was my pleasure, and profit as well, during the autumn season of last year to make a trip through some twenty-five states of the Union. Although I came from one of those states and deem myself fairly familiar with them, wherever I went I was surprised by two things: the lack of orchards and vineyards in the Eastern States and the abundance of California fruit, particularly at that season of the year—California grapes everywhere. So it seemed to me that while I before had a theoretical knowledge of the fact that California was supplying the United States with fruit, I had no actual realization of the fact until I dropped into the markets of Chicago and New York, New Haven and Hartford, Washington and Atlanta, and other cities, and saw there in the fruit markets practically nothing but California fruits.

But it seems to me that the fruit industry of California is still in its infancy, and that in order to forward the interests of this great industry you have many steps that you naturally will consider: the growing of more fruit to the acre—that is not so important, because California soil and California climate can grow plenty of fruit to the acre; growing better fruit, and that is a matter of importance. Not only the growing of better fruit, but the growing of better varieties of fruit. The California peach is one of the handsomest, the most juicy, the most palatable of fruits in the world, and yet, ladies and gentlemen, the most of you believe, and I think correctly believe, that a better peach can be grown in California than has ever been grown up to this time. And so with other fruits. There is a capability of cultivation, of obtaining better varieties, of obtaning better fruit, and this, I presume, is one of the subjects that you will consider.

Another serious subject—and I notice here among the fruit-growers some people that are directly interested in that question as shippers—is the question of how shall we get this fruit to market. If we had the California climate and the California soil and had the exclusive possession of it, as we have, but could place that in a strip in the central part of the United States, say through Ohio and Tennessee, California lands would be worth $5,000—$10,000—any number of dollars per acre that we would see fit to ask for them. But here to the east of us, and between us and the markets of the world, is this great strip of comparatively barren country, so that there is practically no market for the product of this great industry of California until we reach the Missouri River. I say no market because, while there are great communities between here and the land that I name, they are insignificant in comparison with the amount of fruit that California puts on the market. The subject, then, in which the fruit-growers are interested is that of the market, the transportation of the fruit; and in connection with this subject, I can not help but believe that while much can be done by improved methods of refrigeration, care of the fruit, etc., still an increased competition by the transportation companies is a large factor in the direction of solving this problem.

But it is not fresh fruit alone that is marketed by the fruit-growers of California. While we sent, credited to Sacramento, somewhere between 12,000 and 13,000 carloads of deciduous fruits, I take it that that is comparatively small share of the actual deciduous fruits of the State during the present year. Fortunately, the business of canning fruits and putting them upon the market in that form is no longer experimental. I am not a very old man—I am older than I wish I were—but I am old enough to remember the change that has occurred in the appearance of the grocery store. My first recollection of a grocery store was some boxes and barrels. There was no such thing as canned fruits or canned vegetables or canned meats. The appearance of a grocery store has absolutely changed, and that change has been occasioned by the perfection to which the tinning or canning process has been carried, so that now the retail grocery store is practically nothing but rows of cans, and by the canning of the fruits of California we are enabled to send those fruits to every corner of the world. This is a great industry; the canning of fruit is a relief, is something to fall back upon, when the fruit can not be shipped to a market that will accept it as fresh fruit.

Still farther back of that is the process of drying fruit, which, while not perfect by any means, has made great progress during the past fifteen years, and this affords the further opportunity of marketing our fruits. This present season fruit of certain kinds in this section of the State was so abundant that people tried to give it away. The good people of Loomis and Newcastle, just up above us here, telephoned to me one day that they wanted to send down several carloads of fine peaches and give them away to the people of Sacramento, and wanted me, as the chief executive of the city, to undertake the distribution. I am not certain whether my decision in that matter was right or wrong. I certainly hold in grateful remembrance the generosity, the good intention, of those people. At the same time, while they desired to be generous, and while they desired to see one of the finest products of the world not go to waste, I deemed it my duty to absolutely decline to have anything to do with the proposition of distributing fruit by the carload to the people free of charge, because I did not believe—and the thought I have given to the subject makes me still of the same opinion, though not with much firmness—I do not believe that with all the generosity of nature to the orchards of California it is a good thing for the people of California to have the fruit given to them for nothing. There is something in the proposition that seemed to me would have a bad effect upon the people themselves; that it was better for the people and better for the fruit-growers that the fruit should remain and rot under the trees rather than it should be made as a present to the people and cultivate the spirit that unfortunately comes with the proposition so frequently when people obtain something for nothing. I believe in giving value received, and I believe that the people of Sacramento were able to buy their fruit, especially when fruit was as cheap as it was during the present year.

What will be the result of your deliberations? Will you within a few years give us better peaches, better apricots, better grapes, better figs, better fruits of all kinds? And will you make them more nearly what they may be considered at present, so that these things which are considered luxuries in other countries are so cheap in California that they are considered necessaries, and they go on to the table of all the people, rich and poor?

But it is not for me to give to you a general lecture in this rambling way concerning what your convention should do. If—and I believe you can accomplish much in that direction—if you can exchange ideas, if you can get better and easier methods of cultivation, give us better fruit, give us better markets for the fruit, give us wider, more extensive markets for the fruit—if you can do these things and other things that will suggest themselves to you, your convention will be a success.

I want to say to you that you are heartily welcome to the city of Sacramento; that we recognize that you will do much good to the city. We are glad to have people of your kind come here. We recognize the fact that a convention of fruit-growers, gathered from practically all corners of the State, is a convention of representative men—no, not hardly representative men in a sense that that term might be used, representative simply of the average community. That is not so. A convention of fruit-growers is not a convention of farmers who farm according to the old methods, but the growing of fruit successfully is almost to be ranked as one of the learned professions; it requires skill. And you as representatives of the fruit-growing interests in this State are a big set of men and women, you are above the average; so, when I say that you are a representative convention, I do not mean that you are an average set of people, but I mean—and I do not intend to flatter you by this statement—that you are far above the average in intelligence, in enterprise, in ability, and such people we are glad to welcome here to the Capital City, and I trust you will make yourselves at home, and that when you go away you will carry with you a pleasant impression of the city which you have visited and in which you have held your convention. Ladies and gentlemen, I thank you for your attention. (Applause.)

PRESIDENT JEFFREY. I would like to ask Judge Chipman to come on the platform, if he please. Governor Gillett has been struggling for weeks with very serious indisposition, and he was good enough to write me a personal letter yesterday, stating that he could not find the strength and the time to address this Convention, and we certainly feel the loss of the Governor's presence; but I know those of you who know of his condition for the past six weeks will be pleased to excuse him, and I have asked Judge N. P. Chipman, of the Third Appellate District Court, to say a few words in the Governor's stead.

ADDRESS BY GEN. N. P. CHIPMAN,

REPRESENTING GOVERNOR GILLETT.

Mr. President, Ladies and Gentlemen of the Convention: I regret very much the necessity for my appearing here in the capacity of a substitute for the Governor. I know the great interest he takes in the industry to which we have devoted our lives, and the regret he will feel in not being able to look you in the face. I do not believe we have ever had a Governor who has taken a deeper interest in the welfare of the State and who has exhibited a broader intelligence in regard to the development of its resources than Governor Gillett, and it for that reason that I know he will be exceedingly sorry he could not be here to-day himself to give expression to his own thoughts upon the subjects which will chiefly occupy your attention. As his substitute, I have got to imagine something that he might say to you, or, at least, something that I might say myself in lieu of what he might say, and in a very brief way.

I have been, as some of the older members here know, very many years associated with this movement of the fruit-growers. Some sixteen, seventeen, or eighteen years ago it was my privilege to formulate the first general report that was made upon the fruit industry that obtained any circulation or significance, a report made to the California State Board of Trade. I became impressed then with the great importance, the future importance, of this industry to the growth of the State. It seemed to me that general farming here was under no very much greater advantage than general farming in other states of the Union, and it is not to-day in any better condition. I believe that the grower of corn in Missouri and Illinois and Iowa is making more money to the acre than any of our wheat-growers are making in the growing of wheat in this State, or in any of the cereals. It looked to me then, and looks to me now, as though the dominant industry relating to the soil is and must always be fruit-growing in this State. Of course, there are incidental things to be considered in connection with the farmer. We can not all grow fruit. Our land can not all be devoted to fruit-growing. But what I mean is, it is the dominant industry, it is the industry out of which the chief agricultural wealth of the State must spring. You can see what has come of the feeling that was inspired in those early days, some twenty years ago, when I tell you that from that period up to the present time we have increased in the shipments out of the State—I do not speak now of home consumption at all, but what has gone out of the State and resulted in bringing wealth back into the State—we have grown from 16,000 carloads in 1890, of 10 tons each, including the products of our orchards and vineyards and gardens, to 90,000 carloads; the vegetable shipments out of the State do not at present amount to very much, but still something, about 5,000 carloads of 10 tons each. We still retain for the purposes of calculation the unit of 10 tons. Of course, a carload now is anything that you can get into it, from 10 tons up to 30 or 40 tons. The growth has been phenomenal. As a matter of fact, we are inviting people into this State from other states in the Union, not to grow wheat, not to grow corn, not to grow alfalfa alone, which is a profitable crop, but the truth is that we are inviting them here to occupy small pieces of land under irrigation for the purpose of growing fruit. Now, that must come from the fact that fruit-growing is profitable and must continue to be profitable, but I can say to you, my friends in this business, my fellow associates who have gone through many of the trials and struggles of fruit-growing, and have not gotten over them yet, that there is a great necessity to-day for the work that you started in to do when you organized this society—there is as great a necessity to-day, and I think even greater. We have conquered some of the pests, but not all of them. We have conquered, to some degree, the markets of the East, but we have not fully taken possession of those markets and have not fully established ourselves with the companies that carry our products across the continent.

Recently there has been brought to the attention of the State Board of Trade that this little insect called the thrips is threatening the destruction of our deciduous orchards. Some years ago, you will remember, the destruction of the citrus orchards was threatened by pests which appeared in the south. By the skill and energy thrown into the subject of fighting those pests, through the influence largely of the fruit-growers of the State, the pests of the south have been conquered and citrus fruit growing in the south is profitable and stands at the head of the fruit growing industries of the State. But this little insect has recently developed itself in this State, particularly in the Santa Clara Valley and Contra Costa County, spreading to some extent in the interior, causing the destruction of many of the deciduous fruits—the peach escapes better than others, but largely the pears and the prunes. You must not allow yourselves for one moment to cease your efforts towards protecting this industry against the enemies which we all must fight in order to secure the final success of the industry itself. I do not know what report our Horticultural Commissioner may be able to make to you upon that subject. I hope it may be to some degree hopeful, but, at any rate, it is an exceedingly important matter.

To my mind the development of this State must depend, as it has in the past, in the future upon this industry which you are here, gentlemen, to represent, and I hope you will put the same intelligence and energy and enterprise in your deliberations here to-day that you give to the work which you may do at home in your orchards. (Applause.)

OPENING ADDRESS.

By J. W. JEFFREY, State Commissioner of Horticulture.

Twenty-seven years ago, on the 6th day of December, the first State Fruit-Growers' Convention was called to order in the Assembly Chamber in this city, with C. H. Dwinelle as President. The convention was attended by a few but very enthusiastic fruit-growers, yet they here organized an enterprise that has since held thirty-four meetings, and is now recognized as one of the most beneficial institutions which engage the attention of the fruit-growers of California. Nearly a generation has passed since the first general conference of horticulturists met at Sacramento, and few of its members are now living to wonder at the marvelous progress the fruit interests have made since they first assembled to discuss the issues to be met at that early day. Brave men and women they were—for we see the honored name of Mrs. John Bidwell upon one of the committees—courageous delegates who attacked the scale pests with vigor, and roasted the supervisors who refused to appoint horticultural commissions, the growers who failed to maintain clean orchards, and the nurserymen who sent out infected plants. They were also liberal, as well as progressive, for they assessed themselves $1.50 each to pay the expense of the convention. One of the members could now draw upon his bank account for a million times this amount, and yet there are people to-day who believe that the fruit business does not pay. When we consider how few of the scores of similar organizations formed in this State have held their membership long enough to get acquainted, is it not good evidence that our convention has some useful purposes that the fruit-growers have recognized and supported all these years? And should it not encourage them to continue to support an institution that has survived all its contemporaries and shall be made yet more useful and lasting?

With all honor to the pioneers who initiated this work, with all respect to those who have continued this work down to the present meeting, and with great misgivings as to my own part in it to-day, I believe it is profitable to inquire at this time if we or the earlier membership have given to these conventions the full scope and importance the opportunities have offered. The programs of the past have been representative of the live issues concerning horticulture; the attendance of progressive fruit-growers has always been fair, and the conventions have spoken with candor and courage upon the affairs that concern the business of their members. There is no lack of interest in reading the reports of these meetings, or doubt as to the helpfulness of the reports. The first edition of the Riverside convention report, issued last June, was exhausted soon after it left the press. So valuable was this publication considered that when the first edition was distributed, two or three of the fruit-growers' associations offered to pay for a few hundred copies, and one of them made arrangements to have the printing done at a Los Angeles printing office at its own expense. My printing fund was all gone, with a demand for a thousand copies of this report unsatisfied. The State Board of Examiners was appealed to and from some emergency fund produced the money to pay for the last edition, and thus the fruit-growers were saved from the necessity of going down into their own pockets to pay for printing after having paid their taxes for all the purposes of State. It can not then be from lack of value in our work, or the lessening of public interest in our published proceedings, that we should inquire at this meeting, "What provinces of the whole scheme of horticultural pursuits have we overlooked or neglected at these conventions?"

I need only refer to the two conventions of which I have had the direction to demonstrate that at least these two have not made paramount what may be the chief function of these meetings, namely, the expression of the fruit-grower's convictions upon the deeper and more obscure problems that continually affect the welfare of his occupation. Of these problems are the civical and industrial policies of State; the relation of farm property to the support of government; the fundamental principles governing the sale of farm produce and the adjustment of produce merchandising to the commercial practice of the times; the executive management of the orchard as distinguished from the art of fruit-growing; the mutuality and dependence of farmers toward each other; the farm labor question and other features of rural life that touch upon profits, influence values, and affect the comfort and stability of the tenure of land. At the Marysville convention four fifths of the addresses were devoted to scientific lectures, cultural methods, and the harvesting of crops; at the Riverside convention, certainly a model of its kind, only three papers pertained directly to the resources and opportunities that have been almost ignored by many farming communities of the State. As my Irish ancestry would say, if these conventions are to rise to the measure of expectancy and opportunity, they must go down deeply into the economics that bear so largely toward success, and then these conventions should give intelligent and forceful expression of their conclusions from what is discovered. This might illuminate the horticultural literature of the State where it is in most need of light, for what does it profit a fruit-grower, for example, to grow more and better fruit and not know what to do with the harvest; or, why should he allow the commission men and speculators to absorb all the profits on the other side of the continent and then wonder why he has not enough money to retain American labor upon his farm? The program of this convention is planned to give greater opportunity and influence to the delegates in the discussion of whatever may be to them the live topics of the day, possibly some of which I may have suggested. Instead of forty addresses and papers, the present program contains about twenty. The delegation has been assigned the time absolutely of twelve papers, as they will see by reference to the schedule. The success of this policy will depend upon the way you take up the work here provided for and conduct it yourselves.

I do not mean to minimize the value of thoroughly digested addresses, elucidating the scientific and practical features of fruit-growing. Far from this is my attitude, for from these papers the orchardist may learn principles and truths, and grasp suggestions pertaining to the cultural features of his business, and acquire from these the ability, in connection with his own experience, to master his individual problems. But suppose we fail to thresh out a single idea in practical fruit culture here, is not the National Department of Agriculture busy in our State? Is not the State College of Agriculture investigating, educating and demonstrating continually along these lines? But who are looking after the great economic problems that pertain so closely to the farmers' means of living? I have already confessed that our late conventions have not discussed extensively these problems. However, as these meetings are our own, we may be able to correct this fault in the future, if you believe, as I do, that it is a fault.

If our meetings do not give attention to the economic problems that pertain so closely to the fruit-growers' means of livelihood, where are we to turn for information? Not to the National Department of Agriculture, for that institution does not give instruction upon running the finances of the farm; not to the State Department of Agriculture at Berkeley, for that institution is devoted to teaching and demonstrating the industrial arts of farming, the protection of crops and the sciences fundamental to agriculture. It is true we have the University Department of Economics, but every instructor in that section is a professor of commerce, and must necessarily devote his time to commerce under the general acceptance of that term. But why do not our commercial schools devote some time to the principles and practices that govern the negotiation of farm produce, and not so much to the principles of banking, brokerage and shopkeeping? The elements of barter and trade are fundamental to all traffic, to be sure, but why illustrate them altogether in the countinghouse and the store, when the proper distribution of, and the returns from the products of the farm are the foundation upon which our financial security rests? Why is the farmer not to the front with his business along with the lesser industries of the country? is a question comprehensive enough to cover all our discussions. But who can answer this question? The farmer is not up-to-date in all the departments of his pursuit. He has not generally considered it within his sphere to create, control, or even influence his selling agencies. The manufacturer has not neglected this most essential matter. The manufacturer in choosing his own salesmen and accountants has created a demand for efficiency of service that is felt in every school, and thus commerce to the young man has little connection with the sale of fruit and grain from the ranch. The farmer has not created the demand for superior service in merchandising his crop, and consequently the make-believe money and business transactions of our commercial schools speak only in the language of the factory and countinghouse. Likewise, the economics of business life, and this condition will prevail until finally a chair of farm economics will be established in each of our universities and colleges, and the study of business economics will not be confined to other industries.

Why should not the agricultural and horticultural interests of the State be served with whatever is necessary for their advancement? When these industries became self-sustaining the real and permanent prosperity of California began. Discovery, exploitation, hunting, speculation, lumbering and mining, all had an influence in the development of the commonwealth. Most of these agencies of civilization simply utilized the reserves placed here by Nature, exploiting in a transitory way the bounties found so abundantly. But agriculture is of the soil for all time, however much its conditions and requirements may change. The very permanence of farming calls for steady and concerted efforts to maintain the productiveness of the soil and to keep the farmers' business in step with all other legitimate enterprises. As a class, he can never hope to be rich, as that term is interpreted by the money-getters of to-day. But he may be comfortable, happy, and prosperous by taking advantage of the resources of the soil and the economic conditions at hand. Of all others of his class the fruit-grower of this State has grown farthest from the idea of merely trading the products of his land for the necessities of life. It is true that the larger portion of his wealth lies in the freedom and healthfulness of his pursuit, but he has also chosen to enjoy the modern conveniences and diversions of life, and hence the necessity of placing his business upon an industrial basis as firm and attractive as possible.

How long would the railroads of the country continue in business if they paid no attention to the economics of freight hauling? They follow out every detail of efficiency and thrift in their administration to the very letter. Their managers know everything about fruit-growing that affects railroading. What do the fruit-growers know about railroading that has a bearing upon freight rates on fruit? If dividends run low, the railroads do not curse their fate and do nothing. They will raise the tariff on your fruit if possible, and they are trying to do that now. But they apply other means of increasing their earnings, to which there can be no objection. For example, by improvement in roadbed construction, in car-building, in the improvement of appliances, and in all around advancement of all that relates to freight transportation they have vastly increased the tonnage that can be handled by one train crew. Twenty-four years ago the average number of tons carried by each freight train in the United States was 143; twenty years later the average was raised to 310 tons to each train. This is an increase of 117 per cent in the efficiency of a train crew, and has largely decreased the cost to the railroads of delivering freights, even allowing for the increase of the first cost of equipment and the raise of wages since 1885. What have the fruit-growers done to increase the efficiency and lessen the cost of selling their fruit through the commission merchants at the other end of the line? Is there not room for the study of economics in the business of fruit-growing?

I am taking you into freight transportation to show how an enterprise can protect itself at all points, and also to exhibit some of the complexities that should be understood by the fruit-growers. The last time I took an invoice of freight rates, which was four years ago, the average rate per ton per mile for all roads in the United States was 8.3 mills for the preceding sixteen years. With the exception of two years this average did not vary one mill during the sixteen years. The average rate per ton per mile for oranges was 10 mills per ton per mile, or only 1.7 mills below the average for all classes of freight throughout the country. The rate on oranges has lately been reduced nearly 9 per cent, notwithstanding the fact that oranges are put through on fast time, the weight of the fruit about 14 tons and of the car 17 tons, and the risk of the railroad company great. The transcontinental lines have another element to contend against that few of the eastern roads have to meet, namely, the lifting of its tonnage over great elevations. The elevations to be overcome by the Southern, Central and Union Pacific lines is 20,099 feet; the Salt Lake and Union Pacific, 19,383 feet; the Santa Fe, 19,448 feet; the Southern Pacific and Rock Island, 13,038 feet, or an average for all of them of nearly three and one half miles. These, of course, are the roads upon which the California fruit-grower must depend. All these figures are my own, and they show further that the railroads, if they return the refrigerator cars empty, were getting only 35 cents per hundred pounds for hauling the oranges, the balance of the $1.25 per hundred pounds being consumed in hauling the 17-ton refrigerator car twice across the continent, and lifting it perpendicularly 7 miles on these journeys. The same principles and difficulties apply to the transportation of deciduous fruits. Let us look into the inequalities of freight rates a moment. Four years ago, when I examined this subject, the railroads were carrying 15-ton carloads of sugar from this coast to Missouri River points for $150; their revenue for a 13-ton carload of oranges was $325. This seems an enormous discrimination in favor of the millionaire sugar producer. It may be a discrimination, but not to the extent it appears. Sugar can be shipped by water. The orange car carried two tons less freight and the car was 25 per cent heavier than the sugar car. The refrigerator car companies at that time charged the railroads for car mileage. The railroads carried the sugar at this rate on condition that no claims should be made for loss or damage on the way; on the oranges liability for damage was assumed by the carriers. Sugar can be loaded at the siding with less demurrage than fruit, and the sugar has a definite destination, is not entitled to diversion to different markets, does not have to be run into a round house en route to prevent freezing, and does not run on schedule time. We might examine a dozen circumstances of fruit transportation to show that a deep study of its economics is necessary by the fruit-grower that he may know railroading as it affects his business, and his business as it affects railroading.

It is just as important that the railroad man understand what the fruit-grower is doing for transportation. The fourteen years preceding 1904, the production of deciduous fruits increased 47 per cent; dried fruits, 376 per cent; raisins, 137 per cent; nuts, 622 per cent, and oranges, 677 per cent. Can the fruit-growers afford to remain in the business if exorbitant freight rates are maintained? Should there be no concessions to the immense increase of tonnage the above percentages represent? Some authorities claim that the cost of transportation varies with, or depends directly upon, the amount of traffic. In other words, light tonnage means high freight rates, and heavy tonnage low freight rates. This showing on increase of products should entitle the growers of California to the best and cheapest freight service possible. Are they getting it? The railroad men know, but the fruit-growers do not know, because they have been cultivating, improving, and multiplying their fruits without giving heed as a class to the business economics that affect, or, I should say, dominate entirely the price of orchard products. I know of no way of determining what is a safe and equitable basis of rates than a thorough understanding of all the elements of transportation, by both the producer and the carrier, in handling the enormous tonnage of fruit which your enterprise has developed. What are our students, lecturers, writers, or schools doing to carry this paramount question to the understanding of the farmer? What is he doing for himself in this line?

But while you are waiting for the solution of your economic problems, your orchards must not be idle. The fruits must not be destroyed by insect enemies and diseases. The horticultural laws must be enforced, for the slower your fruit is in selling the more will these enemies despoil it. In my Riverside address last April, I explained the needs of the State Commissioner's office in quarantining the State, executing the laws, and administering the other affairs of the office and the new Insectary. I showed that if the Legislature would give my office one cent for every five bearing fruit trees in the State it would give you $80,000 a year with which to protect the orchards and advance the interests of the fruit-grower. If the coming Legislature will appropriate one cent for every twenty-five bearing trees it will give us $16,000 a year for the support of the work we are doing in guarding your coast, enforcing the laws, advising you from demonstration trains, and promoting your interests in every possible way. Instead of this, the past annual appropriations have amounted to one cent for every fifty bearing trees. One member of this Convention told the Country Life Commission last Saturday that he was assessed $50 for every fifty bearing trees he had. In this case the State took 5,000 cents in taxes on his trees and gave him back for the support of his chief horticultural office all but 4,999 cents of this tax. If the State exacts a special tax from you for the privilege of growing fruit, you should see that the trees are properly protected.

But this paper is proceeding rapidly toward the time limit, and there are very many matters that will have to be omitted concerning the welfare of the great industry you are here to represent. Plenty of time has been allowed on the program for forwarding any subject the Convention itself may wish to introduce. I will not enumerate the issues that might be profitable to discuss, and, indeed, I do not consider any or all of them as important as that which has been the theme of this address, namely, of getting down to the fundamental principles of handling the fruit markets. This involves a study of transportation, of the distribution of fruits, and of carrying the risk of getting your fruit to the consumer, for this risk falls upon the grower whether he sell for spot cash, through commission men, or through his own agencies in the East. I have tried to show you the folly of going forward in producing more and better fruits, and yet not providing for their disposal. I have intimated that if the fruit-growers would gather in their share of the market profits they would have enough money to pay for American labor in their orchards and vineyards. I have intimated that if we do not delve into the economical problems affecting our California fruit markets overproduction is already upon us. But with all this we should not be found on the pessimistic side, for we have faith in the men who cultivate and harvest so abundantly of their golden fruits that they will work out the problems of the sale of these fruits, as they are solving the problems of the production. But let the members of this and future conventions lead in discussing these economic difficulties and join with the fruit-growers of the State in their prompt solution, recognizing the burden of this address, that they will always be at the mercy of all circumstances adverse to rural progress till they learn to secure their portion of the profits of their horticultural labors. (Applause.)

MR. JOHN ISAAC was nominated for Secretary of the Convention, the nomination was seconded, and Mr. Isaac was elected to that position.

PROFESSOR WICKSON. Mr. Chairman, I am sorry that I can not be here to participate in the discussion upon the able address which you have made. It seems to me one of the most significant and pertinent addresses to which a convention of this sort has listened for a great many years, and I would like to say a word or two now, because I can not stay through the meeting, with reference to the point that was made against the present instruction in economics, or, at least, if not against that, in favor of something better; and I want to say that from my point of view that point is exceedingly well made, and I am very glad that fruit-growers are reminded that economics, from an agricultural point of view, ought to be more circumstantially dealt with in our institutions. I have no doubt Mr. Jeffrey has looked into it, but I have the general impression that economics in our institutions are, as he says, more with reference to general instructions, and they are not illustrative by reference to agricultural conditions, particularly with reference to the agricultural commercial situation in California. I hope this Convention will deal with that feature of the President's address seriously, and will declare itself very loudly, and will specifically demand that that view of the science of economics shall be given attention to in our universities. In one sense the university and the other institutions, especially those under State control, are like a store; if you don't see what you want, you can ask for it. Perhaps that duty really devolves upon the producers, who understand the situation, and that constitutes one of the chief reasons for the existence of an organization of this kind. Such an organization ought to keep our institutions up to the mark, and ought to suggest to them things which perhaps from their academic point of view they overlook. My suggestion is this, then, that the committee which, after a time, has under consideration the address of the President shall present to this Convention something very definite; and it would be perfectly proper for them to memorialize the Board of Regents of the University, asking that this matter be given attention to and that instruction may be provided, and to ask for it reasonably hard—of course, respectfully—but you want to approach these matters as though you meant to get them and you proposed to have them, and I think there is no question at all but what such instruction will be provided. It can be just as well as not. We have men, and if we have not, the university can get men who are willing to enter into the study of this matter. Mr. Jeffrey's address itself shows you how much can be learned from looking into the subject. It discloses a situation which is manifestly exceedingly important and timely, and, therefore, my advice would be that if you appreciate the point made by the Chairman, let the committee on the President's address go into the matter somewhat definitely and ask for what you want. (Applause.)

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION.

Mr. A. N. Judd moved, and the motion was duly seconded and carried, that the Chair appoint a committee of three on the President's address. The Chairman appointed as such committee Mr. A. N. Judd of Watsonville, Mr. George E. King of Fair Oaks, and Mr. S. A. Pease of San Bernardino.

Mr. A. R. Sprague and Mr. George H. Cutter were unanimously chosen as Vice-Presidents by the Convention.

In the absence of Prof. A. L. Quaintance, his paper was read by Mr. Foster of the Department of Agriculture, Washington.

THE PEAR THRIPS PROBLEM IN CALIFORNIA.

By A. L. QUAINTANCE.

In Charge of Deciduous Fruit Insect Investigations, Bureau of Entomology, Washington, D. C.

The present critical situation in deciduous fruit culture in the San Francisco Bay region in California, due to the presence of the pear thrips (*Euthrips pyri*), furnishes but another illustration of how an injurious species previously obscure and unknown to science may suddenly become abundant and destructive and literally threaten the existence of a well-founded industry, representing an investment of many millions of dollars.

The pear thrips came prominently into notice in the Santa Clara Valley in the spring of 1904. The blasted condition of the buds and flowers of various fruit trees attracted the attention of several orchardists, and specimens of the "new insect" were brought to the attention of the State Horticultural Commissioner. The importance of the insect as an enemy of deciduous fruits was promptly recognized by the Horticultural Commissioner of Santa Clara County, and Mr. Dudley Moulton at once began a careful investigation of its injuries and life history, and conducted certain experiments with remedial measures, the results of which were published in 1905 in a bulletin from the office of the State Horticultural Commission.

Upon his employment by the Bureau of Entomology in the spring of 1906, Mr. Moulton prepared an article on the pear thrips, giving the essential facts concerning the insect as determined in his earlier investigations, and also additional information subsequently obtained. This paper was issued in 1907 as Part 1 of Bulletin 68 of the Bureau of Entomology, and furnished a fairly complete account of the insect's biology.

The continued and increasing losses brought about by the ravages of the pear thrips led to the establishment by the Bureau of Entomology of a field station in deciduous fruit insect investigations, which was located at San Jose, in the Santa Clara Valley, and Mr. Moulton, under the writer's direction, was placed in immediate charge. An additional man, Mr. Chas. T. Paine, was also detailed for the work in California in the fall of 1907. Both of these men, natives of the State and trained entomologists, were regarded as exceptionally well equipped for the work, especially by reason of familiarity with local horticultural conditions. Practically all of the attention of Messrs. Moulton and Paine has been given to the pear thrips, and much additional information has been accumulated. During the spring of 1908 extensive practical experiments were carried out, and a vigorous campaign work is planned for the spring of 1909. The thrips situation was carefully investigated by the writer in 1907 and also in 1908, and Dr. Howard made a personal investigation of conditions in the thrips infested territory during September of the present year. The Bureau at Washington is therefore closely in touch with the work, and everything possible within the limits of its appropriation will be done to bring about as speedily as possible the practical control of the pest.

Distribution.—The pear thrips at present occurs quite generally in the Santa Clara Valley, and is present in orchards in Contra Costa County, in the neighborhood of Concord; in Solano County, in orchards in the vicinity of Suisun; in Yolo County, and also in Placer County, in the neighborhood of Newcastle. The insect is probably present throughout this general region of the State, and will unquestionably further spread, though perhaps not rapidly, unless introduced in localities in ways other than by its natural diffusion. It is also quite probable that the insect will eventually make its appearance in other states on the Pacific coast, and that it may make its way to Eastern orchards would be not at all surprising. The pear thrips, therefore, is an insect of more than local interest, and its satisfactory control is a matter of importance for the fruit-growing industry as a whole.

Character of Injury and Habits of Thrips.—No remedial work with an insect may be undertaken with a reasonable hope of success, except as based on a knowledge of its life history. The small size of this insect has made it an unusually difficult one to carefully study. Nevertheless, Mr. Moulton has been able to determine many facts concerning the behavior of the insect, covering its entire life cycle from year to year, and his painstaking work is much to be commended.

The adult thrips puts in its appearance on the trees late in February and early in March, at which time such fruits as almonds, apricots, and peaches are coming into bloom. From the middle to the last of March and early in April the insects are out in maximum numbers, when prunes, cherries, and pears are in full bloom. The thrips attack the swelling buds, working down between the bud scales, and by feeding upon the essential organs of the young flower or other parts soon destroy it. In the case of some fruits, like the almond and peach, these may suffer comparatively little injury if they are not attacked until the period of full bloom. The thrips feed upon the nectar in the calyx-cup, and the little fruit itself may thus escape. The insect is worse on pear, prune, and cherry, as it is most abundant during the period of swelling of buds and of blooming, and furthermore the fruit buds are developed in clusters. Buds of these fruits are, in extreme cases, so injured that they wither and die before opening, and even after the blossom has expanded the little fruit and other parts may be attacked and prospects for a crop quite destroyed. Leaf buds are also attacked in the same way, and the destruction of these may be so general that little foliage is put out, and it may be some months before a natural growth is developed. The small size of the thrips and its habit of working within the buds and flowers is calculated to prevent its detection by fruit-growers, and much thrips injury has doubtless been attributed to the effect of cold. On the other hand, the insect has been charged with injury properly due to unfavorable weather conditions.

The adult female thrips (no males are known) deposits her eggs in almost any tender part of the plant, as the fruit and leaf stems, the midrib and veins of the leaves, etc., by the aid of a saw-like ovipositor, with which a slit is cut into the tissues and the egg inserted within. The egg hatches in the course of about four days, and the young thrips wriggles its way out, and soon begins to feed on the tender tissues of the plant. These larvæ are at first very small, and when full grown are scarcely one twelfth of an inch in length. They prefer secluded places, as on the under surface of tender leaves, the growing tips and under the protection of the dried up calyx before it has been thrown off by the swelling fruit. In this latter situation they feed upon the young and tender fruit, and in the case of prunes and pears the injured places develop as the fruit grows into scabby spots, greatly disfiguring its appearance, and resulting in serious deformities, especially with pears. This injury by the larvæ to the fruit which may have escaped the adults is very important, and in badly infested orchards a large per cent of the remaining crop may be thus injured. The scabby spots on prunes do not shrink uniformly with the rest of the skin, and stand out very conspicuous, materially reducing the grade.

When full grown, which requires about three weeks, the thrips larvæ make their way to the ground and penetrate the soil to a depth from 3 to 10 or 12 inches, depending apparently upon whether this is soft or hard, the majority in tilled orchards going down some 6 to 10 inches. Below the soil each larva constructs for itself a little earthen cell of sufficient size to accommodate its body, and here the insect remains until the following spring, to appear as an adult during the flowering period of the trees, as already stated. In late fall and winter, however, the larva transforms to the pupa stage, and in this condition is much more helpless than as a larva. It is not known how long the pupal stage continues, but it is probably several weeks. There is thus but one generation of the thrips each year, and they spend much the greater part of their time safe below the surface of the soil.

The mouth parts of thrips present an interesting difference from those of insects of other orders, and a knowledge of these organs is of importance to fruit-growers. There is a snout-like projection, armed with several spines. Within the snout are stiff setæ or stylets, with which the epidermis of the plant surface is first penetrated, and then by aid of the bristles on the rim of the snout the opening is enlarged, the tissues lacerated, and the juices thus liberated sucked up for food. The thrips thus feeds, practically, on the interior portion of plants, and can not be destroyed with arsenical or similar poisons.

Food Plants.—Practically all deciduous fruits are attacked, as almond, apple, apricot, cherry, peach, pear, plum, and prune. The insect is also recorded from fig, grape, and walnut, and such indigenous plants as madrona, wild California lilac, and poison oak.

How May the Thrips Be Controlled?—Unfortunately this question can not be satisfactorily answered at the present time. From the résumé of the life history of the pest above given the extreme difficulty of controlling the adults with sprays is evident. At first thought it might appear useless to try such methods; nevertheless, considerable time has been given to testing various sprays as to their possible efficiency against the adults, and also against the larvæ. During the past spring Mr. Moulton has tested at different strengths the following:

Whale-oil Soap; Black Leaf Tobacco Extract; Tobacco Decoction from stems boiled in water; Kerosene Emulsion; Distillate Oil; Crude Carbolic Acid Emulsion; Creosote Oil; Lime Sulphur Wash; Arsenate of Lead and Molasses Spray; Arsenate of Lead and Glucose Spray; Arsenate of Lead, and Crude Oil Emulsion.

Of these several substances none proved to be especially effective except the proprietary tobacco extract and the distillate emulsion. Mr. Moulton concluded that by timely and thorough use of either of these sprays, directed especially against the larvæ on the under surface of the leaves, these can be destroyed in such numbers as to result in the protection of the crop for the succeeding year. The possibility of doing this will be fully tested during the spring of 1909, and the work will be done under the most favorable conditions for success. To be effective, however, spraying operations must be done on a large scale to prevent possible overflow of the insects from untreated orchards. It is planned to carry out spraying operations in Santa Clara County, Contra Costa County, and, if possible, in Solano County. Spraying for the thrips, should this prove effective, will offer, however, several practical difficulties. Two or three applications of sprays perhaps will be necessary, and in so short a space of time as to tax the resources of the orchardist to accomplish the work.

The destruction of thrips during their long stay in the soil, if it may be accomplished, would be much the more practicable solution of the problem. Mr. Moulton and Mr. Paine during the past summer have been carefully investigating various points connected with subterranean life of the insect, as their distribution in the soil, the effect of cultivation as possibly disturbing them in their cells, and also the possibility of destroying them by protracted submergence in water, as might be practiced in irrigation. This work thus far has been necessarily confined to the insect in the larval stage, but will be begun against the pupæ as soon as these appear in the early winter. While the results thus far are not especially hopeful as against the larvæ, it is not improbable that a method will be found effective against the more helpless pupæ. In addition to cultural methods, irrigation, etc., the possible effectiveness of various fertilizers, chemicals, and fumigants will be tried, and it is hoped that some practical expedient will be developed from the coming season's work.

An additional man has already been detailed to the thrips work in California, and another will be dispatched early in December. The four men thus assigned will be able to carry out experiments and demonstrations on a larger scale than has been possible heretofore.

The sudden appearance in California of the thrips in such destructive numbers suggests that it has been introduced from abroad, and the opinion has been expressed that the species is a native of southeastern Europe. The genus *Euthrips*, to which the pest belongs, is represented in the United States by several species, and also in Europe, so that nothing may be inferred as to its nativity from the distribution of its nearest relatives. A search of European literature does not reveal a thrips of similar character and habits with *Euthrips pyri*. There is the possibility that it is a native of California, as its present occurrence in such destructive numbers finds parallel among numerous other native American insects. The *Thripidae*, as a group, on account of their small size and mode of existence are relatively free from the attack of parasitic and predaceous insect enemies. The principal enemy of thrips in the United States, aside from unfavorable weather conditions, is the insidious flower bug (*Triphleps insidosus*), which searches the flowers and buds and foliage of various plants, impaling the thrips on its beak and sucking out the body juices. The alimentary canal of thrips is often infested with nematode worms, but it is not certain that these are especially injurious. A fungus has been found by Mr. Moulton which, according to his observations, is parasitic upon the thrips, destroying them in considerable numbers. On the whole, it is not considered probable that any natural enemy of the thrips may be discovered or will appear in orchards which will be of much use in bringing about its subjugation. It is likely also that the thrips will not disappear of its own accord, and that its control must be affected by definite preventive measures, as in the case of other well-established pests, such as the codling moth, scale insects, etc. (Applause.)

PRESIDENT JEFFREY. The subject of thrips is a very important one. It is an insidious insect or little creature that is coming into your orchards to give you untold trouble, to give you immense losses. The orange-growers of one of the largest new sections of the south are on the verge of a panic with regard to this little family of insects. That is the reason that this paper was presented to-day. Of what use is it for a pear-grower up at Marysville to spend a fortune in weeding out the blight if this little insect gets into his orchard, as it has at San Jose, and destroys his pear crop every year? Hence it is necessary to give our close attention and our best effort in discussing this matter. Don't imagine it is a light question. I tell you it is a very, very serious question, and will, unless soon mastered, be of paramount consideration in California. Mr. Briggs was to lead in the discussion on this subject, but he is not here. Mr. Moulton is here, and he should have followed Mr. Briggs. Mr. Moulton is of the Department of Agriculture, Bureau of Entomology, a California man, and I think he can tell you something that may be of interest to you on the matter.

MR. MOULTON. Ladies and Gentlemen: We have already investigated the orange thrips in the south, and have found that it is doing really more damage than people appreciate. I was in a packing house at Lindsay last Friday, where they were sorting out the oranges, and about 30 per cent were being classed from fancy to choice on account of the scabbing on the fruit, and about 5 per cent were going out as culls. The reduction in grade from fancy to choice means about 40 cents a box. About a third of the crop was being passed back to choice, which is a great loss itself in the value of fruit. The nursery stock is very badly affected also by the thrips feeding on the foliage and especially on the very tender branches. In the Roeding & Wood nursery I found in the neighborhood of 250,000 trees just ready for the market. The trees are sold at from $1 to $1.25 or $1.50 apiece, and the loss there is going to be tremendous in cash just by the injury on the foliage and injury on the buds. The same injury is found on mature trees, but it is not so noticeable. We hope to try some experiments on the orange thrips, beginning early in the spring, but we have not decided yet just what the line of work will be.

Question: Is the orange thrips a different variety from the other? Answer: Yes.

Question: Different habits? Answer: We don't know much about their habits. They apparently have two broods, and the first brood injures the fruit just during the period of blossoming, and causes a circular scabbing at the stem end. The second brood seems to eat very largely on the foliage and scabs the fruit at the outer end. It is not a very deep scab.

Question: What was done about that nursery stock that was found infected? Answer: It is still in the nursery, and will be sold as first-class stock, and it really is first-class stock. You can't hold out anything against the trees on account of the injury.

PRESIDENT JEFFREY. It is liable to be a pest in every section of the State. In San Bernardino County, Mr. Pease had the matter up and threshed it out for years. It is not confined to any one locality.

Question: I would like to ask the name of this particular thrips you find in Fresno County. Answer: It is a new species. I have described it and called it *Euthrips citri.*

Question: Have you any idea where this thrips exists during the period it is not found on the orange trees? Answer: It is probably in the ground. There is going to be the trouble. Wherever the thrips have been present we will probably find that the larvæ are in the ground, and since orange trees are always balled when they are transported from the nursery to the field, you will probably take thrips in every ball of earth that goes out from the nursery, and every nursery that I visited in the southern San Joaquin Valley has thrips in it.

Question: In San Bernardino County the thrips are not visible on the orange trees, but we find a species of the thrips in the blossom of the wild sunflower. Do you know whether that is the same? Answer: The thrips you have in the south is *Euthrips tritici*, but that is not the thrips that is doing damage in the San Joaquin Valley.

Question: Is it the thrips that does the damage in the prunes? Answer: No; that is the *Euthrips pyri.*

A MEMBER. The effect on the fruit is identically the same as that described, making the circular marking around the stem and blossom end of the fruit, and also on the green fruit we find the markings very distinct on what we call the off-bloom. This variety of thrips we have had as long as I have had anything to do with the orange business, but it has never developed into a pest until the last seven years; that is, it has never shown a disposition to attack the fruit, and whether it has ever decreased the yield of oranges by destroying the fruit during the blooming period of course we are not able to tell. It seems to me that this same variety, as far as we can find now, has been in southern California, and it is very much in evidence during the blooming period. It has been there for fifteen or twenty years.

MR. MOULTON. Mr. Phil Baer, of Visalia, who is probably one of the best nurserymen in the section, says he has seen this curling of leaves and marking of oranges for fifteen or eighteen years, so it is probably a thrips that has been in the orchards ever since the orchards were planted, but with the increasing acreage of oranges and lemon the thrips have developed.

A MEMBER. There is a thrips on prunes in the San Joaquin Valley also.

MR. MOULTON. I don't know what that is.

MR. CUNDIFF. I would like to ask if in your investigations in the orange section you found any difference in the severity of its attacks in different localities; that is, in the valleys or the lowlands? We find quite a decided difference in our section on the upper lands, our hill lands, very much worse than it is in the low land or valley lands.

MR. MOULTON. That is true in this San Joaquin Valley orange section, and we can find the difference within a very few yards, almost, according to the kind of soil the trees are growing in. The clay soils and the adobe soils are heavy and have the thrips on trees very much worse than in the loam or the sand, and I can explain it, or try to explain it, only in this way. We know that the pear thrips and most other thrips spend a part of their life in the ground. They drop from the tree and work down four or five or ten or twelve inches and make a little cell and stay there for several months, almost a year. In the case of the clay soil it is very easy for them to get into a small crack or opening and make their cell and thus protect themselves, but in the loam lands it seems that they can not make their cell, and I should think that as they go down into the soil the soil would rather follow after them, as you know how sand will run. I think most of the larvæ, when they drop to the ground, must die before they mature, and the damage is so much more noticeable in the clay soils than it is in the loam and lighter soils that I can explain it only in that way, but every one has noticed the difference. I think the coming orange nurseries in the southern San Joaquin Valley will be planted on low land rather than up on the high land, where they are at present.

PRESIDENT JEFFREY. Will you give the Convention some idea of the thrips as it relates to the deciduous business?

MR. MOULTON. The pear thrips that we are working the most with is distributed all over the central bay counties or around the bay, and attacks almost every variety of deciduous fruit. During the last three or four years we have been working on it it has spread, and next year it seems it will be worse than ever, from the number of thrips we have been taking from the ground. We have found under some prune trees in Santa Clara County where they run as high as 2,000 or 3,000 to the square foot under the trees. In a number of orchards we find only 100 or 200, not very many, but enough, of course, to kill all the buds. At 2,000 or 3,000 to the foot, where the trees are large, it would mean a million and a half or two million thrips to the tree, which, of course, would kill every bud before it could open at all.

Question: What state are they in at this time of the year? Answer: They are changing from the larvæ to the adult. They are mostly in a pupa stage.

Question: How do they reach the trees? Answer: They have wings when they leave the ground.

MR. SPRAGUE. At what time do they leave the pupa stage?

MR. MOULTON. There are a great many now that have developed the wings and are simply awaiting the proper time to come out of the ground.

MR. GREEN. Where the thrips stays in the ground in the winter season have you ever tried the experiment of flooding?

MR. MOULTON. We have tried that only in an experimental way. We gathered a great many squares of dirt and soil from under prune trees where we found a great many thrips, brought them into our laboratory grounds and submerged them. For instance, we took an ordinary kerosene can and brought the block of dirt in that and removed the bottom of the can so that the drainage could be normal, and kept the ground flooded for from three to six, nine, twelve, fifteen and eighteen hours, and with eighteen hours we found no thrips that were dead; that is, probably all were living. That was without disturbing the ground. I think, though, the result will be different after we have plowed or otherwise broken up the soil.

MR. CUTTER. Could gas penetrate the soil?

MR. MOULTON. I don't think the hydrocyanic acid gas would.

PRESIDENT JEFFREY. I understand it is to be a campaign perhaps of years, and there will be thousands and perhaps tens of thousands spent by the Government and perhaps the university in making this test, and I would like for Mr. Moulton to tell you how the farmers themselves can help in this investigation.

MR. MOULTON. I hardly know how to answer that, because we have found in our experiments that in cultivating or plowing we have to cover so much ground in each experiment, 20 or 40 or 100 acres if we can, in order to know that when the thrips do come out in the spring they are not coming in from outside orchards. Generally the work requires too much for an individual to carry it through, even where we are helping him, unless we pay a large part of the expense for spraying materials or labor, toward cultivating and plowing. At present we are working in five or six orchards in the Santa Clara Valley, covering in each case from

20 to 40 or 80 acres, but we have selected large orchards and places where the owners are well able to carry on the work under our directions, so there is almost no expense on our part; the growers are bearing most of the expense. That has been necessary up to now because of the lack of funds we have been struggling against. Our appropriation has been modest, and not at all adequate for the work.

Question: Would you recommend winter plowing? Answer: Yes. We are recommending winter plowing, especially during the last of December or during December; deep plowing and thorough cultivation after the plowing, in order to break the land all up and let the January rains and February rains run them together. We know the thrips can not bore their way out. They have not proper claws; they can not dig and they can not eat or bite their way out, because of their peculiar mouth parts, and our idea is to thoroughly wet the ground and let the rains run it together, hoping that they will be, in a way, sealed in. I think that will do quite a great deal of good. We hope in our experiments to plow the ground and later spray for adults when they come out to enter the buds, and spray again for larvæ before they go into the ground. We know we can get quite a large per cent of the larvæ before they get into the ground.

MR. PEASE. What would be the danger in shipping deciduous nursery stock from an infested locality? What would be the danger of transporting the insect?

MR. MOULTON. I don't know that the young nurseries are injured by the thrips.

MR. PEASE. Would the larvæ be apt to be carried if they are in the ground?

MR. MOULTON. You do not usually ship dirt with your deciduous stock; there is a little, but not much.

MR. PEASE. You think there would be no danger?

MR. MOULTON. I don't think so.

MR. PEASE. The orange stock that you have in Fresno—if you have a remedy by which you can control them, why can't the nurserymen destroy the whole of them?

MR. MOULTON. They probably could, but the matter has never been investigated.

Question: What time in the spring does the pear thrips start to work? Answer: It comes out of the ground about the last week of February and during the first week in March.

Question: If the trees were flooded during that time that would be sufficient to keep the thrips down, wouldn't it? Answer: No; I don't think so.

Question: Wouldn't it be advisable to require the roots of all nursery stock to be washed before they leave the nursery? Answer: What would you do—puddle the roots again after you have washed them?

Question: Wash them in clean water. All the dirt could be washed off. The roots could be dipped in some solution? Answer: If you washed the trees there would be no larvæ left on the trees, but if you puddled the trees again in water and mud, if there were any larvæ there they would be carried. I know some nurserymen usually puddle their trees after they have been washed.

MR. SPRAGUE. Are not these thrips found in almost every locality where deciduous trees are being raised?

MR. MOULTON. Yes, sir; all through the central part of the State.

MR. SPRAGUE. So the few thrips that would go with the trees would not be of any particular moment?

MR. MOULTON. No.

MR. PEASE. I would like to know if it is possible that the thrips might carry over the winter.

MR. MOULTON. The egg stage lasts only about four days.

PRESIDENT JEFFREY. I will now call upon Mr. E. M. Ehrhorn. the general deputy in charge of the quarantine work, for a paper upon insect pests.

NEW PESTS WE SHOULD GUARD AGAINST.

By E. M. EHRHORN.

Very few of you who have toiled in the orchards and vineyards of our State can appreciate the good fortune which California enjoys in not having more injurious insects and tree diseases. It is true that we have had a number of very bad pests, which for a time threatened some portion of our great fruit industry. We Californians have been rather fortunate though to have been able, through the progressiveness of our leaders in horticulture and viticulture, and through the untiring efforts of the State and County Boards of Horticulture, to reduce these threatening foes of our industry to a minimum. We are also to be congratulated that by the strictest quarantine against insect pests and tree diseases, we have been able to keep out many of those insects with which other countries and even our eastern neighbors have been battling for many years. It is true that we yet have some pests to contend with, which like all pests the world over, have their periods of increase and decrease, and such conditions are, to say the least, very exasperating and costly. I will venture to say, though, that with the closest attention on the part of the grower and the utmost care and the most thorough investigation by the officers of the State and County Horticultural Commissions, we should ere long be able to keep these remaining pests greatly reduced and possibly render them harmless.

It has been my good fortune to visit some of the Eastern States, and I had a good opportunity to observe and study some of the injurious pests of our eastern neighbors. I am convinced from what I have seen that we should more than ever do all in our power to strengthen our quarantine laws, and we should devise some plan, or rather pass some new laws, to compel counties that have not availed themselves of horticultural protection to immediately establish horticultural commissions, for it is through this opening, this unprotected area, that we may receive some of the most destructive pests from which we have so far been spared.

Acting as your Horticultural Quarantine Officer at the port of San Francisco, I am probably best qualified to know the many pests which are constantly being discovered on the ever-coming shipments of plants and fruits which find their way from other countries into our markets. Here again we should do all in our power to further strengthen our horticultural quarantine laws, so as to be able to give the very best protection to our growing industry. The regulations should be broadened in such a way that all cereals and foodstuffs and other insect-infested materials, such as timber and the like, be included in the protection against new pests. Other countries have copied our laws and methods, and I assure you that they have passed more stringent laws than we have, and some countries have even closed their door against the importation of fruits and plants which come from countries where it is well known that certain dangerous pests exist to the detriment of its industries.

In our work with orchard pests we have had a great deal of experience with scale insects, and without doubt have had sufficient species to deal with, yet there are several species in other countries and in the Eastern States which, if introduced here, would cause considerable annoyance and expense. The following species may be mentioned:

The terrapin scale or peach lecanium (*Eulecanium nigrofasciatum*). This species might be called a medium-sized scale, resembling somewhat the olive scale in form. It has been known under various names in the Eastern States, and attacks the peach, plum, apple, sugar maple, hawthorn, and many other plants, showing it to be a general feeder, and it has been reported from about fourteen states and from Canada. Great care should be taken in the inspection of nursery stock, for the young scale insects could be easily overlooked.

The scurvy bark louse (*Chionaspis furfurus*) has not gained a foothold in our State, although it exists all over the Eastern States. It attacks apple, pear, cherry, quince, peach, walnut, and many roadside trees; in other words, it is a very general feeder and causes much damage.

The peach scale (*Aulacaspis pentagona*) has unfortunately become quite a pest in many of the Southern States, and as far north as Pennsylvania, infesting plum, cherry, and peach, and also at times attacking other plants. For many years this pest has been found by the Horticultural Quarantine Officer on plants arriving from the Orient, and the strictest quarantine has been maintained against it. Up to the present time it has not gained entrance into the State, but don't let us get it in on deciduous stock from the Eastern States.

The maple scale (*Phenacoccus acericola*), on account of its clustering habit during the egg period, is often mistaken for the cottony maple scale (*Pulvinaria innumerabilis*). It is much more prolific, and belongs to the mealy bug family, which are too well known to us to need much discussion. These insects are among the hardest to fight, for the eggs are enveloped in a dense cottony secretion, which is a great protection to them; in fact, it prevents any wash or even a fumigation from reaching them. It has been our experience with nearly all the mealy bugs that a pest like this one on our avenue trees would soon make them fit for the woodpile. In our mild climate there is a possibility that this species would change its habits and take to other foodplants and become a serious pest of our park trees. There are other scale insects, some of which might prove serious if ever introduced, but space will not permit their discussion.

Other insects which are to be feared are these:

Pear-tree psylla (*Psylla pyricola*). This insect, originally from Europe, resembles and is closely related to the plantlice, but can be distinguished from them by its ability to hop. It is of a reddish color, with some black markings; the wings are clear and rest roof-like over the body. The psylla at times becomes quite abundant and does considerable damage to the pear tree, which it only attacks. These attacks are a very serious menace to the tree and crop. The drain of sap and the enormous secretion of honeydew by the insect soon weaken the trees, and the foliage drops and the half-grown fruit as well. The pear-tree psylla can be readily introduced on nursery stock, because the insect hibernates as adult in any crevice or under any rough portion of the plant. Close inspection is therefore most important for the discovery of this pest on nursery stock. There are several species of psyllids in the Orient and adjacent countries, and the closest watch is kept on all plants to prevent their introduction.

Among the butterflies and moths there are many very injurious species, some so minute that their larvæ could be readily overlooked.

The cigar-case bearer (*Coleophora fletcherella*) is a widely distributed pest throughout the State of New York and is also found in Canada. It is a very small insect, the adult resembling our clothes moths in size, and is therefore hard to detect. It hibernates in winter in the larval state, and is enclosed in a small cocoon resembling a miniature cigar, hence the name. In this stage the insect rests on the twigs of the tree during the winter, and could easily be shipped into our State on nursery stock.

The bud moth (*Tmetocera oceliana*) is another small species about the size of the codling moth, and found in several states of the East. It works in the opening leaves and flower buds, and does untold injury to the blossoms and forming fruits. It has also been known to destroy young budded trees and growing nursery stock. Besides the apple, it also feeds on the pear, plum, cherry, quince, and peach, also attacking the blackberry. This pest hibernates as a half-grown larva among the buds and rough places on the trees it attacks, and is a very hard pest to detect. We have a leaf roller in some of the fruit-growing sections of our State which is giving us some trouble. If the Eastern pest should become established here, I can see a lot of expense ahead for the grower.

Two pests resembling the codling moth in their work, but doing more damage, are the Japanese apple fruit-borer (*Laverna herellera*) and pear fruit-borer (*Nephoteryx rubrizonella*). The first species was found in a 6,000-box shipment of apples arriving from Orcas Island, showing that one of the pests at least is established on this continent. Both these pests are a serious menace in Japan, and the closest inspection only will prevent their introduction.

Paramount of all injurious species is the gypsy moth (*Portheria dispar*) and its running mate, the browntail moth (*Euproctis chrysorrhoea*). There has been so much said and written about these two pests and so much money spent in the fight against them—I think it now amounts to two millions of dollars—that one would think that nearly everybody would know about them, but very few do. Although I had read and indirectly studied much about these pests, I must confess that I was greatly surprised to find them as destructive as I did on my visit to Massachusetts. I can not warn the people of this State too strongly against these foes of the forest, for as sure as either ever reach us, especially if it should get started in our beautiful forests, no power on earth would be able to eradicate it, and all we could hope for would be a check at intervals by parasites, just as is the case in its native country, the climate of which is entirely different from ours. Possibly their native land would have the advantage over us, owing to more severe winters. These insects are known all over Europe, and at times are said to do untold damage to the forests. The defoliating of pine trees means sure death to the trees, and with our vast areas of timber, which is one of our greatest products, would mean a loss running into many millions of dollars. Either of these pests can be readily transported on nursery stock or in the packing used with the shipment, which very often contains dried leaves on which egg masses are liable to be found. These egg masses are also found in the most remarkable places, and if plants are sent from infested areas it would be the simplest matter in the world to overlook such egg masses, which, by the way, contain from 400 to 500 eggs each. Any packing box, barrel, old sack, which happens to stand or lie in any dooryard in the infested area would be apt to hold one or more such egg masses.

The introduction of the browntail moth would not be quite as easy, because the small larvæ pass the winter in what is called the winter web; this is formed by spinning together a number of leaves and forming webs in these in which as many as 200 caterpillars congregate. They are about one fourth grown by the time cold weather sets in, and they remain all winter in these leaf-covered webs. Such webs could be overlooked on nursery stock, as they have the appearance of dried leaves. If ever introduced into our State this pest would equal in its spread that of the gypsy moth, for its flight is more perfect, that of the gypsy moth being retarded by the almost inability of the female moth to fly. The egg masses of the browntail moth contain about 300 eggs each; both species are therefore very prolific and are also general feeders, and do much damage to fruit trees. There exists a species of gypsy moth in Japan which resembles the European one so much they can hardly be distinguished. This species in the larval stage was taken twice by the quarantine office on imported nursery stock.

Two boring insects, both belonging to the clearwinged moth tribe, should be guarded against, lest one or the other should be imported. These are the squash-vine borer (*Melittia satyriniformis*) and the peach-root borer (*Sanninoidea exitiosa*). The first is something which would be entirely new to our State, for the few insects which attack our squashes and pumpkins are well known to us, and we might say that we are prepared in a way to overcome their attack, except perhaps in exceptional seasons, when we must accept the inevitable and take our loss. The record shows that the squash borer attacks the various squashes and also the cucumber, and has been known to attack muskmelons, and is recorded as a serious pest. Its life history gives us some hope, at least, that its transportation would be rather difficult; the moths pass the winter as pupæ in the ground, and unless these should be brought in soil attached to plants it would be difficult to bring the pest into California.

The second insect, the peach-root borer, sounds more familiar to us, and although we have its near cousin in a few sections of our State, yet we should not permit any infested trees containing the larvæ of the Eastern species into our State. I know that infested stock is shipped here, for we have destroyed such and have reared the adult moth from some of the condemned stock in our laboratory. This species has been reported from Oregon, but from correspondence with Professor Cordley, I have his statement that he has never reared the Eastern species in his State, nor has this species ever been reared from material collected in California, despite the fact that rumor had it that it did exist in our State. J. H. Hale. America's most noted peach-grower, is quoted as saying: "The peach borer has killed more trees than all other causes combined." Slingerland, of Cornell, says in his bulletin on the peach-tree borer: "We suppose that but comparatively few of the peach trees which have been planted east of the Mississippi River during the last quarter of a century have lived to produce a crop of fruit without suffering more or less from this dreaded borer." And he also says: "The peach-tree borer has ranked as one of the standard and serious insect pests of the United States for nearly a century." With such statements as quoted above I don't think it will take much more to convince the planter to purchase his peach trees at home, where we do know that we have no risk of getting this dreaded pest, and it should give the County Boards of Horticulture some idea about the great chances they take with nursery stock coming from states where this pest is known to exist.

The fall webworm (*Hyphantria cunea*) is another insect which should be guarded against. It produces webs or tents resembling those of the tent caterpillars we have here, only making them in the autumn. The insect passes the winter in the chrysalis contained in a delicate cocoon which is attached to the bark of the food plant. In some parts of the East only one brood occurs, but in the more southern portions we find two broods, which would no doubt be the case in the climate of California. The records show that this species does considerable damage to fruit trees.

A pest which might prove a great detriment to our cypress hedges and other shade trees is the bagworm (*Thyridopteryx ephemeraeformis*). The larva of this moth lives in a bag formed of silk and decorated with small pieces of twigs and leaves. As the worm grows it increases the size of the bag, carrying it along as it feeds. The female is wingless, and never leaves the bag, and in the fall of the year she deposits a quantity of eggs in the bag, which remains hanging in the tree during the winter. This pest could be very easily transported on nursery stock, such as arbor vitæ or other ornamentals. There exists a much larger species in the Orient and Australia, which does serious damage to trees. This species has been found on shipments arriving at San Francisco, and a very close examination must be made of all such stock, because when the larvæ are young the bags are also very small and can be very readily overlooked.

A pest which has made its appearance in a few of the Eastern States, and is probably a recent importation from another country, is the peach sawfly (*Pamphilus persicum*). It has been reported doing serious damage to the peach, partially or wholly defoliating the trees. This pest has been noticed in Connecticut, New Jersey, and Pennsylvania.

Snout beetles, known as the plum curculio (*Conotrachelus nenuphar*), and the quince curculio (*Conotrachelus crataegi*) are considered great enemies of the Eastern fruit industries, and especially is this true of the plum curculio. Neither of these pests exists in California. For many years the growers of this State, many of them originally from the East, have been in great fear of the appearance of this pest, as it would mean a great setback to our stone fruit industries, and it would not stop at this, for it attacks also the apple and the pear. The injury to the fruit is done by both the beetle and the larvæ, and all fruit except apples and pears usually drop before maturing, or the fruit is so badly scarred as to be unmarketable. The adult beetle passes the winter among the decaying leaves or in the grass-covered orchards or wherever any rubbish has accumulated. Owing to these conditions it is not an easy matter to transport the pest, nevertheless close watch should be kept on shipments of nursery stock, especially if any kind of rubbish-like packing, old leaves, sod and the like are used. All such materials should be immediately destroyed by burning.

Another beetle belonging to the snout beetles is the strawberry weevil (*Anthonomus signatus*). This is a very small species, but capable of doing enormous damage to the strawberry by damaging the blossoms. It is found in Canada, the Atlantic States, a portion of the Southern States, and through the Middle States. It could be easily transported in strawberry plants, as the adult hibernates and is often found among these.

Right here I wish to call attention to the reputation of snout beetles, namely, that nearly all species are serious pests of some plant or of its product. The cotton-boll weevil (*Anthonomus grandis*) is another species too well known to the cotton-grower, and although our State has no cotton industry as yet, we are now trying the growing of cotton in the Imperial Valley. The action taken by the State Commissioner of Horticulture in regard to the importation of cotton seed to prevent the introduction of this pest is very timely. The records show that this pest has cost the cotton states many millions of dollars, and if we are to start a new industry here it behooves us to start it without its greatest enemy.

Our flat-headed apple-tree borer (*Chrysobothris femorata*) is too well known to all fruit-growers to need any further remarks. What the round-headed apple-tree borer (*Saperda candida*) would do in our apple orchards can only be inferred from its record in other places. This insect lives three years in the trunk of the apple tree, and it will also attack the pear and quince tree, but has a preference for the apple. Its work is very similar to that of the flat-headed apple-tree borer, but its three-year work in the tree makes this species a much more serious pest, and would without question prove a very injurious pest to our industry should it ever gain a foothold here. It is very widely distributed through the Eastern States, and also occurs in Canada and some of the Middle and Southern States.

The mere mention of fruit-flies causes a lot of thinking among our fruit-growers, and although fruit-fly maggots could hardly be transported on nursery stock, yet it is worth while mentioning such species as are known to exist near us, and to give some idea of their work and a warning to those who travel abroad, or even to the Eastern States, not to bring any infested fruit as exhibits or curios from their travels before first ascertaining whether or not it contains one of these dreaded pests.

Foremost threatening the citrus industry may be mentioned the morelos orange maggot (*Trypeta ludens*), so destructive in its native country. This pest has been known for many years, and the strictest watch has been given all shipments at our port of entry, and so far the pest has not gained an entrance, and yet there is great danger at hand, for our eastern boundary is unprotected, and hundreds of carloads of

Mexican oranges find a market in the United States. Who can tell when even passengers from Mexico via El Paso to California will bring some of this infested fruit in their hand baggage or lunch hampers? A fruit maggot when full grown leaves the fruit and drops to the ground, where it pupates, and soon emerges as a very lively fly. An infested orange could well remain a week or ten days along the railroad track and the inmates would find good eating, and finally a good home in the warm soil of our State. Such a little start would soon furnish abundant material for a strong infestation.

Other fruit maggots are known in the Eastern States and many sections of the tropics, and have been reported as very serious pests to the fruit industries. The following are worthy of mention:

The apple maggot (*Rhagoletis pomonella*) and the cherry fruit fly (*Rhagoletis cingulata*) of the Eastern States would create a lot of trouble should either ever gain a foothold in our State.

The peach maggot of South Africa, the Queensland fruit fly, the melon maggot of Hawaii, and several other fruit flies in adjacent countries have kept us in constant terror lest one or the other should creep in unnoticed. Since our quarantine protection several lots of maggot-infested fruit and vegetables have been seized and destroyed, and the closest watch is always necessary to prevent other lots from landing.

The two species that are found in the Eastern States are distributed from Massachusetts and New York southward to Maryland and as far west as Michigan. These pests would have to be brought into our State either in the fruit as maggots or as pupæ in soil from badly infested areas.

Another pest which comes in this group is the pear midge (*Diplosis pyrivora*). This is a very small fly, resembling somewhat the hessian fly. It lays its eggs on young fruit, and as soon as these hatch the maggots enter the fruit and feed near the core, causing the fruit soon to shrivel and drop. The full-grown larvæ leave the fruit and fall to the ground, where they pupate and remain until the following spring.

Besides the maggots which attack fruits there are several species which attack vegetables, roots, and other portions of plants. The melon maggot of Hawaii has already been mentioned, but there are the cabbage maggot (*Pegomya brassicae*) and the onion maggot (*Pegomya cepetorum*) well established in the Eastern States and Canada. Both are very serious pests, and at times cause very noticeable damage.

Other pests attacking vegetables are the sweet potato root-borer (*Cylas formicaris*). This species has been reported from China, India, Cuba, Louisiana and Florida. As this pest is already recorded from the United States, there is no telling when we shall discover its presence here. The damage done to sweet potatoes is very serious; at times whole crops are a total loss.

The melon worm (*Diaphania hyalinatalis*) and the pickle worm (*Diaphania nitidalis*) are two other pests, both moths, which would cause very serious trouble to our melon industry. The first is rather abundant in the Gulf States, and the latter is reported from many of the Eastern and Middle States as well as from South America.

A pest which has paid us a visit, but which, as I am informed, has now been under control for a year, is the dreaded orange white fly (*Aleyrodes citri*). We can not use too much care in our inspection of nursery stock coming from outside the State, because this pest has been found in greenhouses in many states, and exists in several of the Southern States of the Union, and it has also been taken on nursery stock coming from Japan by the quarantine office. The pest is very prolific, and being the enemy of citrus fruits, we can hardly blame the citrus growers of our State, with their $30,000,000 industry, for feeling alarmed when this pest made its appearance among us.

The pests of our grape industry are but few in number, and we should be very careful to avoid importing some few others which exist in other parts of the country and in Europe.

The grape-root worm of the Eastern States (*Fidia viticida*) is considered a very serious pest in the vineyards of the Atlantic coast. We here in California have had some experience with our California grape-root worm (*Adoxus vitis*), and know the seriousness of such a pest. Both species do about the same damage to the vine, and let us endeavor to keep out the other fellow.

When we in California begin to notice wormy grapes it will set a lot of us thinking and asking ourselves, What next? Wormy apples, pears, and peaches are bad enough, but wormy grapes would create some excitement, I am sure. The grape berry moth (*Polychrosis viteana*) is the cause of wormy grape in the Eastern States and Canada, and at times does enormous damage to the crops, making them unmarketable. It is an American insect, and like its European cousin (*Polychrosis botrana*) has a very bad record as a pest. It has been reported as destroying one third of the crop in some vineyards in Ohio, and is usually double brooded, the first brood feeding on the blossoms, the second in the fruit. A third brood has been reported in some of the Southern States, and this would happen with us if the pest ever got introduced here. The insect passes the winter in the pupa state, and the cocoon is fastened in the leaf of the vine, so that transportation would not be very difficult if vine or cutting were carelessly packed.

The grape-seed worm (*Isosoma vitis*) and the grape curculio (*Craponius inaequalis*) are two other pests which do equally injurious work as the foregoing.

The grape blossom-bud gnat (*Cecidomyia johnsoni*) is another pest reported from New York, which from its record would prove a very serious enemy to our industry. This insect attacks the blossom buds, and after the maggots have matured, they issue from the bud and drop to the ground, where they transform. As many as eighteen maggots were found in a bud, showing that the maggot is a very small individual. In one vineyard as many as one third of the blossom buds were destroyed by this pest.

An insect which is placed next to the phylloxera in France, owing to the enormous damage done, is a tortricid moth (*Cochylis ambiguella*). As many rooted vines are annually imported from France, great care should be used in the inspection of such stock. This species also attacks the blossoms and fruit.

There are many very small pests, such as thrips and mites, which are known to do serious damage to trees and vines in other countries, and as we have had some experience with similar species in our orchards and know how hard it is to fight or even to detect these until they become so very abundant that the plant indicates trouble, it will be necessary to employ the very best inspectors to guard against all these minute pests. Many other injurious insects could be mentioned belonging in nearly every family of the insect world, many of which now exist in countries with which we have as yet small commercial relations; but with our growing commerce and the advent of the Panama Canal, which no doubt will bring us in closer touch with these countries, we shall be required to employ many good men, and above all we shall have to broaden our laws, so as to be ably prepared for this work when it does come.

A serious pest which would soon destroy the looks of our elm trees is the elm leaf-beetle (*Galerucella luteola*). This insect is of European origin, and has been known as a very destructive pest to the elm in most of the New England States for more than fifty years. The damage to the tree is done by the grub of the beetle, which skeletonizes the foliage of the tree and causes it soon to drop, and in a few seasons this damage so weakens the trees that many become worthless. In warmer climates this beetle is double brooded and hibernates as an adult, frequently entering houses, barns, boxes, or any place where it can get shelter from winter storms. I mention this to show that it would be an easy matter for this pest to be transported for a long distance. The fight against this insect is very costly on account of the large size of elm trees, and specially equipped outfits have to be used to do thorough work with sprays.

Eucalyptus growing in our State has taken great strides within the last few years. The idea that this tree is, so to speak, immune from insect attack seems to be general, and it might be well to mention a few of the more injurious species which attack this remarkable tree in its native country.

The gum emperor moth (*Antherea eucalypti*) is a very large moth, resembling our *Cecropias* in size and beauty. The larva of this moth does serious damage to the foliage of the tree. The eggs are laid on the leaves, and could be easily transported this way. This pest also attacks the pepper tree, which has been extensively planted in Australia.

In New South Wales and Queensland there are two very destructive tree borers, *Zeuzera macleayi* and *Leto staceyi*, which do immense injury to these trees. Both these could be brought here in samples of wood.

The wattle goat moth (*Zeuzera eucalypti*) is another tree-borer principally attacking the wattle, but also reported doing severe damage to some species of gum trees.

Several gall-forming scale insects attack the eucalyptus, and do much damage to the smaller branches, stunting the growth and injuring the symmetry of the tree. Other scale insects, such as *Eriococcus eucalypti* and *E. coriaceus*, commonly called the gum-tree scale, and some very large scale insects belonging to the *Monophlebinae* are reported as doing serious injury.

We have found scale insects attacking the blue gum in this State, and we have also found one of our twig borers (*Polycaon stoutii*) attacking this tree. How very fortunate it was for California that eucalyptus growing was started from seedlings raised here instead of from imported trees, as has been done with other plants. However, that now there is such a demand for the different varieties and a constant inquiry for some species remaining in the native land, it might be well for those interested to take precaution and not send for trees, but continue to raise seedlings, thus preventing such pests as cited above from ever gaining entrance here.

In concluding, I may say that it has been observed that as agriculture with its various branches advances all over the world new pests are constantly appearing, and the more acreage is planted to the various crops the more enemies seem to appear, and are always to increase. Constant care and untiring vigilance is therefore necessary to keep our crops free from new invaders, and the most sincere coöperation with the various institutions who are here to help the grower should be the first thought and duty of those who are engaged in agricultural pursuits. (Applause.)

PRESIDENT JEFFREY. Mr. Maskew, of the Department of Entomology of the United States, will lead in the discussion.

MR. MASKEW. Mr. Chairman, ladies and gentlemen: As the Chairman has told you, I am to conduct the discussion. You don't know how gratified I was when he used the word "conduct." It relieves me of the grave responsibility of attempting to do full justice to the matter that Mr. Ehrhorn has just called your attention to. He has indicated a plan of action. It is for us to devise some ways and means of circumventing the danger. This is the place, now is the time; to-day is for us to do it. Gentlemen, what shall we do? Now, just as a starter, to get you to expressing your thoughts, I am going to ask Commissioner Camfield, of Orange County, to tell us what he thinks is the best thing to do.

MR. CAMFIELD. Mr. Ehrhorn includes a wide field of work. I don't know that we could cover all that field in a short time, but it seems to me we should get busy and try to do so as far as we can. There is a big territory outside of this State that we have got to look out for, and it seems to me there are not enough quarantine officers to guard the State alone. We are liable to get the morelos maggot worm in here any time, not only as Mr. Ehrhorn tells, but you may get it from Nogales. I have information from Arizona that oranges are coming in there now, and passengers are bringing them in over the railroad; so I think we had better try to get more appropriations and have more men put in the field, and try to keep out the enemies. We have already got too many here now.

MR. MASKEW. The San Francisco division of the State Board of Horticulture has shown us what is possible in quarantine work with competent men. I think I am safe in saying that probably nowhere in the world is there such a complete record as they have obtained in the past ten years. In California we think we have all the ills that trees are heir to, but the fact is that we have but a very small quota of the full complement of the injurious insects of the world. I think I am within the bounds of truth when I say that more new and different varieties of insects injurious to trees and fruit are detected and destroyed every year in the San Francisco quarantine division than we have in California. As the Commissioner from Orange County has told you, his idea is to strengthen this branch of the service by the addition of more men. We need men specially qualified for quarantine work—men who have a technical knowledge and long experience, which enables them to act promptly and with efficiency. I see Mr. Mills from Riverside. I want him to help me a little as to what we should do.

MR. MILLS. Mr. Conductor, we will do well as horticulturists and agriculturists if we pay diligent heed to the warnings given to us in Mr. Ehrhorn's paper. Those of us from the south know full well the gravity of the situation so far as we are concerned now, and the enormous cost there is to us to fight the insects now taking charge, almost, of our orchards in some places. Personally, I have been responsible for the expenditure in two years of over $50,000 in fighting scale—a tremendous tax upon an industry; five per cent on a million dollars, a very fair dividend on a million dollars. We probably never can eradicate the white scale or the red or the purple or the yellow scales and the many others that are infesting our orchards in the southland and in the northland. There are those who say we can. I believe we can eradicate it on this tree or on this orchard, but the fact is, nevertheless, that we can not take a blanket and cover all of our orchards at the same time, and the scale pests cover the orchards very fast. I myself have had to cover one orchard three times because my neighbor has not been diligent in covering his at the same time, and the scale there has come back over my orchard. We represent the wealth-producing people of this State. This is an agricultural State, it is a horticultural State, pure and simple. You and I, who are delving in the soil, not only grow oranges, but we build cities. I may not lay bricks one on the other in San Francisco or Los Angeles or Sacramento, but, nevertheless, I am one of those numerous hosts which produces the wealth which does lay those bricks one upon the other (applause), and I am entitled, and you are entitled, as producers of wealth primarily, to protection at the hands of the Legislature of this State. It is not a selfish thing. If it is selfish at all it applies alike to the city man and the country man, and the lawyer, the doctor, the minister and the teacher, for without the horticulturists the grass would grow in the streets. We are entitled to and must demand and must get protection from our Legislature—not alone our protection, but the protection of this State, and that protection can not be given us unless we have the strongest possible quarantine laws and the strongest possible individuals to enforce those laws. Gentlemen, we lost one of the greatest men that this State ever had. He went from here to Honolulu because we could not pay the price that Hawaii paid. We must not harp at the wages demanded by men of brains. We must not only demand more service, but the highest talent. An industry such as ours is the life of the State. I am not speaking for myself, although I represent 3,000 acres of citrus orchards and manage and control them. I am speaking for you, for all of you, for all of us, for the State at large. Let us demand, and when our demand is made, let us see that we get the protection that this great industry needs, and if we are insistent and persistent we will get it; if we are not, we will not. Let us back this up at the legislative halls yonder this coming January, not ten years hence. (Applause.)

MR. KING. I am not a protectionist, but it just occurs to me in this discussion that a part of your efforts might be expedited if at the coming discussion of the tariff by the General Government the fruits from infected countries should carry so high a tariff that it would be prohibitive. Now, that is going a long way, but I believe we are justified in that. For instance, take the orange that comes in from Mexico. If you had the tariff that prohibited it you would not have to watch your borders with men who might look after any infected fruit. And it occurs to me that it might be possible for us to have a prohibition upon the bringing in of trees and plants from foreign countries, unless they were brought into the country through a clearinghouse, that they should be consigned to a clearinghouse, and then in that way we would get protection at a minimum of cost.

MR. MASKEW. Unfortunately, very few of our insects come in that way. The state of knowledge is such that every one knows that the modern methods of transportation are so thorough and complete that the nurseryman and dealer in any part of the world is guaranteed in warranting the arrival of his plants in sound condition. How few of us stop to think that that same guarantee covers the arrival of the bug that infests the plant! Every week in California thousands of people send to the four corners of the world for new and strange varieties of plants. Many of them come through the mail, and I assure that gentleman that the risk is greater through the mail than through carloads of fruits.

MR. KING. Wouldn't it be possible to even control the bringing in of these plants and fruits through the mails?

MR. FOWLER. I have no doubt about the efficiency of our horticultural quarantine. I think they are doing a great work, and I think one of the greatest things we could do to assist them would be to ask the people not to send away for these things; and I think if Mr. Ehrhorn's paper should be published broadcast it would go a long way toward educating the people to the dangers that confront them, and they would not send off for these things.

PRESIDENT JEFFREY. The Commission of which I am the head had to borrow the money or get it through the Board of Examiners from a contingent fund of some kind to publish the last thousand copies of the Riverside Convention. I just merely throw that out to inform you how little the appropriation is for the publication of this work; $2,500 has to cover all of our bulletins, and the printing of our letterheads and furnishing of our envelopes and all of these things.

MR. CUNDIFF. I make a motion that Mr. Ehrhorn's paper be published in bulletin form and distributed to the fruit-growers throughout the State.

The motion was duly seconded and carried.

Vice-President Sprague in the Chair.

THE CHAIRMAN. I am very sorry to break in, but our time is past for this discussion. The next subject is "Present Status of the Apple," by Mr. A. N. Judd of Watsonville.

PRESENT STATUS OF THE APPLE.

By A. N. JUDD.

I suppose each of you in filling out the monthly crop reports sent you from Washington by the Department of Agriculture think you are adding your mite in a degree to the sum total of information that is supposed to assist the fruit-grower and farmer of the Pacific coast, and yet down deep in your heart you are not wholly satisfied. You feel that other questions are pertinent to the welfare of horticultural California. Distribution, markets, and freight rates seem to you important. It seems also that the Agricultural Department should extend the inquiry and add the number of trees and vines, the number of acres, per cent of increase or decrease in both; again, the average quantity of each kind and variety in each State, the increase and decrease of them, and their comparative market value separately. The present system is like playing Richard III. without a Richmond. What value is it to you to know the apple crop is 20 per cent below normal unless you know the normal production? Even then you should know whether or not the market is open to you through railroad discrimination or otherwise.

The Watsonville apple-grower would give much for this information; publicity they say cures many evils; then why not have crop bulletins in reference to apples, if you please, read like this: "The apple crop in the greatest apple section west of the Missouri River (Watsonville, Cal.) is the largest in its history, having 4,000 cars for shipment; the area is 15,000 acres: one third in full bearing, one third coming in, the rest young trees. The increase of annual planting about 2 per cent, but with a gradual falling off, owing to uncertain and fluctuating freight rates. The varieties are Bellefleurs and Newtowns, about equal in acreage; other varieties form one fifth of the apple territory planted. The Bellefleur is a fall apple; should be marketed in October and November, and should have a special rate, as well as a permanent one, to the west of and to Missouri River points, and not be classed with Newtown Pippins, whose market is mostly in Europe and to the Eastern markets that take no Bellefleurs. The same rate on each, of $1.00 per hundred pounds, works a hardship on Bellefleurs that are hauled but half the distance. Years ago our Bellefleurs found markets as far east as the Great Lakes, north to St. Paul, Grand Forks, and Butte, but the liberality engendered by a building up policy, and with a shrewd business sense the northern roads have, by giving a lower rate than the Southern Pacific, closed those markets to us, and are even now curtailing the rest by invading our very home markets."

Mr. Stubbs will tell you the rates are the same, for, he will tell you, he went himself to Oregon and Washington (when the apple-grower of Watsonville asked for an emergency rate equal to those northern states and owing to the stringency of the money market in Missouri points) and had the rate raised to $1.00, and it is said the schedule was accepted by the Interstate Commerce Commission, and it is understood that any violation of that schedule would be a fine of $500, but it seems that Mr. Stubbs was not equal to the protest of the entire Northwest. They saw ruin to the fruit industry; that champion of the farmer and fruit-grower, The Oregonian, came to the rescue with the aid of other papers of that country joining in with the horticulturists; the result is Mr. Ober of the Northern Pacific says the old and regular rate of 60 cents per hundred to Montana and Dakota points, and 85 cents to St. Paul, Chicago and Missouri River points, will stand, stating as a reason that when an emergency rate exceeds the regular rate, the regular rate will be the ruling rate; but I am sorry to say that that rate did not affect California, and especially the Pajaro Valley, and here are some of the results. We shipped no choice or five-tier stock at all to these points this season, and as our fancy four-tier stock is marketed in the face of a discriminating freight rate at Butte and Grand Forks of 42½ cents per box, Denver and Pueblo of 26 cents. and in Arizona points of 15½ cents per 100 pounds, you can readily understand why the driers. canneries, vinegar and cider works are overcrowded with fruit, much of it fine, at $5 per ton or 10 cents per box. To economize many are hauling to the plants, apples in secondhand sacks. These sacks can be used over and over again, saving expense of boxes, also expense of handling, as no care is necessary in picking. This system saves more money to the grower than by shipping our Bellefleurs to a losing market. Now, let us see who is the real loser by the Southern Pacific's selfishness, as well as its short-sighted policy in finally driving the apple business out of the valley.

A full bearing orchard of Bellefleurs, with a full crop, will make a carload of 15 tons minimum weight allowed to the acre, or $300 a carload; but we can't afford to ship at that price, hence the by-product mills get them. Then what happens? Why, the Southern Pacific hauls what little they get for Eastern shipment in a dried state at $1 per hundred pounds (the same price as is charged for the green fruit), but is reduced to one ninth of a carload per acre. What little canned apples, vinegar and cider go East is met at Salt Lake and Ogden with a 62-cent rate from the East, against our 97-cent rate to those points, and the freight is even reduced here by the weight of the cores, peelings, and evaporation. Again, the mills, driers, and canneries are overstocked beyond their capacity, hence many trees are not picked at all, besides the ground is covered with good stock. Now, with a competitive rate and decent service, all this would be changed and available to the railroads at an acceptable rate to the grower of even $100 per acre in freight for all full bearing orchards.

Before our apple orchard days we raised prunes. Six years of all the traffic would bear made firewood of the prune orchards. It happened this way. Low prices prevented the use of evaporators in the Pajaro Valley; having no sun sufficiently warm to sun dry, and on the promise of the railroad company giving us a fair and reasonable rate, the fruit exchange put up extensive works for a sun drying plant at Rucker, 20 miles distant, and this was the fair and reasonable rate we got: $2 per green ton from Watsonville: $1.40 from Pajaro, 1 1-10 miles nearer the drying plant; $1.20 from Vega, 3 miles less distance, and 90 cents from Aromas, 7 miles shorter haul.

Red ink results drove us out of business at Rucker in three years, and no amount of loss to us or argument could induce the company to make a reduction, hence we moved back. This the railroad company deprecated to the extent that they offered to return and put up free of cost to us the plant and give us a 75-cent rate, if we would load the plant on the cars, and yet all this time the same railroad company was hauling sugar beets almost double the distance at a 50-cent rate per ton. But a burnt child dreads the fire, even if made of prune wood. Now, when we go back to raising sugar beets, potatoes, onions, and beans the railroad company will get, if the rate is as now, on beans 50 cents per hundred pounds, or $10 per acre if we have good crops, and mind you twice the distance they now haul our Bellefleurs at $300 per acre. Again the State and county will lose in the Pajaro Valley alone three fourths of a million of dollars in personal property for annual tax purposes, there being 48 trees to the acre and assessed $1 a tree. I mention these facts as evidences of a woeful lack of business ability on the part of the managers of the Southern Pacific Company, and to also show their stockholders the reason their per cent of profit is zero. I quote in proof Mr. Stubbs, in his paper before the Transmississippi Congress, when he said: "Since 1900 the farmer has made 9 per cent on his investment, the railroad companies but 3⅓ per cent, divided as follows: The Great Northern, 7½ per cent; the Santa Fe, 2½; the Southern Pacific, 0."

Now, as we all know, the Santa Fe has to pro rate with the Southern Pacific in order to use the Southern Pacific's track, and is at the mercy of the Southern Pacific in that regard, and is not allowed (unless the shortage of cars is real pressing) to come into our territory at all, giving, in fact, the Southern Pacific practically a complete monopoly from the Columbia to Panama. According to Mr. Stubbs the Great Northern is making 7½ per cent, and, mind you, with three strong competitors, all hauling apples, and at 15 to 40 per cent less than we pay, which would give us a profit in place of a deficit. Besides, these northern roads give better and much quicker service and a minimum of 10 tons a carload, and mixed green fruit allowed in the same car. This is a great advantage, much greater than at first sight you would believe. This small minimum allows much smaller towns to take whole or mixed car lots, thereby saving the consumer the local rate from large cities to their points. This greatly extends the market, and at less prices to the consumer and more profit to the producer. The Great Northern is making 7½ per cent and the S. P. "0," says Mr. Stubbs, and yet California's great fertile valleys were thoroughly exploited by the Southern Pacific before the first rail was laid in those great arteries that cover the once great buffalo and Indian ranges of America.

We in California do much as citizens in the way of promotion work, fairs, etc. Every little town has its board of trade and other civic bodies, all boosting. The various counties subscribe liberally of the people's money trying to populate the best State in the Union, as far as nature's handiwork can make it so, in climate, soil, and health; but the result of all this hard work shows that the Southern Pacific Company can tear down faster than we can build up.

No one dares to move vigorously in any enterprise for fear of ruin through that octopus. The rivers of the great mountain ranges of California have a surplus energy, almost without cost, that would turn every wheel of one half of all the factories in the United States; and we have soil, mines, and climate that would furnish raw material to run them. What's doing? What has become of those enterprises that were once the pride of the coast? What has become of the rural population? Why do the cities in California increase in population all out of proportion to the country and in comparison with our North and Northwest? The last census gives some striking figures that are worth investigation. Along the Great Northern, that is making 7½ per cent, in Minnesota the increase in population from 1890 to 1900 was 33 7-10 per cent; North Dakota, 70 9-10 per cent; Idaho, 82 7-10 per cent; Montana, 70 3-10 per cent; Washington, 45 per cent. In the Santa Fe territory that is making 2½ per cent profit is Arizona, with a gain of 68 per cent; New Mexico, 24 6-10 per cent, and yet both of these territories are considered the deserts of the North American continent. How about the Southern Pacific's territory. California's increase was 22 4-10 per cent, and poor old Nevada, that in climate, soil, and situation compares with eastern Washington and Oregon, had a decrease of 10 6-10 per cent, and this is not all. In California eleven whole counties fell off in population in those ten years, and in all but two, one or more rural townships in each county met with a loss. Is our glorious climate, the ever fertile soil, the people, or the railroad the cause? I saw Mr. Stubbs when he read his remarkable paper before the Transmississippi Congress. You could tell that he felt that he was in the house of his friends. I saw the many facial expressions used by Forest, Booth, and Irving in playing the tyrant, play around his thin cruel and lips, the glint of hate gleamed from his steel-like eyes, and the public-be-damned was depicted in every feature when he threatened California, as well as the whole country, with disaster if they were not allowed to handle their business in their own way. There was not a line of conciliation in his paper, but everything to exasperate. It is strange to me that a corporation that depends on the public patronage should maintain the position of a common enemy. It does not seem to me that a heritage of popular ill will, engendered through long years of injury, is a profitable asset for a public corporation.

What a contrast between Mr. Stubbs of the Southern Pacific, threatening our industries with disaster if we do not take our medicine; and Mr. Jas. J. Hill, the builder preëminently, not only of railroads, but of the great northwestern empire. To illustrate, Mr. Hill while being banqueted by the farmers and business men of Oregon and Washington in Portland, November 6th, on the completion of another of his great enterprises, the North Bank Railroad, at a cost of $45,000,000 (and no noise about it either). This is the way he spoke to the farmer and merchant, to Mr. Howard Elliott of the Northern Pacific, and other competitors that were present: "You will prosper as the business of the country prospers, and so will we. We have been for thirty years occupied in trying to build up; I don't want to pull down; I don't want to pull down anything; I always feel that there is room enough in the country for ourselves and for all our neighbors (great applause), and if we can not hold our own with them, and if we can not keep our prow to the front without doing any little act of discourtesy, or delay, or obstruction, or anything of the kind, I always feel that we will make a mighty poor race (tremendous applause) by being mean about it. We do not propose to do it that way. We will live and let live, and give every fellow room according to his heft and see what he can do. (Laughter and applause.) We will either prosper with your prosperity or we will be poor with you." How different was the attitude of Mr. Sproul of the Southern Pacific four years ago in replying to the President of the Pajaro Valley Board of Trade, that in the interest of the apple-grower asked for more yard room, which was wholly inadequate to accommodate our fast growing industry. He said: "If you don't stop this agitation we will move the depot and everything over to Pajaro and you will ship from there at a higher rate than now."

Then came the electric line and wharf, which gave great relief; then came a cut of 50 per cent in local rates by the Southern Pacific; then came ample yard room for loading and for packing houses, and, I am sorry to say, then came the local thieves and boodlers and stole the steamer and robbed the treasury to the end that finally Mr. Sproul's curse has come in a way by the company hitting the apple industry, at least half of it, its death blow, unless the Interstate Commerce Commission comes to our rescue and gives us a certain and fixed rate equal with our northern neighbors. We don't want to pull them down, not a bit; but just ask for a fair show, so that we can prosper, too. I say a fixed and reasonable rate, so we can plan for the future and build accordingly, and with such an assurance we could look adversity in the face that at times is brought about by short crops, wet or dry years, fighting new and destructive pests, as well as the old ones, always at an added expense. The nurserymen could plan, too. To-day they are going out of business in our valley. How different in the north. The Oregonian of November 19th says: "In the Walla Walla country the fruit men netted a million dollars this year from less than a thousand carloads of fruit, and the orchard men are preparing to place in a large area of fruit trees this winter, the majority being apples and prunes. [Did I hear anybody say 'prunes'?] Nurserymen here can not nearly fill orders for trees, so great is the demand."

Now, it is needless to tell you that Walla Walla is in eastern Oregon, and in no respect can it be compared in climate, soil, or fertility with California, but it has something that offsets all of those inequalities, the very needful and all-important freight rate that does not tear down, but, as "Jim" Hill says, "Lives and lets live."

The good Lord helps those that help themselves. Teddy will have the canal done before we know it. We have a Government road now across the isthmus. He suggests a line of Government owned steamers from San Francisco to connect with the said line and that connects at the other side with a line of Government steamers to Atlantic ports. With such a line on the Pacific side, the monopoly enjoyed so long by the Pacific Mail Company, and the excessive rates charged by that company in order to protect its allies and real owners, the Southern Pacific Company's lines will be a thing of the past. The time is here, and now is the time for all interests, productive and commercial, to join issues. Don't listen to the siren call of the rebate or those little petty special privileges. They are only delusions. You pay it back in many other ways. Besides, they destroy stability and independence as well as retard progress in all lines of development. Uncertainty and distrust pervade all lines of business. There is no security in this, our land of gold and sunshine, as long as those abominations are abroad in the land. Give all a fair deal, so we can all prosper in each other's prosperity or be poor together.

In conclusion, I want to quote from Henry Clews & Co.'s Investment Guide, ending June 30, 1907. This will show, I think, some of the reasons why our freight rates are so high and so low on the Great Northern. All the figures are in round numbers.

Great Northern:				
Gross earnings	$57,000,000	or	$9,000	per mile
Operating expenses	33,000,000	or	5,000	per mile
Fixed charges	7,000,000	or	1,100	per mile
In betterments	5,000,000	or	800	per mile
Profits	19,000,000	or	3,000	per mile
Southern Pacific:				
Gross earnings	$125,000,000	or	$14,000	per mile
Operating expenses	80,000,000	or	9,000	per mile
Fixed charges	20,000,000	or	2,000	per mile
For betterments	200,000	or	20	per mile
Profits	29,000,000	or	3,000	per mile

How much of that hundred million dollars for operating expenses and fixed charges goes into rebates? and how much went into Mr. Herrin's political bureau? (Mr. Ruef only told of $14,000.) "Jim" Rea did not tell all his story. How long are the people of California to be slaves to this inglorious system, and how long are our apples to be overtaxed to pay interest on the water that is in $70,000 per mile on the Southern Pacific lines as well as an additional tax to pay that $75,000 per month subsidy to the Pacific Mail that assists so materially in keeping our noses on the grindstone and at present closes the high seas to us? And again, and finally, the fruit-grower is anxious to know if he is to be rewarded with higher freight rates as production increases. (Applause.)

MR. DARGITZ. I had a little experience with the Southern Pacific in freight and refrigeration last July that might be interesting to some of you. I had some plums, and you will recall that at that time the market for plums in the East was not very inviting. It meant red ink to ship. In seeking for some way to dispose of my plums I wired for the markets in Los Angeles, Portland, and San Francisco. The market report from Portland was very enticing. I loaded a refrigerator car, ordered it iced head end, to go through to Portland, with vents open four inches. When the fruit arrived at Portland I got a telegram that it was in perfect condition, but the market had fallen, and they did not believe they could realize the railroad's charge for the freight. They finally did, however, and after paying those charges sent me $2.40 and kept a lot of new lug boxes that I ordered returned. I took the matter up with the Southern Pacific as to the icing charges. I did not find any fault with the freight; I let that go, but it developed that they had in their tariff a kind of a joker that called for the icing of the cars in full, both ends, for shipments to Oregon, and instead of following my instructions they iced both ends full at Sacramento, and up at Ashland, Oregon, they did the same thing again, and when the car got to Portland it was almost full of ice. And then they charged a percentage in addition because the vents were left open, and I had absolutely no redress when I went to them. They said, "There is the tariff," but their agent didn't tell me what was in that tariff when I ordered the car and started the shipment. It was simply a joker in the tariff that gave them the opportunity to sell ice at enormous rates when it was not ordered and was not wanted and was not needed.

A recess was here taken until 8 o'clock P. M., to reconvene at the Chamber of Commerce.

EVENING SESSION.

PRESIDENT JEFFREY. One of the members of this Convention asked me a while ago, "What is the programme for to-night?" The programme is printed on the page there for Tuesday evening. You will notice it is not much of a programme. For many years the members of this Convention have been asking more time for discussion. As I stated in my paper to-day, the number of papers and addresses to be delivered at this Convention has been reduced to twenty or thereabouts. At Marysville one year ago we had forty papers, or nearly so. Now, to-night it depends upon you as delegates to this Convention to make this meeting a success or a failure. There has been a feeling for many years that the laws relating to the administration of the County Horticultural Commissioner's office need some improvement. We come before you to-night with this little programme to that end. I think it would be in order for the members of this Convention to present any topics for consideration on this matter that you may wish. I already have one resolution submitted by a fruit-grower, and we will, no doubt, have others. It is as follows:

Resolved, That we, the fruit-growers of California, in convention assembled, at Sacramento, December 1, 1908, favor the present horticultural law in so far as it provides for three members of the County Board of Horticultural Commissioners.

It was moved and seconded that the resolution be adopted.

MR. STABLER. Mr. Chairman, and ladies and gentlemen: As the mover of that resolution, I would like to say a few words in its advocacy. I may preface my remarks by saying that I am the oldest horticultural commissioner in the State of California. I have served continuously for nineteen years, and must necessarily have had some experience in the work of a county horticultural commissioner. For one, I contend that the present law is good, it is sufficient, it covers the ground as well as any law that might be enacted at the coming Legislature. I do not say that the law is perfect; no law is perfect, and if this law is repealed and another one is passed there will be defects arise, just as there may be in our present law, for the reason that the State of California is 750 miles long and 250 miles wide, embracing all manner of soil, climate, and other conditions; so that you can not draft a law and make it apply to every condition, making it applicable to every part of California. I was a member of the Legislature myself in 1891, and until that time I never appreciated the vast extent of the State of California. You can not pass one horticultural law that will cover all conditions any better than the present law. The present law provides for a commission of three horticultural commissioners in a county. I understand there is some objection to that, particularly in the southern part of the State, where it is felt that it would be better to have a law appointing only one county commissioner. I grant that may be correct in that part of the State, but I believe in the northern part of the State it would not be as well. But with the present law it is quite possible to have in effect one horticultural commissioner by agreement with the board of supervisors in appointing this commissioner; that one man will be understood to be active, and the others will act in an advisory capacity, or would simply concur in the acts of the single member. My particular objection to the one man commission is this: I am satisfied if an adequate salary is added to the office and one man is appointed in the county, we immediately have the County Board of Horticulture in politics; and yet I understand the advocates of the one man commission contend that in order to take it out of politics they want a one man commission. At the present time, under this law as we have it to-day, the supervisors appoint three fruit-growers as a commission, and these three fruit-growers appoint the local inspectors, and the work of quarantine is carried out under this system. The judgment of three men, in my opinion, is better than one, because, as you all know, the present law is very drastic, and the commission has wonderful powers. If the horticultural commissioners absolutely carried out the law, as they might do, they could in many instances remove a man's orchard entirely, have it dug up and burned; but I think in no case has the commission ever adopted drastic measures. They have acted for the good of our industry.

I have seen the working of every law we have had in horticultural quarantine from 1881 to the present time, and whenever a law has been amended it has not been improved. Some of it might be improved, but it has been impossible to improve the entire feature of the law, because it has always been a drastic provision of the law. The salary is inadequate. A county commissioner gets $4.00 a day while actually employed in the discharge of his duties, but when a fruit-grower is appointed on one of these commissions he has enough interest of his own to take some interest in it, and fruit-growers are all broad minded and are willing to take some interest, and for that reason I would like to see this Convention go on record as favoring the three man commission. Remember that in the southern part of the State you have worked this up to a fine point, but in our part of the State we have many things to fight. In the first place, we have to fight the pests. Then we have to fight the nurserymen, and I am sorry to say that in many instances we have to fight the fruit-grower. We have to compel the fruit-grower to have clean trees.

MR. PEASE. Mr. Chairman, ladies and gentlemen: I have not been in the horticultural commission business quite as long as Mr. Stabler has, but I have been connected with the horticultural commission in one capacity or another almost continuously since 1891, and while he has stated the point at issue from a northern California standpoint, I would like to present some of the features from a southern California standpoint. I note what he says about one man doing the work and the other two being an advisory committee, as it were. When I was first appointed on the horticultural commission in 1896, as commissioner, the conditions that I found existing at that time were about these: There was one paper that we called a political paper, that was run in the interests of one of the old parties there, and a man was always hired to run that paper, and if a new man came in he was instructed about like this: "If you get short of news you can always jump on the horticultural commission," and that is about what they proceeded to do. We started in in a small way, and I remember of hearing two of the later commissioners talking. We were starting in the fumigation business, and they were wondering whether it would be feasible for them to order two 100 cases of cyanide, whether they would use it all or not. We gradually built up the commission in San Bernardino County after that, and I will say that at the present time it is pretty strenuous work for one man to attend to, and yet, in every county, so far as I know, where there are three horticultural commissioners, there is one man that is responsible for the whole business; that is, there is one man that is authority, and one man must put in his whole time at that business. One hundred dollars a month for a man with a family will just about keep that family. But suppose you compare it with some of the county officers we have. It is admitted freely down where the fruit industry is the main industry that southern California is nothing if not a citrus fruit raising country; that the business of the commission there is paramount to anything that is done by any other set of people, and yet, alongside of a horticultural commissioner who is putting in his whole time for about $100 a month how are the other county officers paid? In our county we have a live stock inspector. He may put in one day in a week, and draws $1,500 a year. We have the county auditor, who draws $200 a month. Some of the other officers draw above $5,000 a year.

Now, as to the amount of work done by the horticultural commission in our county. We have purchased so far this year four cars of cyanide. A carload calls for a little over $4,700.

Now, as to some of the troubles. When I first went into the commission it used to be considered a political office. A man starting in to the work was told, "I don't think it is any use to try to inform yourself in this business, because the next election may change the complexion of the board of supervisors, and out you go." But that has changed greatly. They have found that a man that is educated in a certain line of business is better than another man not educated in that business. The pay of the inspectors is $2.50 a day. If you have work for an inspector that is going to take the whole of his time, and you get a good man, a man that informs himself, a man that knows the different pests when he finds them and knows what to do with them, that man is a valuable man to the commission. But very soon some man that is in business will find out that you have a good man. He will offer him two bits a day more, and you lose your good man and start on the ground floor again to educate another man. If a man will inform himself and keep up with the band wagon, that man should be paid as well as any other. (Applause.)

MR. MILLS. Mr. Chairman, I did not expect that this important question was going to be precipitated here to-night. It is really too big a question for us to settle here. Those of us who are largely interested in the fruit industry, our interests are greater than the interest of just a board of commissioners in any county. The question for us to determine first is, by which method will we get the greatest amount of protection for the money expended? We do not get it always. I doubt very much if it would be wise for us to-night to say to the committee you have appointed as a legislative committee that they shall do thus and so, because they have got to meet the legislators of this State in January, and there wrestle with them as to what shall be the laws provided for the guidance or appointment of the horticultural commission of any county, whether it shall be a one or three man commission. Yet it is wise for us, on this resolution of Mr. Stabler's, to look at both sides, whether we are in favor of the one man or the three man. Mr. Stabler knows that some of the northern counties never had a commission appointed. Some of them, when the white fly came up, had no commissioners appointed. Some of them stated that they could not afford to pay a commission, that they had not fruit trees enough to protect; and if it be true that some of the counties can not afford to pay a three man commission, then it would be wise to provide that they have one, because we want to approximate to this thing. There are arguments that may be made for a one man commission, and this is one, and it is a very serious one. Here is a commissioner here and another here and another over there, and there are many times struggles as to whether or not this man is getting too much of the money. There may be ten times as much scale in Jones' section as in Smith's, and yet Smith thinks he ought to have more of the money than is necessary, approximately, for his section. This protection from the scale pests is one that the whole county has at stake. If my grove is clean and yours, ten miles away, is dirty, I must give of my money to cleanse and protect yours, because therein lays my salvation. For that reason I believe that it may be rightly argued that a one man commission is a good thing, because he can state where the money will be expended to the best advantage. And, mind you, gentlemen, we are denied the money necessary. Even in Riverside County, where vast interests are at stake, where all our money is in one basket, that of the citrus, we are denied sufficient money to give us that protection which we need. I know that I can not get my orchard inspected when I want to cyanide. The law requires that the commissioner shall go all over my land if I demand it and mark my trees and give me a schedule, and to do that we need ten times as many inspectors as we have got. The one man commission can throw his inspectors where they are most needed and where the scale is creating the most damage. Again, take Kern County. At one time they said they had not trees enough to protect. They are getting them. If one man will do them, let it do. We want the brainiest men in this business that there are to be had. Men are scarce with brains such as we have in our horticultural commissions who will work for a hundred dollars. We want a one man commission so we can pay at least $150—I would say $250—for a man who can give his life to it. We want to train men up in horticultural commissioners' offices who will make it a profession, who will study entomology; we want a man who knows when he puts his finger on a desperate scale pest that there is a new one. A one man commission will give us a better paid official, who, with intellectual ability, ability to study and acquaint himself with the necessities of the office, will give us a service we can not otherwise get by taking them haphazard.

Mr. Stabler says, let us have a three man commission; two men dead, one man alive. You very seldom can get two men that will consent to be put on as figureheads and remain dead. I think they will all seek their proportion of the income that the law allows for their office. I do not think that is a solution of the difficulty. The salary I have touched upon, that we give competent salaries, not for the commissioner only, but for the inspectors. We want the very best men for inspectors, brainy men, conscientious men, strong men, men who can work for $3.50 and support their families well. I myself am paying teamsters to-day more than the inspectors are paid in the orchards of Riverside County.

It should not be so. The men in our orchards inspecting are men competent to fill higher positions. Let us pay them sufficiently for it.

I don't want to raise antagonisms in our counties. We must endeavor to get harmony all along the line, so that we to-day who are grubbing in the soil to try and reach out to a competency may keep politics out. I think that we can keep politics out more with a one man commission than with three, for we will have only one politician to deal with where otherwise we would have three. We would have brains, we would have men that can give their time and attention to it, men who would be at the command of this county or that county, men who have started out as Ehrhorn did and as Carnes did—as most did—will be in demand by the Federal Government and State government and other counties.

Mr. Stabler says fruit-growers are appointed. Where are they appointed? Have you, Mr. Fruit-grower, time to take upon yourself the weighty duty of horticultural commissioner? No, you have not. I know the horticulturists of Riverside County work from 6 o'clock in the morning until 10 o'clock at night, for many a time I call them on the phone at 6 o'clock in the morning. No fruit-grower has time. It is a profession, and we must make it possible for the best men we have got to give their time and attention to that profession, that we may be protected as we deserve to be protected. I have been studying the matter for a very considerable time, and I feel to-night that I should say a one man commission. (Applause.)

MR. ROGERS. This is one time in my life I can agree with both sides. I think in our county we have solved this problem to the satisfaction of all. We have a horticultural commission and also a specialist, an entomologist, and everything is running very smoothly. We believe that the law is entirely adequate as it stands. The entomologist is working under special laws devised and passed by our board of supervisors. We find that in our county, if you have the right kind of people, it is not necessary to have many inspectors; it is not necessary to enforce the law. We have very little difficulty. Our orchardists have been trained to detect pests, and they go after them themselves.

MR. MILLS. You are certainly blessed.

MR. ROGERS. I don't mean to say that every man keeps his orchard as perfectly as he could, yet at the same time I don't think there are men anywhere who look after their work better. The time was when they had to be forced, but they soon found that it paid them when they learned that pests could get in and destroy their orchards.

PRESIDENT JEFFREY. Just one word on a question of law. There are four or five counties in the State which have county entomologists. In Mr. Rogers' county and the adjoining county they have three commissioners, and Mr. Volck is the entomologist of that county. The reason our law should be amended is that there is no law in California for that method of handling the pests in Santa Cruz and Santa Clara counties. The Attorney General has decided that the supervisors have no right to create the office of county entomologist, and that Mr. Volck must be only the employee of the commissioners of one of those counties, and that he must work for $2.50 a day.

MR. LIVINGSTON. I wish to ask the name of that perfect county where the gentleman comes from.

MR. ROGERS. That is Santa Cruz County.

MR. COSTELLO. I am an inspector in San Joaquin County. We have a pretty good board of commissioners there. Two years ago the army worm came along. There was an inspector in Lodi, one at Stockton, and one at the other end of the line. Of course, we had to go right to the commissioners; they were our superiors. We decided that three heads were better than one. One man might have got excited and lost his head, but the three men got together. We dug ditches until we could get word to the head of this thing, the supreme head, Mr. Ehrhorn and Mr. Jeffrey, and we found out that we were following right along in their footsteps. Now, wouldn't it have been an awful thing if there was just one commissioner and he was tied up and didn't know what to do? (Laughter.) I will recite you a little case. There was a child sick in my town about a week ago. They brought in a doctor, and he said the child had malaria. He wrote out a prescription and came back the next day and said, "I don't understand it; the medicine ain't working right. Well, I will give him another dose." So he wrote out another prescription. The next day he back and said, "I think the child has throat trouble." Well, the father got to thinking and said, "Doctor, wouldn't you call in another doctor?" "Well," he said, "maybe it would be better." The other doctor came out and said, "That child is dying with diphtheria; we have got to get more help." They got an expert and he put a tube in the child's throat and the child was saved. Now, that one man would have killed the child, and one man will kill your county. (Laughter and applause.)

MR. RUTHERFORD. I have been acting as commissioner of Stanislaus County for twelve years. I acted singly for several years, but now I go with a board, and find it much more satisfactory. Oftentimes cases come up where I want advice. Oftentimes trees come in with a certificate and we find scale on them. Of course, the man they are shipped to will object to my decision, and I find it very convenient to call in a brother commissioner to settle the question.

MR. SOUTHREY. In San Joaquin County we find plenty of work for three commissioners. The county is about 50 miles long and about 40 wide. Very often we encounter questions that one man would have trouble to decide, and I think it advisable to have three commissioners.

MR. DINGLE. We have three commissioners in Los Angeles, and we have two pretty live ones—that is, the other two, not myself. I have to stay in the office, and I want to say that I have about all I can do to answer the phones and attend to the work in Los Angeles city. The city is the smallest part of the county, and I would like to see six commissioners instead of three. Down there we serve these legal notices, and in the last six or seven months we have served sixty-seven notices, and it would keep a one man commission pretty busy to keep those things up, and I think you are making a big mistake to cut it down to one, for that one will have all he can do to sit in the office and take care of the nursery stock.

MR. CUNDIFF. I can't lay claim to having served upon the horticultural commission quite as long as my friend Mr. Stabler, but I have been actively engaged on the commission in Riverside County for about fourteen years. There have been some points brought out this evening, one by the gentleman from Watsonville, Mr. Rogers, advocating the three man commission. At the same time he admits that Mr. Volck is the main member of the commission, or the man who is the brains behind the whole proposition. They employ him as county entomologist. In justice to Mr. Volck, why shouldn't he draw the salary and have the authority in the matter just as much as three men?

PRESIDENT JEFFREY. He does draw the salary.

MR. CUNDIFF. Then why should you have the three men? What good argument is there to employ three men, when the other man has to decide on the question? I have served during the past ten years with the commission at three, and, just as stated by Mr. Pease, I know of no commission in southern California where some one man of the commission does not have to do three fourths of the work, or else it is not done. The position of horticultural commissioner with us in the south is largely an advisory position in this way; the man who equips himself for the position is looked upon as an adviser, not necessarily in orchard pests, but in many other problems that come up in the care and cultivation of orchards. If you give a man a proper salary, a salary that is commensurate with the ability to fill such a position and do it as it should be, it seems to me that you certainly get more good in that way than you can out of three, and, as some one said, six commissioners. I think the gentleman from Los Angeles spoke about the large number of notices served. All of our counties have notices to serve. Any of that work can be done by a deputy if the commissioner has not time to do it, and by a man that draws less salary than the commissioner draws. That is simply clerical work that any one can do that has a common school education, and I don't see that there is any particular argument in the fact that we should have this work all done by commissioners. Inspectors can be appointed and the commissioner can remain and be the executive head of the work in each county. In almost every county where there are three commissioners there are times when there is friction between the different sections. I am referring to the conditions in the southern part of the State. The conditions in the northern part of the State, perhaps, are different, but where we are compelled to spend a great deal of money there is always a good deal of friction. We district our counties, and one district will assert that it is not getting a sufficient amount of protection—there isn't a sufficient amount of work being done in their district, when if we take the tax records or the taxable property in orchards in the districts they are frequently getting a good deal more than they are entitled to in proportion to the taxable orchard property that they have. The matter of efficiency of a horticultural commissioner certainly is largely the result of the time he can remain in office, the time he can devote to it. If a man is expected to remain only four years or less, at the whim of some board of supervisors, there isn't very much incentive for him to put in the amount of time that it requires to become proficient in this kind of work. I think Mr. Stabler claimed that the three man commission would not be so likely to be disturbed in a political way. I think the reverse is the fact—I know that has been the case in our county—there has been quite a lot of pulling in the board of supervisors as to who should be appointed on the horticultural commission. They may settle on one man who will be the brains of the commission, and the other two men are political appointments. As far as I am personally concerned I have no criticism of my own county, because they have shown no disposition to work politics, but it is done in other counties—that I know.

MR. REED. I can't forego the chance to make a criticism of this discussion, that you are wasting valuable time and accomplishing very little. Whether you have one or three commissioners, the present condition of affairs is that you are not getting results, and you ought to make some change in the law. In your white fly campaign at Marysville you did a good deal of work there, and you still have the white fly there, and unless something radical is done you will have the white fly there as long as there are orange trees in California. You ought to try to get these laws so you can do some good. (Applause.)

PRESIDENT JEFFREY. The State has spent all the money at Marysville and Oroville and Bakersfield that there was in sight, and I had to get the Governor to declare a deficiency of $2,500, and then go to Los Angeles and get a bank there to advance the money until the Legislature meets in order to conduct the work.

MR. MILLS. I want to make just another point, if I may. The horticultural commissioners are executive heads. Very seldom do you see them in the orchards day by day and month by month inspecting the orchards for scale. There are three executive heads in each county, and in most of them drawing salaries. It is not contemplated, in taking them out and making a one man commission, that it shall be less efficient. We shall have a more efficient executive head, whose duty it will be to have the orchards inspected, and in place of the men now drawing salary we will have efficient inspectors. We can have two first-class inspectors. The executive head of the county, the one man commissioner, can choose the ablest, most competent men, with entomological knowledge and with executive ability as well. He can enforce the law more. The one man commissioner, knowing that he is responsible for the enforcement of the law in that county, will enforce it better than it has ever been enforced by three, because in one section it is enforced and in the others it is not.

MR. CUTTER. Suppose the commissioners were not paid a salary, were all fruit-growers, but were in their executive capacity, and we hired these men you speak of that draw a nominal salary, we would get it away from politics, but if you have the one man commissioner it is too close to politics.

MR. MILLS. My thought is that no man shall be appointed an inspector who has not passed an examination showing his ability as an entomologist. Then men would not be chosen politically, but for knowledge and ability.

MR. LIVINGSTON. I think in appointing three commissioners in our county—Placer County—they simply selected three fruit-growers of perhaps average intelligence. I believe two of our commissioners are here, and I don't believe that any of them know any more about scale insects than I do, and I am free to admit that I wouldn't know a white fly from a thrips; and, notwithstanding I believe that three fourths of the members here are commissioners, I will bet there isn't one third of them that knows anything about the scale. I believe that one man well paid, with a corps of valuable assistants or inspectors, will do much better work than three men who are not paid and who devote but very little of their time to the business.

MR. PEASE. The point I tried to bring out before was to appoint a one man commission and pay him sufficient so he could inform himself. There isn't a commissioner in California who is too well informed. I have a good deal of correspondence over the State. One commissioner, who is drawing the salary of $4 a day, sent me a twig of an orange tree. He says, "What kind of a scale is this? I could not find a bit of this scale on any other tree." If that man had been posted he would have known there would not be any. It was simply a couple of katydids. Why do you send specimens to Mr. Ehrhorn? He is one man. He is supposed to be authority.

MR. JUDD. My friend Mr. Rogers explained the matter, and it was the strongest argument for a one man commission. We have three commissioners in Santa Cruz County, and we hire Mr. Volck as an entomologist; he furnishes all the brains for two counties; the other three or four don't cut any figure.

MR. STABLER. I have watched this debate with a great deal of interest, and I believe that as a rule speakers favoring the one man commission have missed the entire point of the argument. We want three horticultural commissioners in each county, because we want the judgment of three men in the enforcement of the horticultural law. We want three men to sit in each case and decide what the law is and how it should be enforced. We have five members of the board of supervisors, and no man would advocate that we have one. Now, my good friend Mr. Mills, who represents 3,000 acres of citrus orchards, comes to this Convention from a different standpoint from those of us who have only 10 acres and work with our hands and dig and plow and spray. He says, "We want one man who is educated and who is competent to attend to the duties of this office, and to whom we can pay $150 or even $250 a month," and he enumerated this great array of talent, Mr. Maskew, Mr. Carnes, Mr. Ehrhorn, and he left out Mr. Bremner, and I want to add him to the list. There is the crux of the argument. The men who have been named are entomologists, and we don't want entomologists, we want quarantine officers, we want tree policemen, we want somebody to enforce the law. Mr. Volck works in Santa Cruz County as a student; he studies the way to destroy the codling moth. That is not the work of the horticultural commission. Their work is to enforce the law and make you kill that codling moth when he discovers just what is proper to use there. We want some one to enforce the law; we want tree policemen. An entomologist is not a tree policeman. Imagine Mr. Carnes being a tree policeman! Mr. Carnes will spend his days and nights out in this insectary studying the life history of these insects, which is of the greatest importance, but the county commissioner wants to be a hard-headed fruit-grower, farmer, man of good judgment, who will take enough interest in it for the measly $4 a day which he gets in order to apply that law and apply the knowledge which these gentlemen as entomologists have supplied to us. That is why I don't want to see one man with this arbitrary power sitting in judgment on these questions.

The question of the adoption of the resolution under discussion was then put and carried.

MR. NEWCOMB. How about this committee that was to report to-night?

PRESIDENT JEFFREY. Will you make a statement, Mr. Mills?

MR. MILLS. Mr. Chairman, the committee is not advised that it was to prepare a report for this Convention. The resolution passed at Marysville instructed them to prepare a report and submit it to the next Legislature, and we were not asked, nor have we prepared ourselves, for the submission of a report at this time. We were to appear before the next Legislature and help push through such a bill as might be drawn. Judge Shields is the chairman, and I do not think he is here.

PRESIDENT JEFFREY. Your recommendations to-night will go before that committee for their consideration, of course.

MR. MILLS. I think that was the purpose of this meeting, that you would discuss some of those things that you wish amended and changes in the law, for the guidance of the committee.

On motion of Mr. Dingle, duly seconded and carried, the Convention recommended that the salary of inspectors be raised to $3.50 per day.

Mr. Mills moved, and the motion was duly seconded, that the Convention recommend that the salary of the commissioner be raised to $5 a day.

MR. LIVINGSTON. I would think, considering the membership here, that that would be a very delicate question to put, considering that nearly all the members are horticultural commissioners. I was about to suggest that the wording of it, instead of saying, "We, the fruit-growers," say, "We, the horticultural commissioners, recommend."

MR. DINGLE. If there is going to be anything done on the raise of the horticultural commissioner's salary, I believe it would be a good thing to put this salary on a monthly basis instead of a per diem. I am not asking for any increase; I am perfectly satisfied.

PRESIDENT JEFFREY. I would like to ask Mr. Mills if he knows anything about the report the committee is going to present on this matter. Has the committee considered anything that would touch on Mr. Dingle's suggestion?

MR. MILLS. I don't think that could possibly be done. If we put it on a salary it would have to be a reasonable salary, $125 or $150. There are some counties that have not work for three commissioners at $150 a month, and we must make it uniform. The law is now that he must be paid $4 a day when actually at service.

MR. REED. In our county, if there were a stated salary, the board of supervisors would not appoint any commission at all.

MR. DINGLE. Los Angeles County says if they work all the time give them a hundred dollars. They can put that on a sliding basis, where the man that does not work does not get anything.

MR. LAMMERMAN. That would not work in Shasta County, because we would not have work enough to keep a commissioner busy for a month at a time.

MR. EHRHORN. Isn't it a fact that there is a great deal of difference in the counties? Some counties won't pay their men anything; other counties will allow them a good, fair salary. I have heard men say that their supervisors will only allow them to put in a certain number of days. I think the law should be amended in such a way that the commissioner who is employed by the supervisors shall draw his $4 or $5 a day, and then he shall get that salary for the work he performs. I know lots of commissioners that are only allowed to put in three or four days a month. If we have a law, as we have it to-day, that the commissioners are allowed $4 a day, it is the grower's business to go to the supervisors and insist that that man be paid, whether he puts in thirty days or ten. But it never has been done in some of the counties, and for that reason we can blame the infections that we find in many counties. Some counties haven't got any commission at all. It is all very well to pass laws, but it is the grower who is to blame for not enforcing the laws.

MR. WILLIAMS. Perhaps I don't look at this matter from the standpoint of a horticultural commissioner. I look at it from the standpoint of a grower. It is all very well to talk about raising the salary of a commissioner. I am willing to do that if the measure carries with it some improvement in the laws to make it more effective. Down in my county they are advertising French grapevines, and have been doing it for two years, and all those who are posted in regard to nurseries and grapevines in France know that France is infected territory, all of it, and now we are having brought into our county vines from that infected territory; and we know, too, that it is practically impossible to discover the root louse and destroy it. There is always danger of infection where you introduce these vines. They may say they are thrifty and good vines, which they may be, and they may introduce the root louse among our vines. I have quite a good acreage of vines, and some of my neighbors have already ordered some of those French vines, and by my telling them the danger they rejected them. If we can get some kind of legislation that will prevent those things happening, very well, raise the salary; but if they are not any more efficient than they are now we might as well let it stay where it is. That is San Joaquin County.

PRESIDENT JEFFREY. When we vote on this resolution of increasing the pay of the horticultural commissioners to $5, we ask no inspector or commissioner in the audience to vote on it, and that will go on our record here.

MR. CUNDIFF. I, as commissioner, am not in favor of setting the salary at $5 a day. I think that would not be fair to many counties in this State that have not business to employ a commissioner continuously, although they should have a commissioner. I believe we should have a monthly salary, and I believe there is no legal reason against it, and that should be regulated by the county government act in each county.

PRESIDENT JEFFREY. Wouldn't you be willing for a recommendation of a raise to go to this committee on this motion and let them thresh out all these constitutional questions in their own way, just merely to show that the fruit-growers are willing that there should be a considerable raise?

MR. CUNDIFF. I haven't any objection to a question of that kind going before the committee; but the point is, that should the committee advocate an increase I am quite sure it would invite a great deal of opposition that is unnecessary, that the other plan, if it was understood and discussed, would eliminate.

PRESIDENT JEFFREY. Mr. Mills, will you change your resolution in such a way that it will voice the fruit-growers of this meeting that the horticultural commissioners under this amended law be paid adequately for their services?

MR. MILLS. Yes.

PRESIDENT JEFFREY. Mr. Brink, you seconded the resolution; will you consent to the amendment?

MR. BRINK. Yes.

MR. MILLS. I move you, Mr. Chairman, that the committee be instructed to consider the proper remuneration of the horticultural commissioners of the State, and endeavor to so make the law read that they can be paid by salary, or, if not, that they can be paid a per diem when in service.

PRESIDENT JEFFREY. That is, an increased salary or per diem?

MR. MILLS. Yes.

The motion was duly seconded.

MR. MILLS. My thought is just this. We have passed a resolution that the inspectors be paid $3.50. I believe, as an orange-grower—and am an orange-grower and one of the grubbers, if I do oversee other fellows' orchards—that the commissioner should be paid a larger salary or a larger per diem, such a salary or such a per diem as will attract to the office the ablest men we can put our hands on. We do need entomologists as our horticultural commissioners. We do need men who can quickly put their finger on a dangerous pest that is brought into our communities by the importation of citrus stock or deciduous stock. We can not wait; it will jeopardize our interests to wait to reach Mr. Ehrhorn.

The resolution was put to a vote, the horticultural commissioners and inspectors not voting, and the resolution was adopted.

MR. PEASE. I move that the Committee on Legislation be recommended to take into consideration some method to get at the qualifications of the horticultural commissioners. My point is, that in selecting a horticultural commissioner, he shall be required to pass some sort of an examination showing that he is qualified for the office of horticultural commissioner.

The motion was duly seconded.

MR. MILLS. It is said that this is a commissioners' and an inspectors' meeting, and apparently it is. They are largely in the majority. This resolution immediately and directly affects their office. I make this point, that was raised before, that commissioners and inspectors in this meeting have no right to vote on a thing which directly affects themselves; that it is a question for the fruit-growers who employ them.

MR. DINGLE. We were all asked to come up here and participate in this meeting to-night, and if we are not wanted here I will go home.

PRESIDENT JEFFREY. This is a regular session of the Fruit-Growers' Convention. One meeting we will have pretty soon when the horticultural commissioners will be invited to meet and discuss their needs.

MR. MILLS. And the fruit-growers are those who should decide this matter. I do not think, gentlemen, those of you who are commissioners and inspectors, should press this matter to-night, because we shall take direct issue. God help us if the greatest knowledge that man is gifted with is not necessary at this time in this State, and we must have knowledge.

MR. JUDD. There is one thing I don't quite understand—why we should divide the house against itself. We have got these commissioners here for the very purpose of telling us what they want. We don't know what they want. They have had the experience. If they will tell us the kind of legislation they want the Legislature will give it to us. We are not competent ourselves to tell what we do want.

PRESIDENT JEFFREY. If somebody would whisper to you that there might be a law gotten up in this State regarding the qualifications of horticultural commissioners, allowing the State Commissioner, or a commission of five men appointed by the Governor, to pass upon the qualifications, and that law would provide that 75 per cent or 60 per cent of these qualifications should be good, sound sense and judgment and the ability to come to a reasonable conclusion, and the other 30 per cent scientific knowledge, that would be a law that I know would strike you all as being very common sense and very effective. My attitude in this matter is that we have a large number of horticultural commissioners who have years of experience, and they have sound judgment and common sense and can come to a good conclusion.

MR. CUTLER. As a fruit-grower I am in favor of what Mr. Mills and the President say. Get a commission to examine these commissioners, and let the board of supervisors then appoint them—men that are competent, and pay them a sufficient salary. If it is $250 a month, I am in favor of that. Get a man that knows a bug from a mule. (Laughter.)

MR. BREMNER. I am neither a horticultural commissioner nor a fruit-grower. I think we have been giving the horticultural commissioners a kind of a black eye here this evening. I don't believe they are all as bad men as represented. I have met quite a number of them, and I believe that a majority of the best commissioners that I know are fruit-growers and fruit-raisers who are vitally interested, and they are quarantine men, because they are protecting their property and their home, and I believe they should have some say about it; and I think you should not go down in the record as throwing any slurs on the horticultural commissioners of the State of California.

MR. GARDEN. I am an inspector and I am a fruit-grower. I own land and I have had a very wide experience in the fruit industry. I have never done anything else, practically, in my lifetime. I was born and raised in the northeast part of Scotland, followed the fruit industry there; then I had seven years in the southern part of England. Then I came to the United States and worked in one of the largest nurseries in the country. I also worked in an experimental station, and I know something of the university tendency in this State to absorb everything from the horticulturist. The State University has no trouble in getting appropriations from the State Legislature for all its requirements, but our Chairman has told us that he has had really to go in debt to fulfill his part in getting publications before the people. That is a very sad state of affairs, indeed. It looks like this to me, that the time is just about here when the whole horticultural business has to be turned over to the State University, or the growers have to take a stand and put men with influence in the Legislature so we can have appropriations to meet our needs.

MR. WILLIAMS. I think our horticultural board might just as well be good common sense farmers, and they could hire the entomologist. I think a good common sense farmer could absorb probably 75 per cent of the science of horticulture and entomology, so far as it applies to the bugs that are injurious to his property. I know some of the bugs that are injurious to my vines, but I don't know a hundred per cent of the science that applies to these things, and need the advice of these scientific men.

MR. STABLER. As I understand Mr. Pease's motion, he asks that the qualifications of horticultural commissioners be passed upon by some higher authority. I hope this meeting will remember that there are just two things that a horticultural commissioner may be: he may be an entomologist, or he may be a horticultural commissioner. If he is an entomologist he will be an enthusiast in studying the life history of pestiferous insects. He may be a very poor .entomologist, but a first-class tree policeman, who can enforce the law. The only qualification a commissioner need have is the qualification of enforcing the present law. As the gentleman from the San Joaquin Valley says, it will be quite possible to employ entomologists, and the commissioners should employ them. The average commissioner, I think myself, has not the ability to pass on the insects. When we heard Mr. Ehrhorn's list to-day of about a hundred thousand pests which might invade our shores, think of the horticultural commissioners who could intelligently pass on that! But I don't want to see this Convention confuse the idea of a horticultural commissioner being an entomologist on the one hand and being an executive officer on the other hand, with the idea of enforcing the law. Keep that matter in mind, whether or not we want entomologists or executive officers.

Vice-President Cutter at this point assumed the Chair.

MR. LIVINGSTON. I would like to ask Mr. Stabler if it is possible for a man to be a first-class tree policeman without being an entomologist?

MR. STABLER. I want to say that I do think a first-class tree policeman does not need to be an entomologist, because with the list Mr. Ehrhorn has presented it would be a life study of a hundred men. We can not expect throughout the length and breadth of the State of California to have at our beck and call entomologists who are competent to pass on all these pests. My policy has been to pass all suspected cases to the State Entomologist.

MR. EHRHORN. There is one point I wish to draw attention to. They have a horticultural commissioner at Marysville, and as far as we can ascertain the white fly existed three years in Marysville before that man knew it. If he had been an entomologist, but not a scientist, if he had an education that would allow him to tell a white fly from a grasshopper, he would have discovered the white fly as soon as it appeared. If your tree policeman has those qualifications he will be all right; but if he has not, he will be all wrong, because in your county some pest might exist for three or four years and be spreading all that time before he would be able to discover it or before somebody else discovered it. In regard to inspecting nursery stock and referring it to our office, that is all very fine, but you have got to be able to protect your own county. How can we tell in San Francisco that a man is packing something into your county that will all of a sudden give you a plague?

MR. STABLER. I admit what Mr. Ehrhorn says about our horticultural commissioner, but Mr. Ehrhorn came up, and he didn't know whether the white fly was a citrus fly, and passed it up to Washington to be sure of it.

THE CHAIRMAN. What is this instruction? Is it to instruct the committee that has been appointed on legislation to act? Are they to hand us a revision of this law, Mr. Jeffrey?

MR. JEFFREY. The motion under which this committee was appointed was made at Marysville one year ago. It instructed me to appoint a committee of five men, which I did at Riverside, to be known as the Committee on Legislation. It was their duty to present some needed laws to the Legislature. The committee was not required to report to this meeting or any other meeting, and the committee is operating under that instruction, which you will find in the report of the Thirty-third Convention.

THE CHAIRMAN. Then where does this instruction this evening come in?

MR. JEFFREY. To advise them. I am not going to speak now for more than three minutes, and I don't want to influence the delegates one way or the other, only this, as to the qualifications of the horticultural commissioners. In my judgment, the field where the university is doing such good work in this State is entirely separate from my office. I apprehend that Professor Wickson's field is investigational and experimental, scientific examination of the fundamental principles of all these things and the best way to handle these pests and the best ways to keep them out, and it is not executive in any sense; it is scientific in every sense; and Professor Wickson is trying to make it scientific. It is one of the greatest works we have in the United States to-day. Now, that touches directly on the point Mr. Pease has made, that is, that in the execution of the laws a great deal of scientific knowledge is not necessary, unless you can have with it the ability and the firmness and the courage and all that that goes to make a good horticultural commissioner, to execute the laws that your Legislature has given you. If I can make you see that they are two entirely separate fields, with no conflict, not even overlapping, you will see at once that you must not require your horticultural commissioner to be a scientific entomologist. I think a scientific entomologist might have the least judgment in the world as to how to advise farmers as to many points in their orchard work. When I was in the office in Los Angeles for six years I was asked more questions relating to the trees than I was as to the insect pests. One of the main requisites of a horticultural commissioner is good judgment, good sense, based on sound experience, and ability to come to a conclusion regarding many, many matters that are not connected at all with insect pests. You might have that with your entomologist. The probabilities are, if he is a young man, you would not. There is one working now over here; his functions are experimental; he is representing your State. I refer to Mr. Volck's experiment. Mr. Volck might or might not have any ability to give those orchardists advice in many of the cultural functions. The fields are entirely separate, and you must have a good horticultural commissioner, with good judgment, and leave the young man to go out into the field where Professor Wickson has not enough men.

PROFESSOR WICKSON. I have no objection to the definition, except that Mr. Jeffrey, unintentionally, no doubt, left out the word "educational." He gave us credit for all sorts of good things, but did not say anything about the educational function, which I think is the chief one we have to perform, and if he will include that I have no objection to his statement.

MR. MILLS. Mr. Stabler wishes to put particular stress upon one thing, that a tree policeman need not be necessarily a commissioner; that the commissioner is separate and apart from the technical knowledge that we are asking for. He says that we can get entomologists to do that work for us in our several counties. Now, gentlemen, if you know where they are, point them out. I believe that most of the entomologists in this State, working in this line, are right here. We have more counties in this State, pretty near a dozen times over, for the entomologists we have to go around. A Mr. Maskew or a Mr. Ehrhorn or a Mr. Bremner or a Mr. Carnes can pass over no more ground in an orchard than the ordinary horticultural commissioner. An inspector must have knowledge, for the quarantine law says that if any infested stock come into the State it shall be shipped out of the State or destroyed. Shall we wait to send a suspected case of the *Aleyrodes* to the State University or to your office? The possibility is that the county will be infested. We must have men with entomological knowledge in that position. If you say that we will employ an entomologist, why not have that included in your commissioner? Why should I, a horticulturist, having my every cent involved in the industry, spending, as I do, for myself and others, over $50,000 in twenty-four months in fighting scale—why should I be jeopardized by reason of the fact that there is not in the office of commissioner of our county a man who is competent to tell me if there is a scale introduced into that county, and if it is a dangerous scale? We must have that, gentlemen; you orange-growers who are paying heavily of your taxes and bearing the burdens of this great tax upon us know that we must have in that office, first, knowledge, and horse sense afterwards. A commissioner without some considerable knowledge of entomology is no commissioner. He is no tree policeman, for he can not tell the very pest that is jeopardizing your orchard. If we will choose men wisely, if we will demand that they pass an examination as to their qualifications to fill that important office—and it is a more important office than the supervisor's, a more important office than any other county office, because it has in charge the protection of an enormous industry, in which your very existence is involved. Gentlemen may laugh. I laugh not because I know the terrible tax on the majority. A man said to me the other day, "I can not get my bread and butter because of the determination to wipe out this scale. My orchard is infected, and it takes all my income to cleanse it." That is true, because it has been allowed to come in there through ignorance of the scale that we are endeavoring now to protect ourselves against. But you are told by Mr. Ehrhorn of that dangerous pest in Mexico, the dangerous pests in the Mediterranean, in Australia, and in Florida. You must have protection that you are entitled to. I beg of you, gentlemen, that you do not hesitate on this question, but that you shall demand and get men who are competent, intellectual men who are competent by reason of their knowledge of entomological questions, to fill an office that is one of the most important in this State. I beg of you to give this great consideration, serious consideration, and that you shall demand and get competency and knowledge, for it is knowledge that we need if we are going to get protection.

MR. FOWLER. Mr. Mills argues eloquently and long here in regard to the need of an entomologist as a horticultural commissioner, and yet he names four or five men in California that are entomologists. I would like to ask where he is going to get his commissioners.

MR. MILLS. You have answered the question for me. There are only a few men of the standard of Ehrhorn and Bremner and Carnes. They are entomologists. I do not say that you shall get an Ehrhorn, because you can not get him, but you can get a Pease or a Cundiff or a Jeffrey. You can get men who are sufficiently endowed with intellect and absorb knowledge enough—not a scale bug from a mule only, but that he shall know the pests that are now infesting our orchards; that he shall know those that are likely to infest our orchards, and that he shall be able at once to put his finger on it, and not send it to Mr. Ehrhorn by telegram. I plead with you, gentlemen, to demand and get that necessary knowledge which will sufficiently qualify him to fill that important office.

THE CHAIRMAN. I think the question could be boiled down to two points. One faction thinks the horticultural commissioners should not have any more than the common knowledge of the common fruit-grower; the other faction feels that the commissioners should have a certain amount of knowledge. I believe you both agree that the average fruit-grower who is making his livelihood from the business will pass such an examination as Mr. Jeffrey suggests. I don't believe that the gentlemen here expect too much of horticultural commissioners. I am speaking as a horticultural commissioner. There are many diseases and many insects that I know in a general way, and those that are detrimental to my county I believe I could pass an examination on.

MR. REED. I want to repeat what I said before, that I think we waste lots of time. I see they are jumping on some of our scientific friends. The horticultural people do not work with success. It will be impossible, probably, to get in every county of this State a horticultural commissioner that will work to any advantage. I know that it is only where we have such brains as Ehrhorn and Carnes furnish that we accomplish anything. It is a bad thing to have a horticultural commissioner who is a resident in his community, because he hates to do anything that will hurt his neighbor. Take the white fly at Marysville. Mr. Harney made a great many enemies there, and he injured his business, and he to-day, perhaps, would rather not be a commissioner than to be one. I think if we are to get anything in a practical way we should all back up the State Board of Horticulture, to give it more men and to put the county horticultural business in the background. We just fritter away our time, and these pests get in and get established in spite of us. I am a horticultural commissioner, and I would not give two cents for my knowledge. We have to go to Mr. Carnes or Mr. Ehrhorn to get it. We have to go to a big, strong State Commission, and we have got to go to Professor Wickson to get that knowledge and that help. (Applause.)

MR. PEASE. I would like to say just one more word. I think that the horticultural commission of our county probably spends more money than any other commission in the State. We are backed by the people. I started in without any knowledge in this line, but any man who has good judgment and likes this kind of work can write to Professor Wickson for his books and pamphlets; he can get them from the Department of Agriculture; he can send his insects to them and get them determined. If he reads of any pest that is not in his locality, he can send to Washington and get specimens of those insects and have an insect case. That is what I have. I think almost any of the insects that are liable to come in here I have got where I could show them to you. Further than that, I have accumulated a library of about 3,000 publications. Also, with the aid of my wife, I have a card index of that, so I can turn to any subject in a minute.

The motion of Mr. Pease was put to a vote and was carried.

MR. MILLS. I move that the law which provides that stock infested with scale which is brought into the State shall be shipped out or destroyed be amended to strike out "shipped out of the State" and left "destroyed."

The motion was duly seconded and unanimously carried.

The Convention then adjourned until December 2, 1908, at 9:30 o'clock A. M.

PROCEEDINGS OF SECOND DAY.

SACRAMENTO, CAL., December 2, 1908.

President Jeffrey called the Convention to order at 9:30 o'clock A. M.

PRESIDENT JEFFREY. I am requested by Mr. Isaac to state that he is going out of town and will not attend any further meetings of the Convention, so we will have to select some one as Secretary.

Mr. O. E. Bremner was unanimously chosen to act as Secretary of the Convention.

PRESIDENT JEFFREY. The first paper this morning is "Sprays and Their Application," by W. H. Volck. I will explain in behalf of Mr. Volck that he is the county entomologist of two counties largely engaged in apple growing. I believe that the spray question in northern California is one of the big questions to be considered by everybody who is growing fruits, whether it is grapes or peaches. Mr. Volck worked for our commission in Los Angeles County for four or five months when he was a boy, and between that and the university he got his start in the work he is doing. I am glad to present to you Mr. W. H. Volck of Pajaro Valley. (Applause.)

SPRAYS AND THEIR APPLICATION.

BY W. H. VOLCK.

In considering this subject I am impressed with the idea that it is one of considerable breadth and rather difficult to cover in the space of a single paper. Lodeman has published a book of nearly four hundred pages in fine print, and, added to this, many other special works have appeared, which, along with numerous experiment station and Government bulletins, now make up a large total of literature on spraying.

Spraying is such a familiar operation to most California orchardists as scarcely to need defining or preliminary explanation. In the broadest sense we mean by spraying the application of a liquid or solid compound or mixture to the above ground surface of living plants. As ordinarily considered, spraying means a liquid application, or at least a liquid carrier for whatever solid body may be in the mixture. We have, however, to consider the form of application in which the active material is used as a dry powder or dust carried in a current of air, hence the broadest definition must be accepted under this title.

Any agricultural operation involves expense which, if considered in an economic way, must have an end justifying the means. Spraying is no exception to this rule, and the farmer applies spray materials to his crop with the expectation of preventing the appearance of some undesirable condition or the creation of a new and more desirable development. Then the economic result and consequent justification of a spraying operation, for a given crop, is measured by comparing the net returns of a sprayed area with a comparable unsprayed area for a season or term of seasons.

Viewed in this light there is sufficient definite and recurring phenomena in connection with spraying operations to justify the hope that the subject may one day be looked upon as a science. Probably, since the dawn of reason, men have recognized an analogy between plants and animals, or, in other words, a relationship in all life. Then it is not surprising that there were attempts to cure sick conditions in plants by administering medicines, even in very early times. The crudity of these early attempts to control plant diseases would no doubt bring a smile to our faces if we could have them described to us. Even those of recent enough date to be chronicled are often quite amusing, but every now and then the delver into the ancient history of spraying is surprised by the accuracy with which some of the formulas hit the mark, even in the light of modern investigations.

While recognizing a general analogy between plants and animals, the early experimenters must soon have been impressed with one important difference. With plants it is impracticable to introduce a medicine or drug directly into the internal structure of the organism, and there have it accomplish a healing process. For this reason plant remedies usually partook of the nature of liniments or surface applications. Fortunately for the success of man's efforts, the great majority of plant disorders are controllable by surface treatments.

Decoctions of herbs and strong smelling substances entered largely into the composition of the early plant remedies. Of course, only such simple chemical substances as were available could be tried. Milk of lime and limewater must have been used at a very early date, and has been frequently and strongly recommended, both as an insecticide and a fungicide. Sulphur was also among the first of the materials used in plant medication. This substance was available to man at comparatively small cost, even when the arts were in a very crude stage of development. Then, with the knowledge or belief in the efficiency of sulphur and lime, what was more natural than to combine the two, and get a double value. Such combinations were often made and applied with good results, but the value of prolonged boiling of the two ingredients together in water seems to have been a comparatively recent discovery.

As time went on the list of substances and compounds tried out by the experimenters must have included practically everything within the range of their experience, but this work was for the most part fruitless, because not conducted in an orderly and scientific manner. Perhaps the substance was of value for some trouble, but not for the one in question, or it may have been a proper remedy, but applied at a wrong time, or again, it may have been of no value whatever. Under any of these circumstances the substance was rejected by the experimenter, because he did not have the necessary knowledge of plant diseases, chemistry, and allied sciences to enable him to discriminate between the three cases. Still another cause often led to error. The trouble in question may have been just ready to abate from natural causes. Then the application of almost any substance or mixture would give good results, a state of affairs that often led to a belief in the value of really worthless methods of treatment. Even the modern horticulturist is not immune to error from this cause where the practice of comparing the treated with untreated plots is not rigidly followed.

The continued application of various compounds and mixtures did, however, eventually result in a right combination, so that several of our most valuable insecticides and fungicides are handed down to us as a result of this unguided experimentation. Viewed in this light we should be thankful for the past, but have no desire to live it over. There is no longer any need for this kind of guesswork, when trained specialists provided at the public expense devote their time to such problems.

Notwithstanding the comparatively early discovery of good insecticides and fungicides, the application of them commercially on anything like an extensive scale is a matter of recent history. This backwardness in practical development was due largely to the great cost of spray materials and their application. Not until the arts and sciences had progressed to something like their present state of perfection was it possible for the agriculturist to make use of the gardener's knowledge. Fancy what some of our modern horticulturists, who object to the arduous task of spraying, would say if they were instructed to go forth with brooms and whisk some rank mixture upon their trees. Then cheap spray materials and the modern spray pump have contributed quite as largely to the commercial development of spraying as has the great dissemination of knowledge concerning the value of such work.

Modern Spraying.—We now come to the consideration of the modern practice and science of spraying. It is well known that the diseases and disorders of plants are largely due to animal and vegetable parasites which, during a portion of their life, are external to the plant body. During the development of these parasites on the surface of the plant there is usually a vulnerable period when the application of the proper insecticide or fungicide will result in the death of the disease producing organisms. It is in the determination of the proper timing of spray applications that the great value of scientific studies in the life history of plant parasites becomes apparent. The critical period with some fungus diseases is so short that the delay of a week may mean all the difference between failure and success.

In the treatment of vegetable parasites of plants, spray materials are used that have the general designation of fungicides. The fungicides, as may be inferred from the name, are capable of killing various fungous parasites of plants at some stage of their development. These fungous parasites are in general propagated by means of spores or seed-like bodies, which are produced in enormous numbers by the mature stages of the fungus plant.

The lodgment of the spores of a parasitic fungus on the surface of the proper host plant marks the first stage in the process of infection. The further development of the parasite requires the germination of these spores and the growth of fungus plants from them, which either penetrate into the tissue of the host or spread out over its surface. The germination of fungus spores, like that of ordinary seeds, requires the proper amount of heat and moisture. The water of fogs, dews, and rains supplies this moisture, and unless such climatic agencies are operative for a sufficient length of time there can be no fungus infection.

Hence, at times we find that the weather has very marked fungicidal properties, and dry seasons are usually characterized by the absence of blights and mildews. So far, very good, but man can not control the weather, and what the climate did for him one season may be exactly reversed in another. In casting about for the solution of this problem it is evident that if the water of fogs, dews, and rains could be tinctured with a substance that would prevent spore germination the desired result might be obtained. Such a substance could be sprayed over the plant to be protected at or just previous to the time of spore germination. The water of the spray, as well as that from dews, rains, and fogs, would then bring a solution of this substance in contact with the fungus spores.

A substance which can act successfully as a fungicide on the surface of a living plant must in general have the following properties: First, a very dilute solution should be effective; second, the deposit should be enduring, that is, not all washed away by the first rain; third, the substance must not be injurious to the plant to which it is applied as a protection. Substances which will kill fungus spores in very dilute solutions were known in the early part of the nineteenth century. The great efficiency of copper sulphate in that respect was discovered at this time, and the chemists of the same period were familiar with the blue precipitate produced by mixing limewater with bluestone solution. The knowledge of the chemist and biologist were then sufficient if put together to have produced the Bordeaux mixture. The matter looks very simple to us now, but the practical value of these discoveries remained unknown until 1882.

The Bordeaux mixture is now regarded as the standard fungicide. In general, it conforms quite closely to the requirements laid down. It retains its fungicidal properties long after the date of application; in fact, the writer has found the deposits of this fungicide remaining on apple leaves four months after spraying, still capable of preventing the germination of apple scab fungus spores. With regard to plant injury the Bordeaux mixture is not perfect, and more fault has been found with it as the quantity used has increased. No injury has ever been reported from the use of Bordeaux mixture on dormant trees, and the hardy field crops, such as potatoes, seem to be uninjured by summer applications. Apple and pear foliage is seldom injured, but the fruit may be badly russeted if the application is followed by much rain. Peach foliage is very sensitive to Bordeaux injury, and complete defoliation may occur even after light applications. No change in the formulas has yet corrected this tendency to injure, and from a chemical standpoint it is not easy to see how the use of greatly excessive quantities of lime can improve matters. Then, with these limitations in mind, the Bordeaux mixture is a satisfactory remedy for the pear and apple scabs, peach blight, potato blight, and other similar fungus diseases. It is not especially effective against mildews, and is seldom recommended as a remedy for that class of fungi. Bordeaux is a slightly soluble compound of copper in the form of a fine precipitate, which is readily sustained in water by agitation. The fineness of the precipitate seems to have much to do with the efficiency of the mixture, and modern formulas are calculated to produce a compound that remains in suspension a long time without agitation. This is accomplished by diluting the copper sulphate solution and milk of lime with large amounts of water before pouring them together.

The Bordeaux mixture is not necessarily a liquid application, but the precipitate may be dried and reduced to a fine powder. In this form it has been used in dust mixtures, to be applied with a blower. The results obtained with dust applications of Bordeaux appear, however, to be much inferior to the liquid applications.

Other compounds of copper are occasionally used as fungicides, such as ammoniacal copper carbonate and soda Bordeaux. These compounds are used on nearly ripe fruit, or where the stain left by ordinary Bordeaux might be objectionable.

Science is now acquainted with a long list of substances and compounds that have pronounced germicidal value, and it would appear that many of them might be used as fungicides. I do not doubt that the future orchardist may make successful use of some of these compounds, but at present the only element that takes rank alongside of copper as a fungicide is sulphur and certain sulphur compounds. Pure sulphur has long been recognized as a specific remedy for mildews. The element appears to act through the agency of its fumes, and it is only necessary to dust the mildewed plants with finely powdered or sublimed sulphur to get the result in the simplest cases. The oidium grape mildew is perhaps the best example of complete control by sulphur dusting. In general, however, sulphur compounds require a more intimate contact with the disease producing organism than can be obtained by the dusting method. This necessarily implies liquid applications. Finely divided sulphur can be mixed with water by agitation, and so applied as a spray. In this form sulphur is much more efficient, especially if a small amount of flour paste is added to insure the adhesion of the particles. Contact of the spray with the parasite is made still more perfect by dissolving the sulphur and using this solution as a spray. These sulphur solutions are usually compounds of the element with lime or some other alkali, and as such may be very effective fungicides. Soluble sulphur, however, is liable to cause injury to plants in foliage on account of its power of penetration. Danger of plant injury then limits the use of sulphur in its most effective form, and causes it to be regarded as a winter spray for dormant trees. It is true that by diluting greatly, and applying with care, the lime-sulphur solution is a good remedy for grape mildew in moist, cool climates, where dry sulphuring is not effective. The lime-sulphur solution promises to be a good remedy for the apple and pear scabs when applied just as the first blossoms are opening. At this time the trees withstand the full winter strength without suffering permanent injury. In short, sulphur appears to be able to accomplish much the same work as the compounds of copper, and often with less danger of injury to the treated plants. Several insect parasites are also controlled by these same sulphur applications, being in this respect entirely different from Bordeaux, which is not known to have insecticidal properties. By precipitating the soluble sulphides with iron a compound is formed which has many of the properties of the Bordeaux mixture, and also to a fair degree the insecticidal and fungicidal ability of the sulphur solutions. This insoluble sulphide has been shown to be a practical remedy for the powdery mildew of the apple, and promises to control the scab and other diseases as well. The plant injury appears to be less than that caused by Bordeaux, and russeting has not been noticed from its use.

Recent investigations have also shown that the old and so-called self-boiled lime and sulphur solution is an effective and comparatively harmless summer fungicide. This formula is seldom ever more than a mixture of powdered sulphur and whitewash, and is in reality a return to the first principles. Thus it is seen that modern investigators are turning their attention to the compounds of sulphur as a possible relief from the shortcomings of the Bordeaux mixture.

Insecticides.—Turning now to the spray materials designed to control insects, we find a great diversity of requirements, and, consequently, a much greater variety of materials in use than with the fungicides. Except in the case of sulphur and its compounds, insecticides seldom have any fungicidal value. The most notable and widely applicable of the sulphur compounds, with both insecticidal and fungicidal properties, is known as the lime-sulphur solution.

We have seen that the requirements of a fungicide are that under various climatic conditions it must be able to prevent the germination of fungus spores, and yet not prove injurious to the sprayed plants. An insecticide must, on the other hand, be able to kill insects, either by outward contact or internal poisoning. The lime-sulphur solution is a contact insecticide; that is, when applied as a spray it is capable of killing certain insects with which it comes in contact. Even the deposit left by the spray has killing properties with certain very small insects. This enduring property of the sulphur insecticides greatly enhances their value, for those insects not killed at the time of application may afterwards succumb to the effect of the spray deposit.

The lime-sulphur solution as a tree spray appears to have originated in California, and was first employed as a remedy for the San Jose scale. The old formulas all called for comparatively large quantities of lime, as well as salt, and were both difficult to prepare and expensive. The effectiveness of the lime, sulphur, and salt wash was very apparent, and when the San Jose scale made destructive progress in the Eastern States it attracted the attention of scientific investigators. Various modifications of the formula were tried, and attempts made to discover the effective portions of the wash. The chemist was even consulted in the matter. As a result of these investigations it was found that the effectiveness of the lime-sulphur solution depended on a soluble compound of sulphur, known to chemists as calcium polysulphide. Evidently, then, the formula best adapted to the production of this compound is the one that should be chosen for the preparation of the wash. The elimination of unnecessary ingredients and complications from the lime-sulphur formula has greatly simplified its preparation, and so reduced the cost. The strictly modern formula reads something as follows:

To make 200 gallons of spray of proper strength for the San Jose scale use: Sulphur, 66 pounds; lime, 33 pounds; water (to prepare), 50 gallons. Place the water in a boiling vat that will carry the quantity safely without danger of boiling over. Then, when fairly hot, add the lime, stirring to insure the formation of a smooth milk of lime. The sulphur should now be added, and the mixture boiled moderately for forty-five minutes to an hour. During the boiling stir every few minutes by raking over the bottom of the vat with a hoe.

When this formula has boiled sufficiently it will be a very dark-colored, rather thin, liquid, with only a small amount of sulphur left undissolved. The solution is now ready for straining, when it may be diluted with water to make 200 gallons. If extra lime is desired, well strained milk of lime may be added along with the water.

This formula is given in detail, because it illustrates the great advantage that scientific investigations can be to the horticulturist. Those orchardists who are familiar with the old lime, sulphur, and salt formula will at once be impressed with the comparative simplicity and cheapness of the new formula.

The lime-sulphur solution has its proper place as an insecticide and fungicide, but is by no means a cure-all. The insect troubles best controlled by it are the San Jose scale and closely allied species and mites. It is seldom of value against large sized insects, and the deposit left by the sulphur solutions is not poisonous to chewing insects. The peach worm is an exception to the rule, for here the lime-sulphur solution is effective against a rather large insect.

Fortunately, other contact insecticides are known which will work where the lime-sulphur solution fails. These are chiefly soaps and oils and mixtures of the two known as emulsions. Kerosene oil emulsion and whale-oil soap were among the first of these to come into general use, and are still in good repute as insecticides. Of late years various crude oil products, and even crude oil itself, have been used in the form of emulsions and mechanical mixtures to control insect pests. Many of these mineral oils are very deadly to insects, but they are also quite dangerous to plants, especially in foliage, and must be handled with extreme care. Some of these oil sprays are quite cheap, and so offer a strong temptation as a substitute for more expensive methods. Practical orchardists have frequently been so infatuated with the apparent virtues of distillate oil as a scaleicide for orange trees that they have persisted in its use even after scientific investigations had shown the principal contention of the oil advocates to be based on a fallacy.

The trouble with most mineral oils is that they are of a nonvolatile nature, and so succeed in injuring the foliage before they have dried away. Kerosene is an exception to this rule, and may be used on the foliage of citrus trees at an 8 to 10 per cent dilution, and on apple, pear, and peach foliage at 5 to 8 per cent. The oil may be used in the form of a soap emulsion or the mechanical mixture with pure water. The kerosene oil spray so applied is a good remedy for plant lice, mites, and certain scale insects.

On dormant plants injury is not so likely to occur, and so they may be sprayed with some of the other oil emulsions, including even crude oil. The distillate lye mechanical mixture is perhaps the best known to California orchardists, and is a good remedy for the brown apricot scale and black scale on dormant trees. Crude oil emulsion is used to some extent, and apparently gives good results as a scaleicide. The oil sprays have very little, if any, fungicidal value, and should not be used where the lime-sulphur solution will serve as well.

We can not well leave the subject of contact insecticides without mentioning tobacco or nicotine extracts. From the standpoint of effectiveness in very small quantities, nicotine is by far the most potent of the contact insecticides. Tobacco decoctions, such as are used in spraying for aphids, seldom contain more than .01 per cent of nicotine. Nicotine is effective against aphids, mites, and other small insects, including thrips, and has this advantage over other spray materials recommended for such purposes in that it is free from foliage injuring properties. The cost of nicotine sprays is, however, somewhat expensive when the quantity used is sufficient to give good results under orchard conditions. Here, then, is a problem for the chemist, namely, to reduce the cost of nicotine or provide some substitute.

Internal Poisons.—With the class of insects that eat the tissue of plants it is possible to introduce into their stomachs along with the food some substance which will cause death much in the same manner that larger animals are poisoned. Stomach poisons for insects are now limited to the compounds of arsenic, for, although in these days of rapid progress there are hints of other things, none have yet been demonstrated to be practical. Arsenic, while a potent poison for insects, is also deadly to plants, hence this element must be prepared in such a way for spraying that it can not penetrate the plant tissue. The problem of preparing a safe arsenical spray has occupied the minds of chemists and entomologists for a long period. Various expedients have been recommended to prevent burning from paris green, such as the addition of lime or the Bordeaux mixture. The results obtained by different experimenters varied enormously, and there was much confusion as to recommendations.

The trouble was diagnosed correctly to be due to water soluble arsenic, but the source of this dissolved arsenic caused confusion. The usual explanation was that the free or uncombined arsenic present in the various arsenical compounds, such as paris green and arsenite of lime, caused all the trouble. The statement found in standard works on chemistry to the effect that these arsenical compounds themselves were insoluble in water was accepted as exact truth. Efforts were made to perfect the existing arsenicals and produce them in such purity that there would be no uncombined arsenic, and consequently no damage.

About this time a chemist in the employ of the Gypsy-moth Commission took arsenate of lead down from the shelf of chemical curiosities, and proposed to use it as an insecticide. In the early work with this substance it was found that very large amounts could be applied to foliage apparently without injury; but, as we shall see later, it was yet too soon to generalize in the matter.

In the spring of 1903 there was begun in the Pajaro Valley of this State an investigation of the codling moth problem. The State University, coöperating with the local Orchardists' Association, furnished the means for this investigation. In the beginning it was intended to make of this work a sort of demonstration campaign, so a considerable acreage was sprayed with paris green. The paris green was carefully tested to determine its purity, and all other known precautions were taken to prevent foliage injury. As a result of this year's work the codling moth was well controlled, but the trees suffered great injury, both to foilage and fruit. Such was the magnitude of the damage done that it became imperative to make a study of the causes of arsenical injury. It fell to the lot of the writer to take charge of this work, and, with due acknowledgment of all the assistance that has been received from many sources, we are able to report a final and complete success.

The failure of paris green was found to be due to the leaching effect of wet fogs and dews so characteristic of the coast climate. The arsenical might not be sufficiently soluble to dissolve appreciably in the spray tank. but weeks of continued wettings after it had been deposited on the leaves caused enough arsenic to go into solution to penetrate and poison the tissue of the plant. A great variety of arsenic compounds were tried out on the foliage of tender plants, and most of them failed in the same manner as paris green. The only arsenicals that stood the foliage tests were certain samples of arsenate of lead, strangely; others that were apparently as pure burned the foliage. We finally recommended Swift's arsenate of lead, because the samples we had tested proved satisfactory. Ultimately it developed that no two lots of this material were alike, and while some were entirely satisfactory others did serious injury.

The uncertainty in the action of arsenate of lead, which we soon found to be a common fault of all the existing brands, made it necessary to continue the investigation. It was not until an exhaustive chemical study of these compounds had been made that the cause of trouble was finally discovered. Arsenate of lead as commonly manufactured was found to be a mixture of two different compounds of arsenic. One of these carried more of the poisonous element than it could hold under the leaching action of wet fogs and dews, which resulted in the formation of an arsenical solution. with consequent poisoning of the foliage. The other compound contained only such arsenic as it could hold, and so was entirely safe. The next and final step was to perfect a process of manufacture by which this desirable compound (orthoarsenate of lead) could be made cheaply and with certainty. Such, in brief, is the story of the evolution of an arsenical designed to meet very exacting requirements. but also equally applicable to general conditions.

After having obtained a proper arsenical it is necessary to use it in such a manner as to make it effective. The arsenical must be of such a nature that it will not dissolve in water, and yet will yield its poison to the digestive juices of the insect's stomach. Necessarily only those insects that feed on the surface tissue of plants can be poisoned by arsenical sprays, and in some cases a special period in the life history of the insect must be chosen for the application of the poison. This is true with the codling worm. which can only be poisoned during the brief period between the hatching of the egg and the entrance of the young worm into the apple. Notwithstanding this short period of vulnerability. it is possible to gain complete control of the codling moth by spraying with arsenate of lead. Other insects of the moth order, as well as beetles and sawflies, are largely controlled by the use of this arsenical. In a very few instances arsenate of lead is not a sufficiently strong poison. the tussock caterpillar being a very good example. This insect is a leaf feeder. and must eat whatever is applied to the foliage as a spray. but so resistant is the caterpillar to arsenical poisoning that double doses of arsenate of lead seldom produce a noticeable effect. For the tussock caterpillar we have been trying a much stronger arsenical poison, known as arsenite of zinc, and with fair promise of success. Zinc arsenite is new as an arsenical, and gives promise of being quite valuable for special purposes.

Diseases Not Controlled by Spraying, and Limitations.—While the great majority of plant troubles now yield to the proper spraying methods, still there are certain ones that are not yet controllable in this way. The physiological diseases, or cases in which plants are sick without an apparent cause, and those parasitic troubles where the pest is at all times invulnerable to spraying methods, are in this class. The diseases of the roots of plants usually can not be reached by spraying or outward application, but fortunately with these and other refractory cases special means have been devised that give satisfactory control.

Even where spraying is effective it is seldom more than a means of control rather than eradication of any given pest. This is due to the fact that it is not possible to so spray tree or plant in such a way as to insure the complete covering of every part. Such missed portions are often very considerable in general fieldwork, and so the parasite remains in reduced numbers to again multiply and require treatment later. It is with due acknowledgment of the limitations of spraying that we at the same time contend in favor of such methods in the majority of cases, on the grounds that they are a complete economic success.

The Application of Sprays.—Thus far the remedies have been discussed with only a casual reference to the way in which they can be applied. For liquid mixtures the spray pump is familiar to all, but there are many kinds of pumps, some of which are much better adapted to their purpose than others. The requirement of a spraying outfit is that it apply the liquid thoroughly and in an economical manner. It requires considerable power to force liquids through the spray nozzles in a copious and well divided spray. The difficulty of supplying this power is the chief fault with hand pumps. It is not sufficient to break the liquid up into a fine mist, but for economical and efficient work there must be considerable volume and force as well. Carrying force and covering power are of more importance than the fineness of the mist. The owners of hard working hand pumps will find that they can greatly increase the ease and efficiency of operation by using Bordeaux nozzles, opened out to carry well, and not attempting to maintain a high pressure.

In general, the modern power outfit, when equipped with a good revolving agitator, is the most efficient and economical machine. The agitator is a point of considerable importance, and should be capable of mechanically mixing oils. Paddles working back and forth are not capable of doing this, and therefore constitute a serious fault in any outfit equipped with them. With power outfits the best results are obtained by working at high pressure, for then large volumes of well divided spray are delivered with proper force.

When once equipped with the proper outfit much then depends on the skill of the man handling the nozzle. To spray a tree properly is no easy matter, and a rather difficult thing to teach men. The main thing to remember is to keep the nozzles directed at the tops and higher portions of the trees until these are thoroughly sprayed, then the lower branches can be quickly finished, because the drip from the tops has already partly wet them.

Such are the general rules for liquid spraying, but spray materials are also applied in the form of a dust by means of blowers. The advocacy of dust spraying is a special hobby with some, and evidently has its proper place in modern economics. There is no difficulty in constructing blowers that will deliver great clouds of dust, and with sufficient force to drive it entirely through large trees. The distribution of dust over the foliage is, however, less uniform than the deposits of liquid sprays. Some portions of the foliage are usually heavily coated with the powder, while other large areas will show scarcely a trace. The efficiency of dusting is largely determined by the nature of the trouble to be controlled. As a distributer of arsenical poisons the method is fairly successful, and good control of the codling moth can be obtained in this way. For the application of sulphur as a control for mildew, asparagus rust, and red spiders, the method is of undoubted value. On the other hand, such fungus diseases as the apple and pear scabs appear to be very poorly, if at all, controlled by dusting. For scale insects dust spraying is evidently valueless. Hence, to meet all conditions, the orchardist must be provided with a liquid outfit, and unless the economic advantage of the dusting method is very great it will not pay to bother with it. The dust spray advocates usually claim a very much reduced cost of application as compared with liquid spraying, but in the opinion of the writer, if they used the quantities of dust and applied the same with the thoroughness required to insure efficiency there might not be so much difference. In general, the most successful users of dust sprays are those that really have very little to spray for. As a means of controlling the codling moth in hillside orchards the duster is worthy of attention.

Commercial Spray Materials.—It is entirely in keeping with modern methods that attempts should be made to manufacture and vend ready for use spray materials. There is undoubtedly a legitimate field for such efforts, with benefit for both the manufacturer and consumer. Unfortunately, however, we can not give an unqualified recommendation to the spray manufacturer. The history of plant theraputics has been much the same as that of human medicine, and the quack plant doctor is a familiar sight to the horticulturist. These charlatans are usually characterized by their advocacy of some special cure-all that will restore any plant to a state of perfect health. Another characteristic, quite as certain as a means of identification, is the open warfare that these individuals maintain with the university professors and other authorities. The consumer should refuse to have anything to do with any material that is not fully recommended for the purpose in question by the Horticultural Commissioners, the State University, or the Government Department of Agriculture.

Turning to those legitimate producers of really valuable materials, we can be just as positive in commendation of them as in condemning quackery. The proper production of spray materials has much to do with the science of chemistry, a knowledge of which, I regret to say, is not very general among the horticulturists. Commercial spray manufacturers can, on the other hand, afford to hire such expert assistance as is necessary to produce a uniform and desirable product. Further, by cheapening and removing many disagreeable features from the spraying operation, the commercial manufacturer can greatly increase the amount of such spraying, with resultant general improvement in conditions.

The spray manufacturer should in general be able to supply ready to apply insecticides and fungicides cheaper than the consumer can prepare them, when all things are considered, and they are not doing their full duty unless they strive to meet this condition. There are some materials which the consumer can not successfully produce himself, and are, therefore, entirely in the hands of the commercial manufacturer.

This is the case with neutral or orthoarsenate of lead. The orchardists of the Pajaro Valley would not be able to take advantage of the discovery that their money had paid for if a spray chemical company had not been organized to make and place the material on the market. The spray manufacturer also has a legitimate field in the production of lime-sulphur solution, oil emulsions, Bordeaux, and many other sprays.

It is almost certain that in the near future the manufacture and sale of spray materials will be regulated by State and Federal laws. This will give the consumer the necessary protection against adulterations and quack remedies. (Applause.)

PRESIDENT JEFFREY. I am now ready to announce the Committee on Resolutions, and I would like to have that committee get together just as soon as they can. I will appoint James Mills, George Chambers, A. N. Judd, P. D. Fowler, and George H. Hecke. The next paper is by Mr. R. S. Woglum, "The Latest in Fumigation."

THE LATEST IN FUMIGATION.

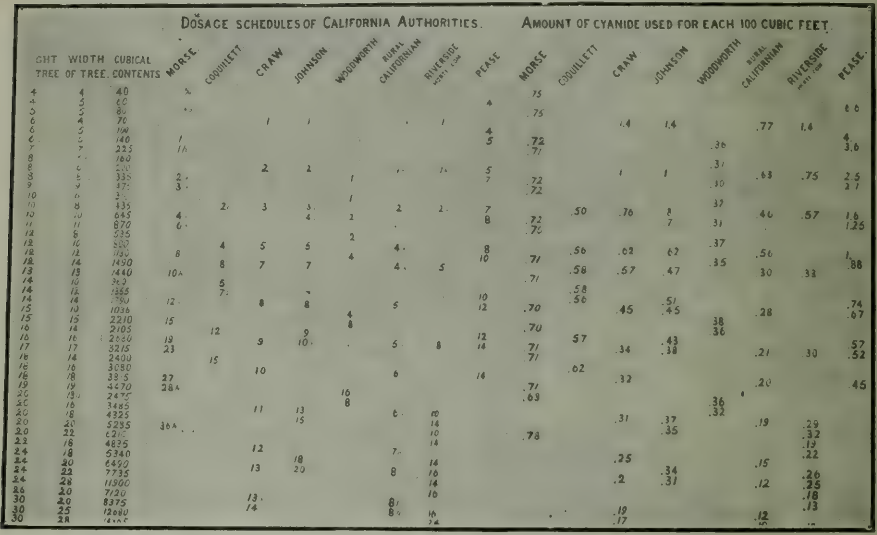
BY R. S. WOGLUM.

Fumigation.—At the last meeting of this Convention I presented a paper on fumigation, covering the field of our activities up to that time. Our honorable President requested me to continue the discussion commenced at that meeting by addressing you on the problems of investigation through which we have passed between that period and the present date. As this field has been a very broad and disconnected one, it will be possible to touch but briefly on the more important phases of this work within the limited time of a single address. For a more thorough discussion of the field of fumigation I would refer you to my report on California work, which will be issued by the United States Bureau of Entomology in the near future.

Condition of the Present Literature on California Gas Work.—In my Riverside address I discussed briefly the chaotic condition of dosage scheduling as published by some of the more authoritative writers on California fumigation since its incipiency. By way of introduction to statements to follow, I wish to touch again briefly on this point, but in a more exhaustive manner than formerly. This I will do by means of the following chart, which has been so prepared as to give an analytical comparison of the dosages proposed by the leading California authorities in their publication:

First, we have the dimensions of the trees, followed by the cubical contents represented by these dimensions. Then comes the dosage schedules suggested by the different authorities, which are so grouped that they can be compared with each other for trees of any desired sizes. The last section consists of a comparison of dosage-rates, or the amount of cyanide used for each hundred cubic feet in the different sized trees.

The table is self-explanatory, yet I will make a few statements to call attention to the great irregularities of the different tables, as shown by this analysis. In looking through the dosage-rate section we find that Morse, Coquillett, and Woodworth dosed their trees exactly in proportion to the contents. Not so in any of the other tables, which exihibit no knowledge whatever of the contents represented by trees of different dimensions. Craw's dosage-rate for his smallest tree is eight times that for his largest; that of the Riverside Horticultural Commission is thirteen times that of the largest. The other tables are about equally variable. Run through and compare the dosages suggested by the different authorities for a tree 6 by 4; one 10 by 8; one 16 by 16. Then compare the dosage-rates of these different men for these different sized trees. After you have finished I think you will agree with me that they are widely separated from so-called uniformity. A half hour of such comparison in this table is interesting as well as instructive.



			DOSAGE SCHEDULES OF CALIFORNIA AUTHORITIES.								AMOUNT OF CYANIDE USED FOR EACH 100 CUBIC FEET.							
GHT TREE	WIDTH OF TREE.	CUBICAL CONTENTS	MORSE	COQUILLETT	CRAW	JOHNSON	WOODWORTH	RURAL CALIFORNIAN	RIVERSIDE HORT. COM.	PEASE	MORSE	COQUILLETT	CRAW	JOHNSON	WOODWORTH	RURAL CALIFORNIAN	RIVERSIDE HORT. COM.	PEASE.
4	4	40	[illegible]								.75							
4	5	60								4								6.6
5	5	80	[illegible]								.75							
6	4	70			1	1			1				1.4	1.4		.77	1.4	
6	5	100								4								4.
6	6	140	1							5	.72				.36			3.6
7	7	225	1								.71							
8	[illegible]	160													.31			
8	6	200			2	2		1.	1	5			1	1		.63	.75	2.5
8	8	335	2.				1			7	.72				.30			2.1
9	9	475	3.								.72							
10	6	[illegible]					1								37			
10	8	435		2.	3	3.		2	2.	7		.50	.76	.8		.46	.57	1.6
10	10	645	4.			4.	2			8	.72			.7	.31			1.25
11	11	870	6.								.76							
12	8	535					2								.37			
12	10	800		4	5	5		4.		8		.56	.62	.62		.56		1.
12	12	1130	8				4			10	.71				.35			.88
12	14	1490		8	7	7		4.	5			.58	.57	.47		.30	.33	
13	13	1440	10								.71							
14	10	[illegible]		5								.58						
14	12	1365		7.		[illegible]				10		.56		.51				.74
14	14	1790	12.		8	8		5		12	.70		.45	.45		.28		.67
15	10	1036					4								.38			
15	15	2210	15				8				.70				.36			
16	14	2105		12		9				12		57		.43				.57
16	16	2680	19		9	10.		5.	8	14	.71		.34	.38		.21	.30	.52
17	17	3215	23								.71							
18	14	2400		15								.62						
18	16	3080			10			6		14			.32			.20		.45
18	18	3915	27								.71							
19	19	4470	28				16				.63				.36			
20	19	2475					8								.32			
20	16	3485			11	13		6.	10				.31	.37		.19	.29	
20	18	4325				15			14					.35			.32	
20	20	5235	36						10		.78						.19	
20	22	[illegible]							14								.22	
22	16	4835			12			7.					.25			.15		
24	18	5340				18			14					.34			.26	
24	20	6490			13	20		8	16				.2	.31		.12	.25	
24	22	7735							14								.18	
24	28	11900							16								.13	
26	20	7120			13.								.19					
30	20	8375			14			8	16				.17			.12		
30	25	12080						8	24									
30	28	[illegible]																

SCHEDULE OF DOSAGE FOR TREES.

It leads us to the knowledge that no two authorities agree. If a man who is contemplating entering the fumigation practice should examine our literature for information as to what dosage he should use, he at once finds himself among a bewildering array of losely prepared dosage tables, which are impediments rather than aids to the economic advancement of this great practice. The subsequent result on the condition of to-day I will briefly mention.

Condition of Practical Work.—In the generation of hydrocyanic acid gas, potassium cyanide, sulphuric acid, and water are required. To each ounce of cyanide we use one liquid ounce of acid and three of water.

The basis of fumigation is the dosage. Within certain limits it might be said that the greater strength of dosage we use, the more insects will be destroyed.

Under the present system of fumigation the dosage is obtained for the most part in the following way: A man carrying a plat of the orchard, which consists of a piece of paper marked off into squares, walks through the orchard between two rows of trees. As he passes along he marks down on this piece of paper the dosages (as represented by cyanide in ounces) which he believes these trees should receive. He secures this dosage by looking at the trees and *guessing* at what he believes they should receive, his eye being the only measuring instrument that he employs. Some men walk through the orchard slowly, examining the trees in the rows at either side with some care. The majority, however, walk through the field very rapidly, taking 2, 4, or even 6 rows at a time. Under such hasty work it is possible to see only the tops, or a side of some of the trees at most.

I have found from very careful observation and measurements made after many fumigators, that the variation in dosage under this guess method of scheduling is very great, even among the most careful of workers. The variation under the careless estimater is remarkable, sometimes approaching the 100 per cent mark.

In the accompanying diagrams are arranged the dosages given trees by three practical fumigators, all of whom are considered to be among the more experienced workers in southern California. These trees have not been selected promiscuously because of their irregularity, but comprise a continuous number of trees taken from a single row or set. I have, however, rearranged the sequence of the trees in order to facilitate comparison. The volume of the trees was obtained after they had been covered with tents.

Dosage Table of Fumigator I.

Number of Tree.	Dosages Used.	Contents of Trees.	Number of Cubic Feet to Each Ounce of Cyanide Used.
1	11 oz.	1690 cu. ft.	150
2	10	1369	136
3	10	1380	138
4	12	1350	110
5	12	2050	170
6	12	1440	120
7	12	1663	140
8	12	1755	145
9	12	1940	165
10	12	2096	175
11	9	1175	130
12	10	1516	150
13	11	1450	130
14	10	1380	140
15	11	1440	130

Dosage Table of Fumigator II.

Number of Tree.	Dosages Used.	Contents of Trees.	Number of Cubic Feet to Each Ounce of Cyanide Used.
1	11 oz.	1000 cu. ft.	90
2	7	400	60
3	15	1800	120
4	10	600	60
5	15	2200	145
6	18	2200	120
7	17	2200	130
8	16	2200	140
9	16	2400	150
10	16	2000	125
11	16	2500	156
12	15	1800	120
13	12	1250	105
14	12	800	65
15	12	1200	100

Dosage Table of Fumigator III.

Number of Tree.	Dosages Used.	Contents of Trees.	Number of Cubic Feet to Each Ounce of Cyanide Used.
1	6 oz.	1500 cu. ft.	250
2	4	1100	275
3	4	800	200
4	5	1200	240
5	4	1100	275
6	4	900	225
7	4	950	238
8	5	950	190
9	5	900	180
10	5	1300	260
11	5	1150	230
12	5	1200	240
13	5	1350	270
14	6	1550	258
15	5	1150	230

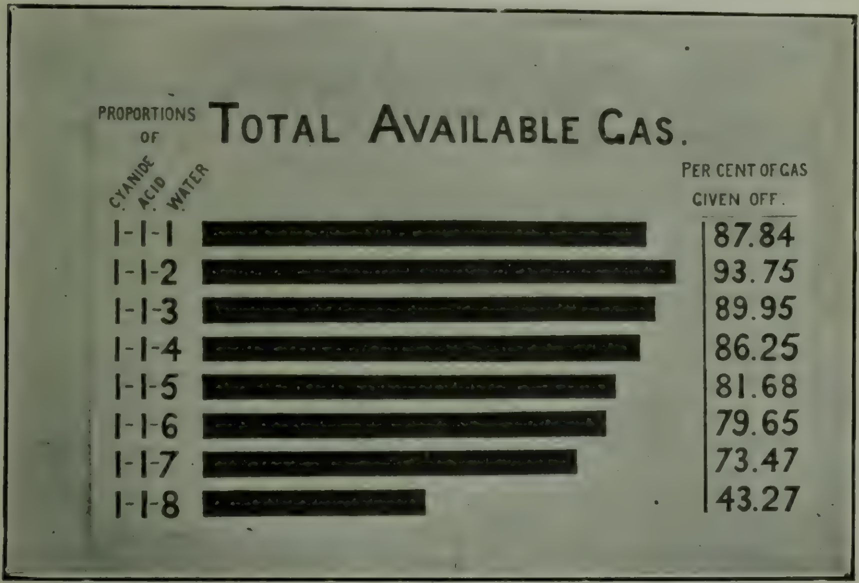
Comparison of Dosages of Fumigators I, II, and III.

Contents of Tree.	Dosage of Fumigator I.	Dosage of Fumigator II.	Dosage of Fumigator III.
900 cu. ft.	-- oz.	11 oz.	4 ozs.
1200	9	12	5
1500	10	--	6
2000	12	16	8

Although there are many striking instances of variation in these tables, I will cite a single example from each case for the sake of brevity. In the case of fumigator I, we find that 12 ounces are used for each tree of number 4 to 10, inclusive. The contents of these different trees vary from 1,350 to 2,096 cubic feet, a range of over 700 cubic feet. In the table of fumigator II, trees 5, 6, 7, and 8 were each found to contain 2,200 cubic feet. The dosages used were sufficiently variable as to result in a range of from 120 to 145 cubic feet for each ounce of cyanide used. Fumigator III gave 5 ounces to trees varying from 900 to 1,350 cubic feet.

The dosages of I and III were used for the purple scale, and II for the red scale. These two insects are considered by most of our practical workers to be about equally difficult to destroy, and the so-called double dosage is almost invariably resorted to in each case. A comparison of the dosages used by these fumigators for different sized trees shows that the results secured by these men must be widely different. The dosages used for a tree containing 1,200 cubic feet are 9, 12, and 5 ounces, respectively, a range of indeed great variation. These rambling remarks are sufficient, I believe, to demonstrate that the system of scheduling in practice to-day is quite as irregular as the dosages suggested in literature.

Under this system the cyanide and acid for a complete row of tents or set, as it is called, is usually measured out beforehand at the commissary and placed into small cans and pitchers, which are arranged on a tray. The man who does the generating carries this great weight, together with a bucket of water, from tree to tree, dosing the trees as he comes to them. The water remains to be measured out at the tree.



I have previously stated that in my fumigation work I use three parts of water. The proportion of water used by different fumigators has been found to vary all the way from 2 to 8 parts; some men even varying widely in their individual work. Coming to a tree, the generator man first looks at his can of cyanide for that tree and then guesses as to how many ounces he thinks it contains. If he is using two parts of water he will use twice the amount of water that he thinks there is cyanide in the can; if three parts, then three times the amount of cyanide he thinks to be in the can, etc. Now, the receptacles used for measuring water vary all the way from half pint dippers to quart pitchers and old tin cans.

Think of measuring with accuracy the required amount of water for a 4-ounce tree, using therefor a quart pitcher.

Frequently I have had fumigators tell me that during their work they would sometimes find on looking at a can of cyanide that it apparently contained a heavy dosage, whereas the tree to be dosed appeared small. They would then put in excess water to feel sure of preventing burning. I have frequently seen fumigators in measuring the water for a tree first measure out what they thought to be the proper amount of water; hesitating about it being the correct amount, they would take a second dip or even a third.

What is the effect of this irregular use of water? Does the proportion of water used have any effect on the generation of gas? It does, and a very marked one, too, as shown by the accompanying diagram.

This diagram is the result of analyses of the residue in experiments wherein different proportions of water were used. The work was performed for me by the United States Bureau of Chemistry.

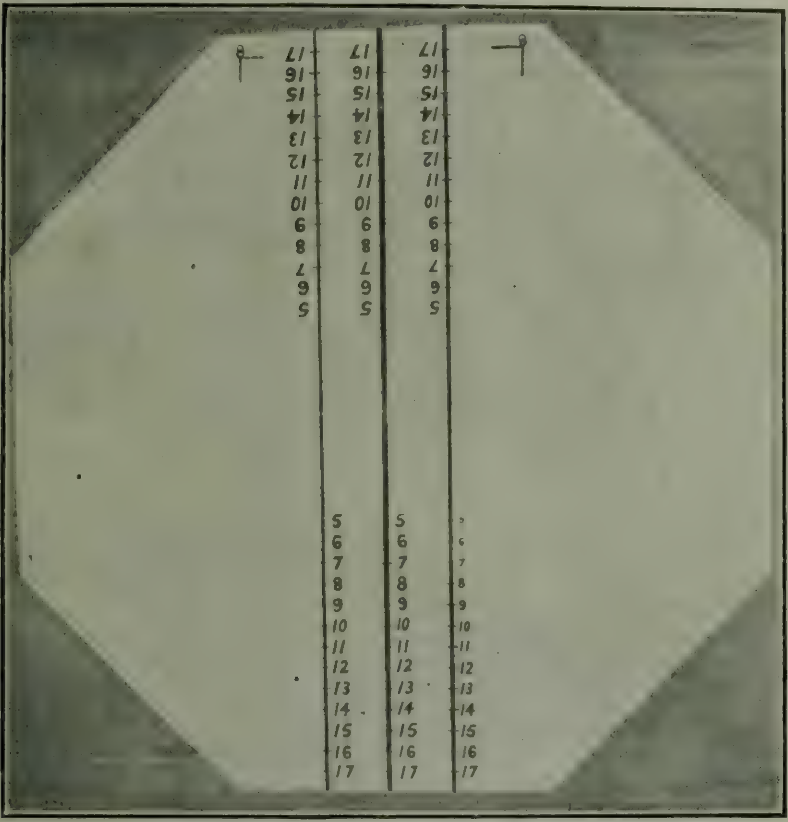
The first columns of figures, as 1—1—1, 1—1—2, etc., designate the proportions of cyanide, acid, and water, respectively, the former in dry ounces, the latter two in liquid ounces. The per cent column to the right represents the total amount of gas given off where these different proportions are used. As the proportion of water is increased above two parts, the amount of gas given off is decreased. At eight parts of water we get less than half as much gas as with two parts. In other words, two ounces of cyanide with eight parts of water appear to produce less available gas than one ounce with two parts of water. Those second and third dips of water meant less available gas, and the common multifold guessing in the measure of water under the present system is a condemnation of good work. In fact, of the different ingredients used in the generation of hydrocyanic acid gas and the various details of operation undergone in its employment in the fumigation of citrus trees, I am of the opinion that no one factor (other than that of dosage-scheduling) has entered more closely into the variability of results secured than the erratic use of water.

Although two parts of water produce the most gas, it is impractical to use this proportion in fieldwork with the present style of generating vessel. The residue of generations where two parts of water are used frequently congeal, requiring some little time for its removal from the constricted neck fumigating pot. This is an impediment to rapid fieldwork. With three parts of water the residue seldom congeals. I recommend the use of three parts of water.

There are many other factors which enter into the accomplishment of poor results under the present procedure of fumigation, but I will burden you with but one or two more of these at this time. The small cans into which the dosages are placed at the commissary are seldom marked. Sometimes these become mixed on the tray, with the result of some trees receiving the dosages scheduled for other trees. Another illustration: When the dosage for a row of trees is measured out, a pencil mark is usually drawn through this row on the dosage plat to show that it has been fumigated. A mistake of failing to cross off a row, or crossing off an extra row by mistake, would throw out the dosage for the remainder of the orchard. Such cases have been known to occur.

I have stated to you with exactness, and, in some detail, the condition of fumigation as it is found to-day. It is *impossible* for us to expect most excellent results from these irregular conditions, yet some fumigators are doing very good work. The number is, however, very small, and can cover only a small part of the great acreage to be treated every year.

After this portrayal of conditions, I believe you will realize as thoroughly as I did the necessity of systematizing the practice of fumigation, with the idea of eliminating some of these guesses if possible. The result of my efforts in this direction I will expose to you in the remainder of my address.



Method of Marking Tent.

In order to secure uniformity of results it was evident that the dosage must be calculated in respect to the contents of tented trees. As mentioned at the Riverside Convention, a method was worked out in which, by knowing the distance around the bottom and over the top of the tented tree, the contents can be readily determined. These measurements were at first secured by means of a tape line. This was a laborious process, especially so in securing the distance over the top of the tree. Early this year, while doing some fumigation work in Florida with Mr. Morrill, another agent of the United States Bureau of Entomology, I was acquainted with a system of marking tents whereby the distance over the top of the tree can be easily secured. A diagram readily represents this scheme.

Three parallel lines running in the direction of the strips of cloth of which the tent is made are spaced about 4 feet apart. The middle one of these lines runs through the center of the tent. Commencing at the center of the tent as zero, this line is marked off into foot spaces toward either edge. If the first mark for a 45-foot tent is placed 5 feet from the center it suffices. The other two lines are marked after the manner of the center line.

Suppose we have the middle line of a marked tent running over the top of a tree. The distance over is then obtained by adding together the two numbers on the opposite sides of the tented tree which are closest to the points where the line touches the ground. As the center of the tent is very often pulled to one side in covering a tree, the presence of a single marked line would require that the tent be always centered. The presence of an auxiliary line on either side of the center line avoids this difficulty.

For obtaining the distance around the bottom of a tented tree, our work has shown to us that this can be secured with much accuracy by pacing. The man who is to obtain the dimensions of trees on a regular outfit should make several practice trials beforehand around tented trees in order to determine what his length of pace is, and to regulate it, if necessary. While pacing around a tree the reading of the line running over the top can also be taken, thus obtaining both dimensions at once.

Thus I have shown you an entirely practical way of obtaining the dimensions of trees in the field; a way in which no other apparatus is required than a marked tent and a man. I have already stated that from these two dimensions we can calculate the volume of trees, which affords us a basis for determining the dosage. To facilitate work in the field calculation tables of some kind are required. I will explain to you shortly a table which I have prepared to meet this requirement, and the fundamentals on which this table is based.

The Leakage of Gas.—We know that for uniform work trees must be dosed in proportion to their contents. If we were using great air-tight boxes for fumigating citrus trees, we know that such a box containing 2,000 cubic feet would require twice as much cyanide as one containing 1,000 cubic feet, and twenty times as much as for one containing 100 cubic feet. This same principle holds good in general with the present character of fumigation tents, but there is another factor which enters into this latter case, and must be taken into consideration along with the volume; a factor which, to my knowledge, has been considered in only one instance by all the writers on California fumigation, and that in a recent table by Professor Woodworth of the State University. Trees dosed directly in proportion to their contents, without regard to leakage of gas, results in irregular work. In using the present kind of fumigation tents, trees are usually covered for one hour. At the end of that period the gas has usually all escaped, or, at most, very little remains under the tent. The condition of the atmosphere modifies this escape of gas to some extent. I will now bring before you a fact showing that gas escapes faster from small trees than from large, which fact must be taken into consideration in the preparation of a dosage table.

Table of Leakage of Gas.

Dimensions of Tree. Around—Over.	Contents or Volume of Tented Tree.	Exposed Surface of Tent.	Ratio of Leakage Surface to Volume.
20 x 12 ft.	99 cu. ft.	85 sq. ft.	.86
30 x 19	364	205	.56
40 x 28	1040	420	.40
50 x 36	2147	675	.31
60 x 44	3819	995	.26
70 x 54	6605	1445	.22

In the first column is given the dimensions of trees which for our purpose we will suppose to be covered with tents. In the second column the contents or volume of the tented trees is given; in the third the exposed surface of the tent, while in the last column we have the ratio of the leakage surface to the contents of the tree, which gives us the information we desire.

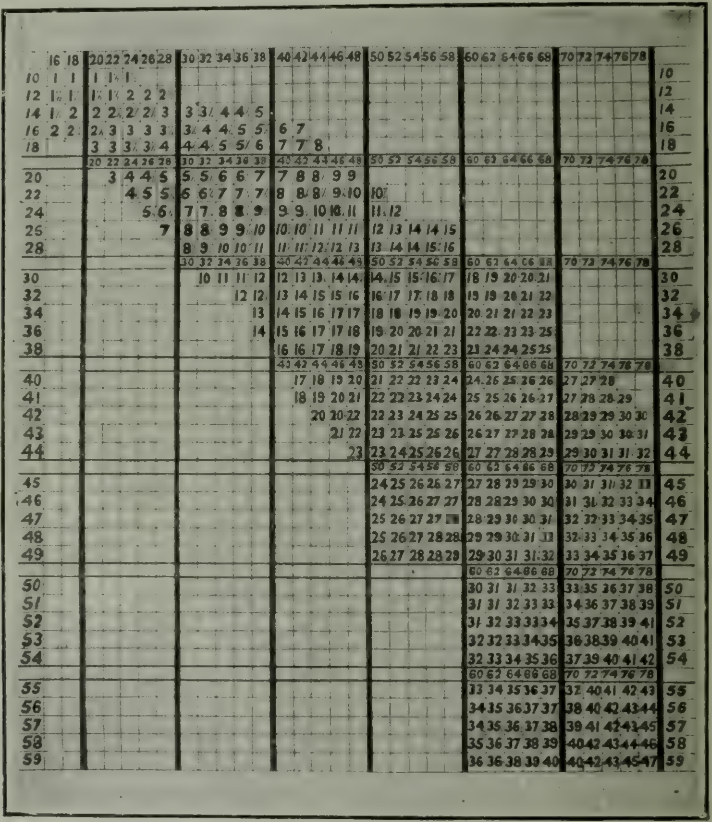
Let us look through this table to feel sure that we understand what it means. We will take the first tree, 20 feet around by 12 over, which represents a volume of 99 cubic feet and has 89 square feet of exposed surface of tent. The ratio of leakage surface to volume is .86. In other words, for each cubic foot of volume in the tent there is .86 of a square foot of tent surface. In the tree 70 feet around by 54 over, there is but .22 of a square foot of tent surface to each cubic foot of volume. Suppose that these tented trees were gassed, and that all the gas would escape through the tent in a given time. For the first tree, 20 by 12, there would be .86 of a square foot of tent surface for each cubic foot of volume to escape through, whereas in the last tree, 70 by 54, there would be but .22 of a square foot of tent surface for each cubic foot of volume to escape through. This would mean that there would be about four times as much opportunity for leakage, or the leakage would be about four times more rapid in the small as in the large tree. This state of affairs has been frequently demonstrated to us in the field, one very striking example having been cited in my last address before this Convention in some experimental work against the purple scale.

Dosage-schedule.—Some of the citrus growers in southern California in the section about Whittier desired to have their groves fumigated during last July, at a time when the fruit was of small size. I was requested to determine what dosage could be used at that time without injury to the fruit. An extensive series of experiments demonstrated that trees from about 10 to 15 feet high could stand a strength of an ounce to the hundred cubic feet without injuring fruit which had attained fully an inch in diameter, or, roughly speaking, about the size of a walnut. Smaller trees would stand a greater strength. As this was the limited dosage which could be used at that time without burning, I prepared a schedule based on this data. A tree 40 feet around by 28 feet over (which would be about 10 feet tall) was taken as a basis.

After determining its contents, it was dosed at the rate of an ounce to the hundred cubic feet. I then worked out the contents of another tree, and also determined its leakage ratio after the manner shown in the previous discussion of the leakage of gas. In determining the dosage for this second tree, I based it at the rate of an ounce to the hundred cubic feet, as done for the first tree, but also took into consideration its leakage rate, as compared with that of the 40 by 28 tree. The result was that if the tree was smaller the actual dosage was increased; if larger, it was decreased, and in all cases by just enough to offset the difference in leakage between the two trees. This process was carried out for a large series, after which a chart was made, and the dosages placed in it. The result is this schedule shown herewith, which I call Dosage-schedule No. 1, by reason of the type or basic tree having been dosed at the rate of an ounce to the hundred cubic feet.

Distance around tree.

Distance over tree.



	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78
10	1	1	1	1½	1½																											
12	1½	1½	1½	1½	2	2	2																									
14	1½	2	2	2½	2½	2½	3	3	3½	4	4½	5																				
16	2	2	2½	3	3	3	3½	3½	4	4½	5	5½	6	7																		
18			3	3	3½	3½	4	4½	4½	5	5½	6	7	7	8																	
20				3	4	4½	5	5½	5½	6	6	7	7	8	8½	9	9															
22					4	5	5½	6	6½	7	7	7½	8	8½	8½	9½	10	10½														
24						5½	6½	7	7½	8	8	9	9	9½	10	10	11	11½	12													
26							7	8	8	9	9	10	10	10	11	11	11	12	13	14	14	15										
28								8	9	10	10	11	11½	11½	12½	12	13	13	14	14	15½	16										
30									10	11	11	12	12	13	13½	14	14½	14½	15	15½	16½	17	18	19	20	20	21					
32											12	12½	13	14	15	15	16	16	17	17	18	18	19	19	20	21	22					
34												13	14	15	16	17	17	18	18	19	19	20	20	21	21	22	23					
36												14	15	16	17	17	18	19	20	20	21	21	22	22	23	23	25					
38													16	16	17	18	19	20	21	21	22	23	23	24	24	25	25					
40														17	18	19	20	21	22	22	23	24	24	25	25	26	26	27	27	28		
41														18	19	20	21	22	22	23	24	24	25	25	26	26	27	27	28	28	29	
42															20	20	22	22	23	24	25	25	26	26	27	27	28	28	29	29	30	30
43																21	22	23	23	25	25	26	26	27	27	28	28	29	29	30	30	31
44																	23	23	24	25	26	26	27	27	28	28	29	29	30	31	31	32
45																		24	25	26	26	27	27	28	29	29	30	30	31	31	32	[illegible]
46																		24	25	26	27	27	28	28	29	30	30	31	31	32	33	34
47																		25	26	27	27	[illegible]	28	29	30	30	31	32	32	33	34	35
48																		25	26	27	28	28	29	29	30	31	[illegible]	32	33	34	35	36
49																		26	27	28	28	29	29	30	31	31	32	33	34	35	36	37
50																							30	31	31	32	33	33	35	36	37	38
51																							31	31	32	33	33	34	36	37	38	39
52																							31	32	33	33	34	35	37	38	39	41
53																							32	32	33	34	35	36	38	39	40	41
54																							32	33	34	35	36	37	39	40	41	42
55																							33	34	35	36	37	38	40	41	42	43
56																							34	35	36	37	37	38	40	42	43	44
57																							34	35	36	37	38	39	41	42	43	45
58																							35	36	37	38	39	40	42	43	44	46
59																							36	36	38	39	40	40	42	43	45	47

Dosage-schedule No. 1.

This schedule is one of uniformity. Based, as it is, on the proper assumptions, we would expect the same percentage of killing from whatever portion of the chart is put to use, whether for small trees or for large. I do not contend, however, that this chart is perfect to the small fraction of an ounce for every dosage, but I have held ever since its preparation that it was sufficiently accurate to obtain uniform results in practical fieldwork.

I have had people tell me that I am a theorist; that my dosage schedule, as colloquially stated, "would not hold water when put to a practical test." As I have already shown you, the dosage table was founded on facts, not theories. Let us now look at the practical side. This schedule has been used in fieldwork this season in fumigating thousands of trees, probably in excess of a hundred thousand. Very extensive experiments have also been carried on by us in thoroughly testing it. The past three weeks have been largely employed in examining these results, and we have found after exhaustive examination that this table does as good work on the smallest trees as on the largest, and vice versa. To those critics of biased opinion I would say that this schedule is no longer a so-called theory of paper value, but a schedule of demonstrated facts.

The row of numbers at the top of the chart represents the distance around the tree in feet. The vertical columns to the right and left represent the distance over the tent in feet. The dosage for a tree of given dimensions is found where the lines running from these dimensions intersect. Thus it can be seen that in practical fieldwork, as soon as we determine the distance around and over the tent, a glance at this table will give us the dosage required.

This dosage-schedule No. 1 was prepared for use against the purple scale in the coastal region at a time while the fruit was small. Its continued use during the present season has shown that it is very close to the maximum strength that could be used throughout the fall in the coastal section of southern California without more or less injury to the fruit, due to the changing conditions of the atmosphere. There occur periods, however, during which double this dosage can be used without injury. Then some varieties of citrus fruits are more susceptible to injury than others. Among the varieties most susceptible to injury may be classed the Homosassa, the St. Michael, and the Mediterranean Sweet. So far as I have been able to observe, this strength dosage will cause burning with the two former varieties under the most favorable conditions.

As this dosage-schedule No. 1 is one of uniformity, it can be manipulated in any manner desired. This schedule is not only available for the purple scale, but can be used for any other scale. Although of a fixed and definite strength in itself, it readily allows of an increase or decrease in strength to meet any and all dosage requirements. If a person in fumigating for the black scale or some other particular insect desires to use a strength one fourth or one half less than that given in schedule No. 1, he can secure such a dosage strength by decreasing each dosage given in chart I by one fourth or one half of itself. If he desires a strength one fourth or one half greater than schedule No. 1 he can secure such a dosage strength by increasing each dosage in chart I by one fourth or one half of itself. The chart can be increased or decreased in any proportion desired, and so long as each dosage in chart I is increased or decreased in that same proportion, the resulting chart will be one of uniformity exactly as is the original one.

Procedure.—In fumigating under this system it is advisable to have a commissary of such character as will allow the measuring of the dosage at the tree. A two-wheeled push-cart equipped with convenient receptacles for holding the chemicals has been found most satisfactory for general use.

To properly carry on fumigation under this system five men are required, two tent pullers, one man to estimate the trees, and two to measure the chemicals and dose the tree. In actual fieldwork, after the tent pullers have commenced pulling the tents on to a row of trees, the commissary cart is brought up to the first tree of the row. The estimater paces around the tree, securing the distance around and the distance over. He determines the dosage from one of my schedules, which he carries. The two commissary men measure out the chemicals and dose the tree, after which the cart is moved on to the next tree. Meanwhile, the estimater has proceeded to the second tree, taken its measurements, obtained its dosage, and also has the generator jar in readiness by the time the commissary is brought up. The second tree is then dosed. In like manner the procedure is continued until the entire row has been dosed. Complete sets of 32 tents are covered and dosed in from 40 to 45 minutes. As tents remain on the trees one hour, the operation is sufficiently rapid for practical work.

Advantages of Improved Procedure.—This system of fumigation which I have been installing in southern California has many advantages for its recommendation. In the first place, it does away with all the errors due to guesswork in estimation, on which, as I have shown you in the first part of this address, the present system is entirely based. The general result is more efficient work and the saving of much cyanide and acid. Uniform results are secured. If we use a dosage of sufficient strength to destroy 90 per cent of the insects on the tree, we may expect that 90 per cent will be destroyed on all the trees, not 90 per cent on some and 50 per cent more or less on others, as occurs under the present system of guesswork.

The dosage is obtained at each tree, and the chemicals are accurately measured out at the tree, using them in the proportion of one liquid ounce of acid and three of water to each ounce of cyanide. Thus every tree receives the chemicals meant for it, and in the proper proportions, which eliminates the further irregular work under the present guess system, due to the several guesses of the amount of water, the mixing of cans, etc.

Another important point corrected under this improved system is that all trees receive the same length of exposure. Under the old system the tent pullers frequently hasten through the row, sometimes getting as much as ten minutes or more ahead of the generator man by the time the end of the row is reached. By reason of this condition of affairs the last trees in a set receive a much shorter length of exposure than the first ones. This new procedure places such requirements on the tent pullers that they are seldom more than one or two trees ahead of the commissary cart, thus avoiding another of the old faults.

In the introduction of an improved procedure in fumigation there are more conditions which have to be satisfied than one would at first realize. The accomplishment of such a task is in no way a chance happening, but rather follows only after hard and persistent effort. In my work I have been placed between three more or less opposing forces, the fruit-grower, the fumigation contractor, and the fumigation crew. The former requires the best possible work at the least possible expense. He does not care how it is done, as long as these two conditions are satisfied. The contractor demands that he secure as much profit as he ever did. He also knows that it is to his interest to satisfy the grower by doing the best work of which he is able. The fumigation crew desire as large wages as they can secure, and at the same time that the work be as easy as possible. The system which I have put into operation has met all these various requirements as closely, I believe, as is possible under any system. Although the apparent cost to the grower is usually some in excess of the old way, he is entirely satisfied by reason of the better results secured. The contractor gets his commission and also satisfies the grower. In the fumigation crew the estimater can be set aside, for he is not needed as in the old way. The generator man has exchanged the heavy burden of a tray, under which he has struggled in the past, to assisting in pulling the commissary cart. Generator men who have worked for years under the old tray system tell me with entire accord, after having tried the new way, that they prefer it. The only men who could possibly complain are the tent pullers. They are required to kick in the edges of the tent in addition to covering the trees.

In the section about Whittier, in which our headquarters are located, two practical outfits have been proceeding under this improved system since July, with the result that the majority of the growers have become so well satisfied with the new way that they will have their work done in no other manner. To have a new practice received heartily by practical growers readily demonstrates its practicability and economics.

Results Secured.—Careful examination of several commercial orchards fumigated with my dosage-schedule No. 1 under the improved system has shown that the dosage is of sufficient strength to destroy all the live insects and 98 per cent or above of the eggs of the purple scale on the leaves and branches in the open section near the coast. I have examined some orchards in which over 99 per cent of the eggs were destroyed.

Eradication of the purple scale on the leaves and branches requires a dosage of between one fourth and one half more than schedule No. 1. For absolute safety in eradication, I recommend this dosage schedule increased one half. The trees, however, are not in a condition at all times to stand this excess dosage, besides there are several other considerations to be taken into account before its recommendation. Destruction of the scale on the fruit requires a heavier dosage than on the leaves and branches. If possible, it is advisable to remove the scaly fruit before or immediately after fumigation.

One season's fumigation with the schedule now used will leave a purple scale infested orchard in fairly clean condition. If this practice is repeated the second year, I am inclined to believe, figuring from the character of work done this season, that many orchards can escape fumigation on the third year, and possibly on almost every other year thereafter. To look for complete eradication of the purple scale from any large citrus district at present severely infested, is, in my mind, a very remote accomplishment.

As to the dosage for red, yellow, and black scale, I would say that I have not as yet found the time to determine the required dosage for these. Frequently, I am asked regarding a dosage for the red scale, so I might say a word on this point. I discontinued examining the results of some experiments which we had performed against the red scale to prepare this address. If I was compelled to state what I believed to be the most suitable dosage to use for the red scale from my present knowledge, I would be inclined to place forward dosage-schedule No. 1. Let it be understood, however, that I do not say that this *is* the most suitable dosage to use. Experiments might show that the most economical dosage-rate is a little less or a little more. My examinations so far in this particular experiment show that excellent work was done with the proposed schedule No. 1. Other fumigators who have used this schedule against the red scale have gone so far as to state that it has killed all the insects.

Conclusion.—I have been asked to state how the fruit-grower can get most out of this work which we have been doing, and how to enforce the application of better methods. I am of the opinion that no person of unbiased mind can fail to see the advantages in economy and various other details of this new method of procedure over the slipshod method now generally resorted to. It has been a favorite accomplishment of many practical fumigators to veil their operations in mysticism, whereby they could secure a reputation of being authorities of a practice which they would make appear complicated and difficult of understanding. The fact that this new system is entirely mechanical, and shows how simple the process of fumigation is—that a careful man of no knowledge of fumigation whatever, can after a couple of hours' practice do better work than a man under the old way who has been at the business all of his lifetime, usually does not leave these men in the pleasantest of spirits toward the new innovation. And no blame can be placed on these men, for we would probably feel the same if we were placed under similar circumstances. The new system will not be adopted universally until it is demanded by the fruit-growers and encouraged by the horticultural officers. The fumigation contractor sees no advantage in its use for him, hence his efforts and assistance can be little counted on; in some instances they are more likely to be an impediment.

One decided advantage is that the fruit-grower is no longer entirely dependent on practical fumigators for carrying out his work. Large orchardists, citrus associations, or communities can obtain outfits, and, after breaking in their men for a few hours, are enabled to do as good work as anybody. Careful and conscientious workers is the one requisite above all others. Experience is unnecessary, as the procedure is entirely mechanical.

PRESIDENT JEFFREY. The reason I asked for this paper from the Bureau of Entomology was that fumigation in northern California is coming to the front. Spraying in northern California is going to reach immense proportions, but fumigation will have to be resorted to in some instances. They are fumigating now in Fair Oaks for the black scale on the olive. Fumigation in the north is already a necessity. They are planting a large grove of oranges at Orland, 600 miles from the lower citrus extremity, and I want to state in lieu of the discussion that I find that is an absolute necessity now in some parts of northern California. I now have the pleasure of introducing Mr. W. I. Newcomb of Sonoma, who will read a paper on the drying of apples.

THE EVAPORATION OF APPLES.

By W. I. NEWCOMB.

The disposition of fruit not suitable for green shipment, or for canning purposes, has, and always will be more or less of a problem for the fruit-grower. In these days when the market calls more and more for better quality, the apple-grower finds, after his best packing fruit is sold, still much fruit on his hands to dispose of—windfalls, that bruised in packing, and small sizes. This amount is largely dependent upon the thoroughness of the spraying methods employed, the season, and the pruning and thinning work done.

While evaporated apples to-day are a by-product of our orchards, a glimpse at the early history of the business in Sonoma County shows that it was to provide a market for the product of the orchards that were put out by the first settlers. The early pioneers were quick to recognize in the cool coast summers a suitable climate for the apple. Every home had its three or four acres, and some as many as thirty, planted with a multitude of varieties. The fruit of these young orchards, which yielded so abundantly, was often allowed to go to waste for lack of proper market facilities.

In 1874 the late W. J. Hunt bought an Alden evaporator that was shipped out from New York. This was an expensive, cumbersome machine to operate, being sixty trays high and requiring three floors, the fruit being elevated the entire height by chain pulleys on the side. Owing to the cost of operation, Mr. Hunt did not run it again until 1876, when he made another attempt, putting up the fruit in two-pound cartons. The press to pack these packages cost $130. Although the fruit sold for 25 cents per pound, the venture did not show a profit, and the machine was never used again. However, the price obtained for the fruit was an incentive for further effort by Mr. Hunt and others. By 1879 and 1880 Santa Rosa had two, and Petaluma, Bloomfield, and Sebastopol each had one large dryer where the farmers sold their apples by the ton, hauling them in some instances ten or twelve miles. But these long hauls of fruit, which when ready for market, were only about one seventh of the weight delivered, soon opened the eyes of the apple men to the advantages of operating on a smaller scale at home. By 1885 a number of dryers, as they are called, were built throughout the apple section, and to-day we have 100 or more scattered about the coast hills of western Sonoma.

The Chinamen were quick to "catch on" to this kind of work. Their habits of rigid economy and thrift soon put the evaporated apple output in their hands, usually working the fruit on a share basis. But the Chinaman's thrift and economy often prompted him to apply too much moisture to his apples to make them pack easy. His horror of waste kept him from "trimming" as he should have done, and he was apt to put in inferior fruit, consequently "China" apples became a trade term. Now, the Chinamen are getting old and not much account. The Japanese and Hindus have not taken up this kind of work. Our own young people, however, are becoming very proficient in the art, together with the packing of the green fruit, the two operations going hand in hand. This pleasant occupation furnishes employment to many for four or five months in the summer and fall, and is helping us to solve some of the problems of "Our Country Life."

The dryers we have about the country are cheaply constructed as far as the building is concerned on account of fire liability. Scarcely a season passes without two or three of these buildings going up in smoke, consequently few insurance companies care to handle this class of risks. What do charge from 5 to 7 per cent.

Our dryers are nearly all built on the same plan, the upright, two trays wide, and from twelve to fifteen trays high, being the style settled on as being the cheapest and most easily operated. The size of the tray is a personal preference. Usually sloping ground is preferred for a site, in order to get the fire box or furnace low down, to prevent the scorching of fruit. The upper side will then be more convenient for unloading the green fruit from the orchard truck or wagon. The furnace is enclosed within brick walls, on which the evaporator is set. These walls should be high enough to give from four to seven feet of air space between the top of the furnace and the bottom tray. Connected with the furnace is a double run of pipes, making a double turn the length of the evaporator. These are to prevent loss of heat. Usually a large drum is connected with the pipes at the back to further hold the heat. The evaporator is made of matched lumber, constructed in "runs" the size of the trays. A ventilator projects from the evaporator through the roof of the building to carry away the moisture in the air. This hot air draft is furnished by cold air ventilators, through openings in the brick walls about a foot square at the ground level. It is more convenient to have the sides of the evaporator all doors for convenience in putting in and taking out the fruit. On one side of the evaporator is a room for receiving the dried fruit, on the other a larger one for receiving the apples, peeling, and placing them on the trays. This work is usually done by a man or stout boy to run the peeler, and one or two girls or women to "trim" and "spread" the fruit on the trays. After the apples are placed on the tray they are put in the sulphur box and exposed to the fumes of burning sulphur to preserve the natural color of the apple. This exposure requires from twenty to forty minutes, according to the variety of apple. The earlier and more open grained apple requiring less, while the hard late apple takes more time. When Ruling No. 76 of the Pure Food Law was announced last year, the apple men came in for their share of consternation, but tests soon proved that apples contained less than one half of the sulphur dioxide allowed under the law. As taken from the sulphur box it contains two or three times the amount allowed, but from 75 to 90 per cent passes off in the process of evaporation. From the sulphur box the trays are placed in the evaporator and heat applied. It is possible to fill and get dry the capacity of the dryer each day by some firing a part of the night. After the fruit is dry it is taken out and the trays emptied in the packing room, where it is packed or sold or removed for safety.

About 100 pounds per day for each person employed is an average day's work. One crew of seven this fall put out 1,060 pounds in ten hours, two "peelers," four "spreaders," and one dryer tender. From one and one half to two cords of four-foot pine wood is required to evaporate one ton of dried fruit, and from five to eight pounds of sulphur. Two and one half cents is about the average cost of drying and packing in fifty-pound boxes, which is the standard package, although some markets, Germany for instance, prefer the twenty-five-pound box. Some ten, five, and one-pound boxes are put out. It would seem that retail trade would be stimulated by small packages of more attractive fruit. The buyers continually deplore the quality of our fruit, and suggest Government inspection as a remedy. This might be accomplished under the Pure Food Law. The shrinkage is generally estimated at about seven to one, early varieties shrinking more and the late less. By actual weight, 100 pounds of windfall Baldwins gave 16 pounds of dried fruit, the shrinkage being 6¼ to 1. Of the 100 pounds, 28 pounds went into the peeling, core, and scrap box, leaving 72 pounds for evaporation, showing a shrinkage of the prepared fruit of 4½ to 1. This quite large percentage of waste can be utilized by sun-drying, there being a small market for this product at the jelly factories, prices ranging from $15 to $25 per ton. But a better way is to feed it directly to hogs, as the seeds are quite nutritious and make a very good stock hog feed. Hogs weighing 100 pounds or more thrive better on this diet. Hard grain can not be fed with the peelings, as the hogs get tender teeth.

This year Sonoma County will turn out about four million pounds, Watsonville district two and one half million pounds, Mendocino and other districts enough to make eight million pounds.

Germany takes some of our apples, but the most are consumed in our own country. Alaska takes a part, as do the Rocky Mountain and Middle West points. Texas, too, is a large buyer, as is also Uncle Sam, for his army and navy and Indian reservations. New York State being the largest producer of evaporated apples, largely controls the market price.

Apples are quoted fancy, choice, standard, and prime, with a variation of two to three cents per pound on the extremes. It is claimed that our choice sell on a par with the New York standards. As our output is rapidly increasing, we will have to look more to the quality of our fruit. Some day the American people will awake to the fact that the best returns are not always obtained by the maximum of production. (Applause.)

MR. ANDERSON. I would like to ask Mr. Newcomb what is the average market price for this product?

MR. NEWCOMB. It fluctuates a great deal.

MR. ANDERSON. But the average, say for five years?

MR. NEWCOMB. This year we are getting 5 and 5½ cents, and last year we got 8 and 10, and in some cases as high as 11 cents, but if we get 5 cents we feel that we have not lost any money; if we get 6 cents we have done fairly well, and if we get 6½ or 7 it is a very paying proposition.

PRESIDENT JEFFREY. We have here Mr. W. M. Bowen of Los Angeles, who has a scheme which will be of direct advantage to every fruit-grower in California, and I am going to ask Mr. Bowen to speak a few minutes on this matter.

MR. BOWEN. Mr. Chairman, ladies and gentlemen: I did not expect when I came to Sacramento to have the privilege of talking to this Convention, because I did not know that it was going to be in session, but I came up here upon a matter that I believe is of vital interest to every one of you gentlemen. In laying the matter before your leader here he stated that this was a very proper and appropriate time and place to make some suggestions, that it might get out over the State and out among the people who are interested in this matter. I attended the Convention last night, and was very much interested in the plans and in the information that I received at that time concerning the product and the handling of the product and the handling of the difficulties that you have to meet. Now, that is all well and good, and is a very important part of the business; but there is another phase of it that is equally as important, as was suggested by this gentleman over here who answered as to the price of the product that was turned out, and that is a market for your products.

The State of California has, inside of the limits of the city of Los Angeles, 110 acres of land belonging to the State, that is worth to-day a million dollars. I am from Los Angeles, but I am modest, and I am not going to overstate things. The property is limited in the purposes and objects for which it may be used by the trust deed that was made in 1880, by which and through which the State acquired title to this property. It is our purpose and intention to erect an exposition building upon this ground in the near future for the purpose of maintaining a permanent exhibit of the industries of this State by the respective counties. Primarily, the property is set apart for that particular purpose of encouraging and promoting the different industries of the State, and we are going to ask the State Legislature for an appropriation for the construction of a building there, and when it is constructed will invite every county in the State, free of expense, except a small expense of taking care of their own exhibit in their own way, if they see fit; but so far as any other expenses are concerned, entirely free of every expense to every county in the State to maintain the most splendid exhibit that they possibly can. I think that that would appeal to you representatives of the great industries of this State as being a very advantageous thing, for the reason that there are thousands of people that visit southern California who never see the balance of this magnificent State or become familiar with our industries and our wonderful products. If a scheme of this kind was kept on foot it would be so attractive that every person from the East visiting Los Angeles would visit this exposition, and there absorb all of the information and knowledge that each one of the counties saw fit to give them, and seeing the beauties of their products, the fertility of their soil, and the wonderful products that we turn out in every county in this State, it would induce them to select any county that struck their fancy, whether interested in mining, fruit-growing, stock-raising or other of our varied and wonderful resources here; and anything that would appeal to them in a special line they would have the information, the data in their hands at once, and would know what county to go to seek out this information and locate and engage in like industries. Now, that is the plan and the scheme that we have on foot. The Chamber of Commerce of Los Angeles County maintains a splendid exhibit. The matter has been taken up with them. By the way, there are several counties that are maintaining at quite an expense an exhibit at our Chamber of Commerce now, but the room is so limited that it is impossible to accommodate but very few, and very scantily at that, but the idea of this will be to have ample space for every county in the State to maintain a separate permanent exhibit, and the Chamber of Commerce of Los Angeles is heartily in accord with this plan, and would be glad to have every county in the State vie with every other county in making one of the most splendid exhibits of our products there that is possible. The land is limited to uses and purposes of this kind, can be used for no other purpose, and it is the object and intention and purpose, when this building is erected, to improve the balance of it with possibly other State buildings along the same line and for the purpose of showing the resources of our State, and then beautify the balance of it so that it will be an exhibit that every tourist that comes to the State will want to see before he leaves. The idea, also, is to construct a building entirely, if possible, out of California products; to not go out of the State for anything that is possible to get within the State, making it a monument itself to the object and purposes which we seek to promulgate.

If this matter meets with your approval as representatives of the great fruit industry of this State, we should be glad to have your coöperation and assistance, through your representatives in the Legislature and through your boards of supervisors in carrying out this project, because we believe, with the outlook for the future for Los Angeles as a great metropolis, as a great center, that it will be one of the greatest and grandest opportunities that this State has ever had or ever will have to embark upon a perfectly sane and legitimate advertising or educational—I would make it more an educational institution—of educating people who come here and who want to learn the resources of our State, to be able to get it, and get it with very little expense, and to get a bird's-eye view of the situation with reference to the industries of the entire State. If this meets with your approval, we should be glad to have your coöperation and assistance in carrying this out and making it a success, because it can only be made a success in the event the different counties of the State take hold of it and make use of it, in the event we are successful in launching it, and your success means our success, and there is no part of the State than can succeed or grow any, whether it be the farthest north or the farthest south, unless other counties grow with it. So in this matter we would be working all together for one common purpose and one common aim, and that is the upbuilding of the State, the encouragement of the different industries, and the drawing of the class of people here that we desire to become part of us and infusing an information and knowledge that we so much lack. If the people of the East knew of the opportunities, of the resources that lie within the boundaries of California, you would not see these vast fields between here and the southland being simply plowed up with six and eight-mule teams; you would see them dotted with homes, all improved and making incomes. That is what we want, and what we will have when the people on the outside understand the resources we have here, and what we have really got that people want. (Applause.)

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION.

PRESIDENT JEFFREY. Mr. Frank Femmons, who was to present a paper, wrote me a letter recently. He is an elderly man, one of the old pioneers, and one of the best hearted men in the State of California. He wrote that he found it impossible to attend the Convention, owing to his age and other circumstances. He sent in a paper, according to promise, which will be read Friday and printed in the records of the meeting. That leaves us without anything for that particular number. Through some mistake of somebody, between my office and the Department of Agriculture, Professor Swingle was left off the programme. He is engaged in a new work in this State, a work that may be of vast importance to the people of northern California. If there is no objection, Mr. Swingle will make a short statement regarding the caprification of the fig and what the United States Government is doing at this time to make it possible to raise perfect figs throughout the State of California. It is a new thing to all of you. His announcements will be new and interesting and valuable. I will ask Mr. Swingle to come forward.

THE MASLIN SEEDLING FIG ORCHARD AT LOOMIS, CALIFORNIA, AND ITS BEARING ON THE SMYRNA FIG INDUSTRY OF THIS COUNTRY.

By WALTER T. SWINGLE,

Physiologist in Charge of Plant Life History Investigations, U. S. Department of Agriculture.

I had the pleasure of presenting to the Thirty-fourth Fruit-Growers' Convention, held at Riverside last spring, a paper* on the history of the caprification of the fig, in which I referred to interesting new varieties of caprifigs that have originated in the seedling fig orchard planted by Mr. E. W. Maslin at Loomis, Placer County, California, some quarter of a century ago.

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*Some Points in the History of Caprification and in the Life History of the Fig. By Walter T. Swingle. In the official report of the Thirty-fourth Fruit-Growers' Convention of the State of California, held at Riverside, California, April 28 to May 1, 1908, pp. 178-187. Sacramento, Cal., 1908.

Since then I have spent some time investigating this remarkable fig orchard, and it is my purpose to give you briefly the principal results of this study.

The Planting of the Maslin Fig Orchard.—In 1885, when Mr. Maslin first started out to grow Smyrna figs from seeds, true Smyrna figs of the standard variety, Lob Ingir, had been growing in California for five years, the cuttings having been introduced by Mr. G. P. Rixford for the San Francisco Bulletin, through Consul E. J. Smithers of Smyrna. These trees had borne no fruit, and many believed that the Smyrniots had not sent the regular Smyrna fig at all, but had maliciously substituted some sterile and worthless variety. It was while the matter was in this state that Mr. Maslin resolved to grow some true Smyrna figs from seed. We now know that the failure of the Bulletin Smyrna fig trees to bear fruit was due to the absence of the Blastophaga, or fig insect, but in 1885 the need for caprification was not recognized by any one except Dr. Gustav Eisen.

Mr. Maslin gave an account of the planting of this orchard in a paper read before the twelfth session of the California State Fruit-Growers' Convention at Fresno, California, November 5, 1889, and I can not do better than quote those portions of his article giving the history of the plantation up to 1889:

> In the spring of 1885 I bought in San Francisco a box of the largest Smyrna figs I could find, and sowed the seeds in a hotbed, letting the growth remain until 1888, when the trees were planted on a hillside in deep, warm granite soil. They made a wonderful growth, the trunks being from four to six inches in diameter, and the trees ten to fifteen feet high. They have never been irrigated, but have been cultivated. They have borne this year an abundance of fruit, while it remains on the trees not matured. The figs are about the size of a pigeon's egg, the receptacle well filled with flowers, but so far I have not observed any seeds. My impression is that the forces of the trees have been expended in making wood instead of fruit.
>
> Determined to have the best fig in the country, I wrote, in January, 1886, to H. K. Thurber, of New York, one of the leading importing merchants in the United States, requesting him to obtain for me a box of the very best Smyrna figs, telling him my purpose. He replied as follows:
>
> NEW YORK, February 1, 1886.
>
> The best grades of Smyrna figs are sometimes described as "Eleme," "Imperial," "Choice Layers," or "London Layers." I have ordered sent to you a box of "Imperial," which are the best in the market. There is no charge for them. I should be only too glad if in your wonderful soil and climate you should successfully raise a fig equal to the Smyrna fig.
>
> Very respectfully yours,
>
> H. K. THURBER.
>
> The seeds of these figs I sowed in a hothouse; fully a month elapsed before there was a sign of growth. Later in the spring of 1886 the young trees were transplanted to a nursery and planted in rows two feet apart and eight inches apart in the rows, and immediately covered with straw to shield them from the sun. They received no irrigation. In the spring of 1887 they were set out in orchard twenty-five feet apart, hexagon or triangular form. They were allowed to grow as many branches and trunks as came, for the purpose of inducing extensive root growth. In the spring of 1888 they were cut down close to the ground, and of the sprouts which came, one, the strongest, was selected, and the others removed. As the stem or trunk grew, the lateral branches were pinched back, but not removed; pinched only that the stocky growth might shade the trunk, and not allowed to grow, that the forces of the sap might be concentrated to make a leading shoot and a stocky trunk. * * *
>
> These trees bore fruit this year upon the wood growth of 1889. I have ten acres planted altogether, seven acres of the sowing of 1886, and three acres of the first sowing. The fruit did not drop, but remained on the trees until the late storm. A few days after the storm began, I found on four of the trees about a dozen perfectly ripe figs. They were about the size of a pigeon's egg, cuneate or wedge shape, but rather flatter than the White Adriatic, with a short stem. Their color was a lively yellow, the flesh amber, decidedly sweet. The other and immature fruit was well

packed with tissue, and except that it was green did not differ in appearance or shape from the ripe fig.

One fact to which I wish to call attention, and a very important one in relation to the necessity of caprification, is that the leaves of all the fig trees grown from the seed obtained from Mr. Thurber are identical in type. There is not the slightest indication of the cross-fertilization by the wild fig, such as wild or scraggling growth or difference in the color of the bark. The growth of the tree is very upright, and the color of the wood is the same. The small size of the ripe fruit I ascribe to the lateness of maturing and the growth of the tree. I have brought with me some of the leaves of the trees which bore the ripe figs, to which I invite your attention.

From his manuscript notes and orchard plots, kindly placed at my disposition by Mr. Maslin, I am enabled to supplement in a few particulars the account he published in 1889. In the first place, the seven-acre orchard planted with seedlings of the Thurber figs in quincunx was so severely injured by a very heavy pruning given in 1890 that it was abandoned, and all the trees are now dead. However, a tract of about an acre was planted in square with seedlings of the Thurber figs alongside of the two acres planted the previous year with seedlings grown from figs purchased in San Francisco. In all, 100 trees were planted in 1886 and 53 in 1887. Of these 153 seedlings, 147 are alive now and 139 are bearing trees.

Recent History of the Maslin Fig Orchard.—Mr. Maslin continued to take notes on these trees until the summer of 1891, by which time it had become apparent that these seedling trees would not yield edible figs in commercial quantities. This was because these figs are all of the Smyrna type, and require caprification in order to set fruit. Partly because of these expensive experiments, Mr. Maslin found his ranch unprofitable, and about this time disposed of it, no further care being given to the orchard for more than a decade. In 1893 Mr. Gustav Eisen found gall flowers and male flowers in the fruits of one of the Maslin seedlings, which must of course have been a caprifig. In the late autumn of 1899 I made my first visit to the orchard in company with Mr. Maslin, and in photographing the larger trees, noted the presence of a very promising caprifig, which has since proven to be one of the best in the orchard. In the spring of 1899 I had sent the Blastophaga from Algiers, which became established in Mr. Geo. C. Roeding's orchard at Fresno. A year or two later Mr. Roeding noticed the Maslin orchard from the car window, while riding through Loomis on the train. He then took steps to introduce the Blastophaga into the orchard, sending profichi full of insects ready to emerge to Mr. J. C. Mazal, whose father was then the tenant on the Maslin ranch. In examining the trees carefully a few days after the profichi had been suspended in the trees, Mr. Mazal was surprised to find that the *Blastophaga was already established* in the orchard, being found by him in two carpifig trees, both, curiously enough, bearing purple profichi, and the only two bearing purple fruit at this time. The Blastophaga were found by Mr. Mazal ready to issue in three profichi on the two trees, so, of course, they must have developed from eggs laid by the Blastophagas that entered in early spring, long before the profichi were sent from Fresno. Mr. J. C. Mazal is of the opinion that the Blastophaga reached the orchard from Mr. Van Lennep's place at Auburn, some 12 miles to the northeast, where the Blastophaga had been introduced the year previously. It has since been found that the Blastophaga is able to spread to considerable distances, probably by being caught and carried by strong winds.*

As soon as the Blastophaga was introduced into the Maslin orchard it was seen that there were valuable caprifigs among the seedlings. Accordingly the chaparral, that at the time of my first visit in 1899 had nearly choked out some of the trees, was now cleared away, and the fig trees were pruned and cultivated by Mr. L. May, who had leased the ranch from November 1, 1903, on. Mr. Roeding sent a man to Loomis to attend to the packing and shipping of the profichi crop during the two seasons he rented the orchard from Mr. May. Considerable numbers of mamme, or winter generation caprifigs, were also sent to Fresno by Mr. May. During the past two summers the orchard has been rented to an Armenian, Mr. K. Arakelian, interested in fig culture at Fresno, and in 1908 no fewer than 452 boxes, each containing 20 pounds of caprifigs, were shipped from the Maslin orchard to Fresno. Of these, 21 boxes were mamme gathered in April, and the rest profichi harvested at the end of June or early in July.

Maslin Fig Orchard Leased by the Department of Agriculture.—As a result of an investigation made in the spring of 1908, I found that exorbitant prices were being charged for profichi and mamme, and many fig-growers had become doubtful as to the possibility of ever growing an adequate supply of Blastophaga on their own places, because of rumors as to the dependence being placed on imported caprifigs by the Fresno growers. If the part played by the Maslin seedling fig orchard had been explained publicly by those who knew about it, there would probably have been no such deep-seated distrust aroused. As it was, I found many of the growers were discouraged, and some had even dug up orchards of Smyrna figs just coming into bearing, because they were uncertain as to ever being able to get profichi when they needed them to caprify their trees, or without paying exorbitant prices.

This being the state of affairs, it was decided by the Bureau of Plant Industry to lease the Maslin seedling fig orchard and place it at the disposal of the Smyrna fig-growers of this country. This was accomplished largely through the good offices of Mr. Andrew Ryder of Loomis, and since November 1, 1908, the orchard has been in the possession of the Department of Agriculture.

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*Since preparing the paper, I have received a letter from Mr. Van Lennep that throws some light on the history of the introduction of the Blastophaga into the Maslin orchard at Loomis. The part of the letter concerning this matter is as follows:

AUBURN, CALIFORNIA, January 18, 1909.

Mr. Walter T. Swingle, Monterey, California:

DEAR SIR: Your letter of January 7th is before me. The capri figs containing Blastophaga were sent me by Mr. Geo. C. Roeding in April, 1901, since which time they have been established here.

Possibly those found by Mr. Mazal before receiving from Mr. Roeding were blown from here, as we know they have been carried in that direction half that distance to trees taken from our nursery.

My [capri fig] trees were from cuttings sent me from Smyrna by my brother, Reinhard Van Lennep, Dutch Consul in Smyrna (my native city), in the spring of 1884.

For years they set abundance of fruit, but would fall to the ground at a certain size, as did also the Erbili, until the insect was obtained.

Yours respectfully,

(Signed) DAVID VAN LENNEP.

Valuable New Varieties of Figs and Caprifigs Found in the Maslin Orchard.—In August, 1906, Prof. S. C. Mason of the Bureau of Plant Industry had found very promising Smyrna figs among the seedlings, and at his request Mr. Ryder cured a few sample figs from half a dozen of the best trees in September, 1906. I was very much impressed with the quality of some of these dried figs, and in September, 1908, I made a trip to Loomis to be able to see these figs in the fresh state, and to make observations on the possibility of curing them on a commercial scale. Mr. G. P. Rixford very kindly gave me the benefit of his experience by looking over with me the new varieties found in the Maslin orchard. Of the 139 trees in bearing, 74, or slightly over half, are caprifigs, and 65 are Smyrna figs. A number of these edible figs are very promising new varieties. At least one in ten of these figs is worthy of careful trial with a view to commercial culture, and at least two, and possibly more of them, show a very valuable characteristic not known in any fig of the Smyrna type now cultivated—the fruits become sealed automatically as they ripen.

The Rixford Self-Sealing Fig.—The best studied of these self-sealing varieties I have named the Rixford, in honor of Mr. G. P. Rixford, who first introduced Smyrna figs and caprifigs into California. It is a medium-sized, thin-skinned fig, with light amber-colored pulp of good flavor. As it ripens a drop of pellucid gum gradually hardens in the mouth of the fig, effectually sealing it against filth, beetles, and all other insects. This variety does not sour, because the germs that cause fermentation can not effect an entrance. The tree is very fruitful, and is of immense size; 2,600 cuttings were taken from it in the fall of 1908 without crippling it seriously. These cuttings are available for free distribution throughout the country, as will be explained below.

Another self-sealing variety was discovered on October 20, 1908, by Mr. A. H. Brydges of Loomis, because its fruits had withstood without injury two soaking rains that had ruined the fruits of all other varieties growing in this part of the orchard.

The Maslin Orchard a Capital Breeding Place for Blastophaga.—Probably the greatest value of the Maslin orchard lies in the fine assortment of caprifigs it contains. A score or more of these caprifigs are valuable for planting in Smyrna fig orchards to provide a breeding place for the Blastophaga. Some of the new caprifigs are valuable because of their large profichi full of insects and pollen; others, as was noted in my paper read at the Riverside meeting last spring, because they support the fig insects in midsummer, when few can find lodgment on the ordinary varieties of caprifigs; still others are of value in producing mamme very late in spring, when they are very useful in infecting profichi buds that push late. All of these varieties are available for free distribution on the same terms as the new fig.

It may be readily imagined what a splendid breeding place for Blastophaga is made by the Maslin orchard, containing, as it does, 74 different varieties of caprifigs, and being the largest caprifig plantation known in the world.

Distribution of Young Seedling Figs by the Department of Agriculture.—In view of the remarkably large proportion of valuable figs and caprifigs that have been found among the seedlings planted by Mr.

Maslin, it becomes evident that the Lob Ingir (Bulletin Smyrna, Commercial Smyrna, Calimyrna) fig is not a highly bred variety, but is, doubtless, merely a chance seedling that originated in the Meander Valley in Asia Minor perhaps many hundreds of years ago. The foothills in the vicinity of Aidin have been celebrated for the high quality of the figs they produce for at least 2,000 years.

The Bureau of Plant Industry has grown several thousand seedling figs from the best obtainable Smyrna figs, including the Lob Ingir and the Rixford varieties, and these one-year-old pot-grown trees are now available for free distribution to all who apply. In order to encourage the planting of seedling figs, and thereby the breeding of new varieties of figs and caprifigs especially well adapted to California conditions, the Department of Agriculture will give one cutting of a new fig or new caprifig from the Maslin orchard for every three seedling figs set out at least 25 by 8⅓ feet apart. Those who plant out seedling figs under these terms will be considered as coöperating in the fig breeding work of the Department, and will be preferred in the distribution of new varieties that may be originated in the experimental fig orchards of the Bureau of Plant Industry, besides receiving all publications on fig culture or fig varieties to be issued by the Bureau. Cuttings from the Maslin seedling fig orchard will be sent *only* to such coöperators.

Mamme and Profichi From the Maslin Orchard Placed at the Disposition of Fig-Growers.—One of the chief objects of the Department of Agriculture in leasing the Maslin orchard was to prevent anything like a corner in caprifigs. The mamme and profichi produced by the orchard will, for the present at least, be placed at the disposition of fig-growers who do not have enough profichi to caprify their own orchard, and who wish an additional supply for their own use and not for sale. So far as possible mamme will be sent in small boxes by mail free of all charges, but the profichi must be shipped by express, and the grower must arrange to gather them himself, or else pay the caretaker the actual cost of picking and packing. Coöperators who have planted out seedling figs will be preferred in the distribution of mamme and profichi.

Names of All Fig-Growers Desired by the Department of Agriculture.—A concise circular and a fuller bulletin are being prepared for distribution to fig-growers by the Bureau of Plant Industry. These publications will give detailed information as to how to grow caprifigs, and will explain fully how to secure the new figs and caprifigs as a bonus for planting seedling figs.

All fig-growers are therefore requested to send at once their names and full addresses to the Department of Agriculture in Washington, so they can be placed on the mailing lists to receive the circulars mentioned above.

Now, the reason I wish to speak to you is just this, that in view of the fact that the ranch is offered for sale, that it is leased for only a single year at a time, it was uncertain as to the future of this orchard, and the Department of Agriculture has taken over a lease of this seedling fig orchard, and will run it for the benefit of the fig-growers of California; that is to say, the cuttings of the valuable caprifigs will be distributed to fig-growers under certain conditions, and those who need a supply of the fig insects will be furnished free of charge. Those who wish to use the caprifigs for caprifying their orchards can obtain them at the actual cost of picking, packing, and shipping. When I tell you that 452 boxes, weighing 20 pounds each, were shipped last season, you will realize that quite a large bulk is involved, too large a bulk for the Department to ship free of all charges; but for the growers who need these caprifigs for their own use, not for sale, they will be furnished at the actual cost of picking and packing.

Now, as to the condition under which the Government will do this. Years ago I was shown conclusively that it is necessary to maintain an abundant supply of fig insects that have an abundant assortment of male figs. It is not sufficient to buy one or two of the best caprifigs; that is, the largest insects and the most pollen; you must have those, too, but you must also have other varieties in which the insect can live throughout the other months of the year. Every fig grower should plant in his orchard a small caprifig orchard. They can be planted thickly, and he should have at least eight or ten varieties. We have been for years collecting in the old world cuttings of all the best known caprifigs. We have 65 varieties in the orchard at Loomis. These cuttings of capri trees will be distributed free to all growers throughout this State and other states upon application, upon this condition, that for every fig tree they receive they agree to plant out ten seedling fig trees, which the Department will furnish free of all cost. To tell you why I make this condition, it is to prevent the miscellaneous request for free trees with which we would be overwhelmed otherwise, and secondly, to encourage the planting of seedling fig trees. Mr. Rixford and I have been fortunate in having been able to make an investigation of the fig trees in Mr. Maslin's orchard, and we assume that at least 10 per cent of these figs are excellent new varieties of high value; that is, I mean edible figs. At least 10 per cent of the caprifigs are also very satisfactory varieties. So, in asking the grower to plant ten seedling trees, we are not asking him to throw his money away, but to carry on one step further the experiment Mr. Maslin made years ago, and I think you will find it interesting to watch these new varieties as they come into bearing. They can be planted rather thickly. I am making this announcement primarily to ask the fig growers in this State to send their names and addresses to Walter T. Swingle, Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C., in order that they may receive circulars giving the exact conditions of this distribution, and explaining in detail why we are leasing this orchard.

Now, I want to ask the permission of the Chairman that Mr. Rixford explain something of the value of the variety of edible figs found in this orchard. I am not myself an expert on edible figs. I want to say just one word, which I am sure your Chairman will be interested in. Through chance we have secured the finest strain of the fig insect there is in the world. I say this because I visited the fig centers of the old world several times, and all through there the fig trees are infested by two fig insects, the Blastophaga, the true fig insect, and the Philotrypesis, which occupies a space that the fig insect should have occupied. In some places in North Africa I found that more than one half the insects were these worthless Philotrypesis, the messmate of the Blastophaga, and the value in the old world is partly governed by the value of this insect. Fortunately, in California we have simon pure strain of Blastophaga. It has no parasite, and I wish to make this public announcement to discourage any further attempt to introduce new Blastophaga from the old world, an attempt fraught with the danger of introducing the Philotrypesis. We have countless millions of Blastophaga in the State. There is, of course, no earthly reason for reinforcing. I give this as a warning to not reimport the fig insect.

MR. ONSTADT. When were those insects introduced up here at Maslin's place?

MR. SWINGLE. They were introduced by Mr. Roeding, I think, in 1891. That is a few miles up the road. They were introduced a few years later to Mr. Maslin's place through Mr. Mazel, then the tenant, but in putting the insect on the trees Mr. Mazel noticed that there were a few insects there. They had extended from another place about 13 miles away.

MR. ONSTADT. I am about 35 miles away from Maslin's. How did the insects get there?

MR. SWINGLE. They are blown through the air. It is an insect which can stay in the air for several hours.

PRESIDENT JEFFREY. I would like for Mr. Rixford to make it clear what trees are benefited by this. There are some fig orchards, of course, where there is no use for the insect.

MR. RIXFORD. Speaking of caprifying different varieties of figs, Dr. Schwartz in 1893 at Fresno found several varieties that do not actually require caprification were greatly benefited when caprified. There is a certain flavor to the seeds which contain the kernels that is beneficial to the fig as an eating fig. You perhaps may not be aware that in all of the ordinary California figs that do not require caprification the seeds are empty shells, contain no kernels, and will not germinate. I have gathered recently about sixty varieties of seeds from the London horticultural collection, and a large number of those had not been caprified; the seeds would float on the water, and those that were growing in the neighborhood of the capri trees were all heavy, so it was very easy to tell the fertile ones from the infertile ones. We have given considerable attention to the Loomis orchard, and have found several varieties that are of superlative merit. There is one fig in particular which Mr. Swingle's sharp eye detected first. It is a fig that he calls a self-sealer. We found that the figs laying upon the ground, those that had been caprified, generally had the eye quite open, so that after laying on the ground a short time beetles of different kinds entered them, laid their eggs, and in a few days they were full of maggots. There are two trees there in the fruit of which the opening is stopped up by a little drop of syrup. We have an idea that it may be quite an advantage to propagate that variety. I have some samples here of two of them. These figs have undergone no treatment; they are just as we picked them off the ground.

MR. SWINGLE. I might say that the ordinary fig with the open mouth is entered by all kinds of insects, and frequently it carries bacteria. This fig is protected. I have been asked if cuttings of this variety can be obtained under the terms and conditions I spoke of.

They can. I will state that we will distribute a limited number of the cuttings of this variety. That is the Rixford fig, named in honor of Mr. Rixford, the first to introduce the Smyrna fig in this State. In regard to the pistache nut; we sent an expert to Cicily, who got the first commercial varieties of pistache nuts. The entomologist at Washington discovered a new, and they believed a very dangerous pest, a bettle burrowing in the buds, and no shipments were allowed to be sent out. We dug up trees, and they were shipped back to Washington and repotted. Out of the 500 we only saved six or eight, and I make this explanation. You will obtain them. We have some up at Chico; they are growing rapidly, but we are, unfortunately, unable to supply the buds at the time stated. It was the discovery of this unknown pest, which had not been known in the world at all.

PRESIDENT JEFFREY. Mr. O. E. Bremner, of the State Horticultural Commissioner's office, will now read a paper entitled "Humors of the Demonstration Train."

HUMORS OF THE DEMONSTRATION TRAIN.

By O. E. BREMNER.

It does not matter when or where the *idea* of the Demonstration Train originated, but it is *noteworthy* that on October 21st it was determined as to the nature of the train, and that it would start November 9th. Right then and there it was passed up to the boys to see to it that the exhibition cars were in order, so away they scurried, one to the south for insect pests and diseases, one to the north for noxious weeds and more pests, and one to the coast counties for a like load of the *scum* of our orchards and fields.

There is no *time* to tell of the thrilling auto rides for miles for samples from a known infested orchard, or of how one boy's horse ran away, and, in dragging the overturned buggy, uprooted a grapevine which proved to be a wonderfully fine specimen of the dreaded phylloxera. There is just room to say that it was "work, work," Sunday and all; and then all too quickly the morning of the 9th arrived.

Hurrying to the electric cars, we were confronted by the old San Francisco story—"no juice," and our train to leave at 7:30 sharp! After about three long delays, by dint of good luck rather than foresight, I arrived and flagged the conductor. I said: "Give them five minutes more and they will be here," and my dead reckoning was *correct,* for soon there hove in sight a rotund gentleman puffing like a river boat upstream, and away in his wake, a bad second, followed an abbreviated figure, all suit case and grip.

Then we were off for Davis, where the rest of the party met us, and after switching the hayseed car into its proper position, we rolled away toward Woodland. But why were we here? Well, we didn't find that out ourselves until the second day, when the oratorical general freight agent turned loose broadside after broadside of such eloquence that it left the populous too amazed for counter. And this, in plain language, is what he said:

The Southern Pacific Company, noticing the remarkable decrease in *produce* tonnage throughout its system, and particularly in the Sacramento and San Joaquin valleys, undertook to fathom the mystery. The *producers* told them that the land was worn out. The *horticultural* and *agricultural* authorities said *no,* just a wrong system of cultivation and care. So Mr. S. P. says, we'll take you if you will come and show them how it should be done. So that's why we went.

When we started we considered that the personnel of the outfit consisted of professors, doctors, horticultural and agricultural experts, but after a few days we found we were composed of demonstrators and train crew, and we finished as a unit, a train crew. For after those freight and passenger agents had set the pace, the train crew, led by the head brakeman, our rabbit's foot, took possession, and all the scientific men really had to do was to show the visitors the way to the cars, and the boys did the rest. Now, *really,* did these trainmen talk to the people? For the first few days they listened attentively, and followed us closely as we explained the exhibits, and then if you could have come upon that same brakeman unawares, as we did, haranguing a crowd of fifteen or more on the mystics of parasitism and the intracies of fumigation methods, you wouldn't have asked.

The questions were handed out freely, and fell alike on all of us, so we had to be prepared for any emergency. One wise lady criticized our olive grafts and buds, which consisted of some dummy olive branches about one foot long nailed to a small piece of board, with grafts and buds inserted as if they were portions of a tree. She said: "Well, it doesn't look as if your grafts were doing very well." The man explained that it was not the fault of the graft, but of the root system of the tree. "Well, what's the matter with that?" "Well," he said, "you see the root system of this tree consists of a tenpenny nail driven through this bit of board." And then she wondered why everybody laughed.

You ask me if we were able to convince our hearers as to the benefits to be derived from following our advice? I remember at one station where olive trees were growing by the side of the track, that the whole crew were expatiating on the delicate flavor of a ripe olive plucked fresh from the tree. Of course, we all took one, and rolling it harmlessly in our mouths, moved away from the tree with an expression of entire satisfaction on our countenances. Mr. Old Resident, who was attentively watching, now slyly approached, and carefully plucking one of the enchanting fruit—bit—and just then we all turned and smiled. I leave it to you if such convincing ability as that *could* be doubted.

When one of the speakers referred to the condition of plowed soils, and said, you sometimes turn up clods as big as your fist, they laughed. He didn't know. Then when he said, as big as your head, they smiled. He had guessed pretty close. But when he said as big as a barrel, they grinned. He certainly did know.

We tried to tell them things they should know, and how they were related to conditions with which they were familiar, in terms that were clear and understandable to them. In other words, not scientific and hidden, but practical and plain. One fellow said, "Why we knew them thar things 200 years ago." "Yes," said his friend, "but you must have forgotten them some years ago, judging from the looks of your place and the crops you harvest.''

We talked of fertilizers, we talked cover crops, cultivation, implements, diseases of cattle and poultry, diseases of trees and plants, insect pests, how to get and plant better nursery stock, grafting, and budding, and pruning. We talked home sanitation. We even talked temperance in the dry town. And then, after talking from thirty to forty-five minutes, we opened the demonstration cars, and showed them just what each individual wanted to see, and explained how, when, where, and why. How to keep from getting something you do not want, and how to get rid of it after you have it. There were noxious weeds and grasses—Johnson grass and Russian thistle, cocklebur, and teasel. Insect pests of every kind, phylloxera of the vine, black scale, red scale, purple scale, yellow scale, white scale, green bug, fleas, flies, hoppers, and mosquitoes, weevils, beetles, and ladybugs, and bugs eating bugs. A score of varieties of wheat, barley, oats, and alfalfa; eucalyptus, and all the dairy products, excepting the maid; also, diseases of animals and fowls, with remedies and appliances for treatment. Is there any wonder, then, that everyone seemed satisfied?

You may think there were no tough questions to answer, but there were, and our rule was to tell them the best we knew. As a result this was reported from an overflow meeting on the outside of the car, conducted by a railroad official: An attentive listener, of much whiskers and long boots, suddenly inquired: ''What do them thar fellers inside mean by a rotation crop?'' ''Why,'' says the railroad man, ''you see it is one of those you cultivate with a rotary plow.'' Another railroad man is reported as saying the only way you could harvest beardless barley sucessfully was by using a safety razor attachment on your mowing machine!

Did any one come to hear us and see the exhibits in the cars? At Bogue, a siding without a platform, and so small at that we had to take the crowd on board and go to the next station to let a train pass. We had an audience here of at least 150, an average of the attendance for all the places, not excepting Marysville and Oroville, where scarcely a score turned out; we had over 125 at each and every meeting. Now, considering that we held thirty-five meetings in the eight days, you will see that we talked and showed our exhibits to fully 5,000, and these were not curious minded, but vitally interested people.

Then why was the train a success? Because the company's commissary department maintained such an adequate standard of excellence it kept the speakers at so high a grade of efficiency they had to keep their chin's moving overtime to relieve the tension.

Because the train was well advertised, therefore the people came, and were interested.

Because we met the producers on their own ground, spoke of their own products from their own standpoint, and in their own way.

Because of the personal element we were able to introduce into the work. We could come into direct contact with each of our hearers, show him the subject we were talking about, and allow him the privilege of expressing his views and asking his questions without the embarrassment that always stands in the way at conventions and institutes.

The one thing that accounted for the success of the train perhaps most of all was the complete harmony of all its members. For, represented in the expedition, either all or part of the time, was the Southern Pacific freight, passenger, and advertising departments, University of California and farm at Davis, Stanford University, and University of Nevada, Sacramento Valley Development Association, and the State Commission of Horticulture, two departments. And right here I might as well tell you how the train was made up. First, an engine which developed over 60 miles an hour without an apparent effort, headed by a cowcatcher, which retrieved a turkey, a rooster, and numerous other strays on our right of way. Next the hayseed car, with its load of grains, eucalyptus, and dairy displays. Then the chair car, where we dispensed divers forms of verbal information. The bug car next, with its horde of friends and foes of the agriculturist and horticulturist; and then, ah! then, the Sunset car, with its forward compartments overflowing with delicious goutiness, and the after portions, where all joined in, with his particular key on the song of the weary. And woe to him who awoke, for it was a case of "spoons all roll;" you had to awake the whole car and start all even, the handicap was too heavy.

Will this train continue to be a success? YES, in capital letters. For if the people continue to manifest the same enthusiasm and crowd the cars, loaded with questions, as they did on this first and really experimental trip, there is no doubt of the ultimate effect. It will prove to be an education to the younger element, arouse the enthusiasm of the elder, and cause them all to take more advantage of the means at their disposal for the betterment of their conditions.

The commercial bodies of the State have voiced their unanimous approval of the project, and have been insistent in their invitations to visit practically every fruit or grain producing portion of the State. With so bright a path behind and so brilliant a track ahead, is it any wonder we are looking forward to the next trip with hope of still greater success? This past trip has been an education to the instructors as well as the instructed, and we believe we know *more* now of *what* the people want, and that is just *what* we are going to try and give them.

So we're coming down your way,
Then prepare without delay.
All the questions and conundrums,
Of cheat wheat and raising pumpkins,
  For the Demonstration Train.

Don't allow the grass to grow,
On your pathway here below,
Till you've fathomed all the sciences,
Rotating crops and the appliances
  Of the Demonstration Train.

Bring the family one and all,
For there's none too big or small
Can afford to miss the time,
When old 1459,
  Brings the Demonstration Train.

(Applause.)

PRESIDENT JEFFREY. Professor Ramsey will read a paper on the culture of the walnut in northern California. Professor Ramsey is connected with the Whittier Pathological Station in southern California.

WALNUT CULTURE IN THE NORTH.

By H. J. RAMSEY.

In treating of a subject so broad it will be impossible to cover in any sense fully or satisfactorily the various phases of walnut culture in northern or central California. I shall not attempt to do so, but in the short time allotted for the discussion of this very interesting and important subject I shall confine myself to some of the more fundamental problems involved in walnut culture as relates to particular conditions in this section.

Of late years there has been manifested a renewed and intelligent interest in this industry in northern and central California, and there is now a constant demand for information as to the best stocks and varieties for use in planting. The general prevalence of blight during the last few years has led to a search for a variety or varieties which would be more or less immune or resistant to blight, and at the same time desirable from standpoints of productiveness and quality. Blight resistance from whatever cause is not in itself or alone sufficient to stamp a variety as being desirable for planting. A variety to be a desirable one commercially can not be lacking in any one fundamental requirement, but must possess all of the most desirable characters to a greater or less degree. For instance, a variety may be blight resistant, it may be a good bearer, but at the same time lacking in size and uniformity or be ill shaped and rough. Such a walnut is not a good commercial walnut, even though it be blight resistant.

It becomes a question, then, in any consideration involving the planting of a walnut orchard, as to which one of the many varieties now on the market comes the nearest to fulfilling the ideal requirements in a walnut. Which one is the all-round most desirable variety for planting? What is wanted is a variety adapted to your own peculiar climatic conditions, grafted on to a root or stock that will give this variety its greatest vigor and maximum productiveness.

Comparatively speaking, there are but few large producing walnut orchards in northern or central California, a large part of the total yield of walnuts being produced on scattered and roadside trees. At first scattered trees of the native black were grafted over or topworked to English walnuts, but later orchards were set out in regular form. The trees were either grafted in the nursery, or else the native blacks were grown in the orchard and grafted over later. Many of these orchards and scattered trees have proven to be good bearers and commercially profitable. These examples of successful walnut culture in the northern sections have largely dispelled the feeling which has been more or less prevalent in the south at least, the feeling that successful walnut culture was limited to certain favored locations in the southland. There is little or no doubt in my mind, at least, that you have certain sections in the north peculiarly adaptable to walnut culture. Your conditions of soil and climate are somewhat different from those in the south, a fact which limits the list of adaptable varieties to some extent.

Your past experience will help you much in the selection both of stock and variety. As with the southern grower, you are chiefly concerned with questions as to stocks and varieties most suitable for planting in your locality. In the south the growers are beginning to realize more and more the desirability of having good grafted trees in preference to the seedling. They are aware, too, that their future orchards should be grafted orchards, and not seedlings. With them, as a rule, top-working old trees and the general proposition of grafting and budding is a new, untried, and uncertain operation. With you, this phase of the business is no new thing, but one of the everyday ordinary operations concerned in walnut growing. I shall not, therefore, dwell on the different methods of grafting and budding, as your familiarity with the various phases of this subject is fully proven and attested to by the great numbers of grafted and top-worked trees found on nearly every ranch.

Success in walnut culture in nearly every section will depend, as before said, on the adaptability of stock and variety to conditions of soil and climate. If you have not already the variety which in every way answers the requirements, it is very probable that such a variety can be found by selection from existing seedlings or by the crossing of varieties. There is but little doubt that some desirable varieties will be found either by selection or crossing, and there is here a wide and useful field for young men with the time, inclination, and opportunities for such work.

It is evident also that the sections which surround the bay, and are affected more or less by the coast influences as relates to temperature and moisture, are at present somewhat favored. I mean to say that there are at present well known and tried varieties which by experience have been proven to be a success in these regions. These sections can be said to have passed through an experimental stage and to have emerged therefrom with a list of more or less fixed and standard varieties most suitable to their conditions. There are large bearing orchards in these sections producing both a desirable quantity and quality of nuts. While these varieties are known quantities and are desirable, there is, of course, ample room for improvement, and the growers are constantly in search for some variety that will be more desirable as relates to greater productiveness and better quality. In the more interior valleys somewhat unaffected by the coast influence, walnut culture is in a more experimental stage. While there are scattered trees in all of these interior valleys, there are no varieties of which I know that have no serious drawbacks. Some of these are so serious that it is somewhat doubtful whether walnut culture can be made very profitable with the present limited list of varieties to choose from.

There are a few general requirements and conditions as relates to walnut culture in particular localities which it is well that we keep clearly in mind. Early varieties like the Santa Barbara Soft Shell and Placentia Perfection are not suitable for planting here. They bloom and come into foliage too early in the spring, and are thus extremely liable to serious frost injury. You require a variety that will come out comparatively late in the spring, but which will in an ordinary season mature early enough to be harvested before the commencement of the rainy season in the fall. This lateness in coming out in the spring will be of twofold benefit, in that in localities where fogs are not too prevalent during late spring, the trees will not be so subject to attack by blight. Many, or most, of our French varieties, which are considered to be more or less free from blight, are so because of their lateness in coming out. They escape in this way a period during the spring when atmospheric moisture conditions are peculiarly favorable for blight development.

A very serious drawback to successful and remunerative walnut growing in the interior valleys is the great and almost universal susceptibility of the walnut to sunburn. I do not mean by this alone the very evident effects of sunburn as evidenced by the blackened hulls where the hulls have actually become sunburned by the direct rays of the sun. I have reference to the meats in the walnuts, which show no external signs of sunburn, but which instead of being white are usually quite brown or dark. In many cases it is not only the skin of the meat which is dark, but the whole meat is somewhat browned. This browning or staining of the meats is undoubtedly due to the extremely dry heat at certain seasons in the more interior valleys. Nearer the coast, or where the coast influence is dominant, the meats are white and clear. It is, of course, admitted that the white meated nut is by far preferable. Actual sunburn can be avoided to some extent by using varieties that have an abundant, thick foliage. At present I know of no variety which will consistently produce white meated nuts in the interior valleys and which is immune to this climatic effect. The procuring of an otherwise desirable variety which would produce white meated nuts in the hotter interior valleys would greatly extend the field of successful walnut culture, and would be a distinct contribution to this branch of California horticulture.

Stocks.—The question of stocks on to which to graft the variety of walnut you wish to grow is certainly a very important one. Upon the stock used depend largely the general vigor of the tree, its productiveness to a large extent, and many other important considerations. In locations where irrigation is not practiced, it is very desirable, in fact essential, to have a stock which is a vigorous grower even in the dryer situations. There have been used for stocks in the past the English walnut, the Eastern black, the native California black, and various hybrids between the two blacks and the English walnut. Experience has taught us that the English root is not a desirable root, being too easily affected by variation in soil moisture and other factors of soil and climate. In fact, it is not worth consideration in any type of soil or locality. It is fully as much influenced by unfavorable conditions of soil and climate as is the ordinary seedling. The genuine Eastern black, or *Juglans nigra*, is too slow a grower, and is not the equal of our native California black in other respects. An interesting fact in connection with the occurrence of the Eastern black in this State is this: that almost invariably second generation seedlings, or Eastern blacks grown from California raised walnuts, do not come true, as far as we know, but produce a tree of quite another type. This type, often called a Kentucky black, is a much more rapid grower, makes a larger tree, holding its leaves longer in the fall, and producing a walnut something like the Royal hybrid. These second generation Easterns, wherever we have found them, are much of this same type. Whether this is due to hybridization or other causes, I shall not attempt to explain, but coming back to the question of stocks, it is certain that this so-called Kentucky type would be far preferable to the first generation Eastern for use as a root stock. The genuine straight Eastern makes but little growth in height the first season, while the second generation Eastern, from this State, makes a growth the first year of several feet and grows erect, more like the California black.

The straight California black is really of somewhat rare occurrence in the north. In the Moraga Valley, back of Oakland, are found some magnificent specimens of these trees, apparently the genuine California black unaffected by hybridization. There are found trees, some over a hundred feet in height and over five feet through, trees which have been there ever since the earliest settlers can remember, and which were large trees when they first came into the valley. Up in the mountains in the Wooden Valley, near Napa, are some more of these old trees several hundred years old, but now gradually disappearing. The California blacks in the Sacramento and San Joaquin valleys probably all came from either one or the other of these two places. The first plantings in these two valleys produced the straight California type, but the walnuts produced by these were hybridized to a great extent with Eastern, and we have to-day every graduation between California black and Eastern black. In the south the California black is found growing more as a dwarf, spreading tree, growing wild on dry, exposed hillsides, in foothills, and to some extent in the mountains from Santa Barbara southward toward San Diego. It is very rare that any of these ever grow to have a trunk two feet in diameter. The northern form is a much larger, more erect type, preferring usually situations in the valleys, where moisture is more available.

After everything has been taken into consideration it would seem that for all-round stock, the selected straight California black would be preferable. It is a fairly rapid grower, adapted to a wide range of soils, growing well in either dry or wet situations, is very hardy, and usually a good bearer. It combines more nearly than does any other proven stock the most desired qualities required in an ideal stock. Much can be gained also by selection in the seed bed and nursery, and using for grafting only the most vigorous.

The best results can usually be obtained by sprouting the walnuts in sand and planting out into the orchard or nursery only the most vigorous seedlings. In this way we can eliminate a great proportion of weaklings from the start. A further selection is desirable in the nursery, using only for grafting the best and largest trees. Some leave the smaller ones to be grafted a year later, but this would seem unadvisable, as it would certainly seem true that these are not as vigorous as the ones that attained a desirable size during the first year. Some deem it advisable to transplant directly from the sprouting bed to the orchard. Selection is still possible by planting out several in a place where the trees are to stand, and eliminating all but the most vigorous. By allowing these to grow three or four years, or even more, before attempting to graft them over, they would make a growth sufficient to allow of the grafting being done at or above the fork. This method has this advantage, that the trunks will be the same as the root, not liable to sunburn nor easily injured by tools in cultivation. There is no interference with the tree's growth or vigor by transplanting, and when finally grafted the tree has a strong, well established root system, capable of producing a good top in a short time. Even though this method, everything considered, may not be the most desirable method, it is certainly worthy of consideration. The method now in vogue in the south, and to some extent in the north, is to graft the one year old stock in the nursery and transplant the grafted stock out into the orchard one year later. In this case there is gained some time and there is greater opportunity for selection of vigorous stock.

The use of hybrids as stocks on to which to graft the English walnut has recently come into prominence. There are in general two types of hybrids: the Royal and Paradox. A Royal hybrid is a cross between the Eastern and California black, while the Paradox is a cross between either one of the blacks and the English. There are scattered throughout the State a great number of these hybrids, most of them spontaneous hybrids, resulting from planting either English or blacks. With the exception of a few of Burbank's Royal and Paradox hybrids, which were planted out as such, these hybrids have come from nuts planted either for black or English. Most of these trees have certain common characteristics. They are all extremely rapid growers, are very hardy, and apparently thrive even in the driest situations, and are also usually shy bearers, especially the Paradox hybrids. I know of one Paradox hybrid, about forty years old, with a trunk having a circumference of more than sixteen feet shoulder height, but a poor bearer for such a large tree. Another Paradox in the south is growing in an extremely dry situation, where the English seedlings of the same age have all but died. The tree is thirty-five years old, and is a large, magnificent specimen. It is fully two and one half feet in diameter, has a spread of over ninety-five feet, and is a very heavy bearer, having, according to the owner, produced some thirty orange-picking boxes a year. The walnuts are shaped something like an English walnut, but are otherwise like the black. If these walnuts would germinate at all readily and would, with any degree of uniformity, produce trees equal to the parent tree, they certainly would be desirable for stock. The rapid growth, hardiness, and productiveness of this tree are considerations which would make it extremely valuable for stocks, were one at all certain to obtain these characteristics consistently from the seedlings. We have collected nuts from most of the hybrids that have come under our observation, and will propagate them in the nursery to see if there are any that will produce a uniform stand of a fixed, vigorous type.

Most of the trees which I have seen growing in the nursery, which are second generation trees from hybrids, have been a very mixed lot. The fault seems to be that none of them produce seedlings true to type, and but few equal to the parent. Very satisfactory hybrid seedlings can be obtained by growing first generation hybrids. This is very easily done by planting out black walnuts gathered from trees growing near English, and which have been pollinated from English trees. In the nursery this year we obtained on the average over twenty per cent of such first generation by planting California blacks from near English. Over twenty per cent of the seedlings are distinct hybrids, over half of these hybrids outgrowing the blacks. Of course, we know nothing as to the productiveness of these trees. I know of but few English grafted on hybrid stock now in bearing, and there is as yet too little data and definite information to be had concerning hybrids as stocks to warrant any very extended use of such stock, except in an experimental way.

If one were to use hybrids for stock, in a commercial way, it is probable that some Royal hybrid would be the most satisfactory. The nuts from Royal hybrids are usually larger even than the large California blacks, and germinate with more certainty than do most Paradox hybrids. One would stand a chance of getting a larger number of desirable seedlings from this hybrid, perhaps, than from the Paradox. There are a few trees of the Royal hybrid producing a fairly fixed type of seedlings.

The question of the best varieties for planting in the north as well as the south is somewhat open to discussion, due largely to a lack of sufficient information in regard to some of the most promising kinds. There is but little question that the best proven variety in the north at present is the Franquette. It is a fine nut, well filled with white meat of good flavor, well shaped, and is a good producer. The one objection to the Franquette is its lateness in maturing in the fall, carrying the period of harvesting well into the rainy season. However, it has considerable blight immunity, because of its lateness in coming out in the spring. The famous Vrooman orchard at Santa Rosa is a fair example of what this variety will do in that section. It certainly is a fine walnut, both in appearance and quality, and commands the highest market price.

The Mayette is another very fine walnut, but, unfortunately, there are but few true Mayettes in the country. It may be that the genuine Mayette will prove to be even a better variety than the Franquette, but it has not been as thoroughly tested. It is generally supposed to be earlier in maturing, being at the same time quite immune to blight. If in other respects its proves to be as good as the Franquette, it should be equally or more desirable than the Franquette. Mr. Hutchinson, of Concord, has a type of Mayette which he much prefers to the Franquette. Of the other standard French varieties, the only one that would be worthy of trial is the Meylan. This needs to be tested further, however. It is a fine, well filled walnut, with considerable blight immunity.

What is called the ''San Jose'' or ''Wiltz Mayette,'' a walnut supposed to be a seedling from a Mayette, is certainly an extra fine looking walnut, and quite blight immune. However, beyond these façts little is known concerning its desirability as a commercial variety, as it has been propagated and planted only within the last few years.

The Concord walnut, but recently being advertised, is apparently a very good walnut, and it may prove superior to the Franquette, but it has not been very fully tested as yet. The original of this variety growing on Mr. Wescottt's place, at Concord, is said to be quite blight resistant, and is a good producer, and matures earlier than the Franquette. Time will demonstrate whether it is to take rank as one of the leading varieties or not.

Among the varieties which we have had under observation in the south, the Eureka is by far the most promising. It has but recently been planted in the south, and none of the trees can be said to be in bearing yet. The original tree certainly is a fine specimen, and is a heavy producer of extra fine, heavy, well filled walnuts. It is quite late in coming out in the spring, but matures its nuts earlier than the Franquette. During the four years we have had it under observation we have never seen any blight on it, while the rest of the seedling trees were full of it. It is certainly the most promising of the many new things I know of, and certainly is worth trying out.

The Chase is another variety but recently planted in the south, and is a good producer, quite blight resistant, and is a fine nut. What it would do in the north we do not know. It may be that where a large acreage is to be planted out it would be well to plant out more than one variety, so as to not put all your reliance on one variety. If one would want to wait a few years before selecting his variety, he could gain a good deal by setting out in orchard form the trees to be used as stocks. By the time they are ready to work over there will in all probability be more definite information to be had with reference to varieties, and some of the newer and more promising varieties will have been tested more fully.

I have not here touched on any of the operations of cultivation, irrigation, fertilization, pruning, and many other important considerations. Practical growers here in the north can give this information better than I can. It was not my purpose originally to give you a paper on walnut culture here in the north, but only to discuss it somewhat after being presented by a practical grower. I feel that such an arrangement would have been better, as I feel that some one who has had the experience here in this section would have been better qualified to speak on this subject, and could have given you more valuable information. I have tried only to give a few things as regards stocks and varieties, and a few general considerations in walnut culture. (Applause.)

MR. MARKLEY. Some fifteen years ago I bought a variety of French walnuts at Nevada City. I had the Mayette and Franquette. Both of them bloomed five weeks later than the Santa Barbara soft shell. The Mayette ripened a little earlier than the Franquette. I got them from Mr. Gillett. Mr. Gillett was a Frenchman, and claimed that he had imported the nuts from France. I am inclined to think, from the way they acted, they were the true Mayette.

MR. SPRAGUE. Did they sunburn?

MR. MARKLEY. No, they were in Sonoma County, and don't sunburn much there. I experimented with walnuts there for seventeen years and kept the records. Were I planting to-day I would not plant anything but the two French varieties. All through the Sacramento Valley the walnut sunburns very badly. If it is on very rich deep land, river bottoms, sometimes it does very well.

MR. WILLIAMS. I would like to ask the writer of that paper a question in regard to those second generation Eastern walnuts. I have in mind four trees of the second generation; they do not show any of the characteristics of our common walnuts; they are heavy growers. Whether he would recommend the native California black walnut in preference to those?

MR. RAMSEY. The only trouble that I have found with the hybrids up to the present time is that by planting these hybrid walnuts you can not consistently get strong trees. You don't know just what you are going to get. Still, if I had some very strong growing second generation hybrids I would not be afraid to graft on them, but it is very difficult to get any number of those, that is, that are desirable. I only know of a few trees that have been grafted on these hybrids and we have no data as to what they will do, but it would seem from the rapid growth which these seedlings make that a good many of these would make excellent stocks on which to graft the English.

MR. ANDERSON. I planted some Præpeturians twenty-five years ago and they were unsatisfactory. In our locality at Davis would you recommend this Franquette?

MR. RAMSEY. As I said in my paper, the Franquette is the best proven variety that we have as yet in the north, and the true Mayette may be fully as good. Here is this Eureka walnut; it is quite a large walnut. The tree itself from which these walnuts were grown is a seedling. The nut from which that tree was grown was taken from one of three or four trees which are growing on Mr. Meek's place, the original of those trees having been sent him from Persia, so it is really a third generation tree. As regards this Santa Barbara soft shell in the north, I would not recommend that at all for planting where you are susceptible to late spring frosts, because it is an early bloomer and you would nearly invariably get caught, and besides that, it would blight. The Placentia Perfection is really one of the best walnuts I know of if it were not for the fact that it is so susceptible to blight. It is white-meated and the meat comes out whole. Aside from the fact that it is so susceptible to blight it is one of the best varieties we have in the south. In the north it would not do, because it is early.

MR. SWINGLE. I am informed by a nurseryman in Texas that he takes the wild walnut for a satisfactory stock, and I want to suggest that perhaps it would be worth while to try a few of them in this State. It is somewhat analogous to the California black.

MR. RAMSEY. Just in that line I want to say that we are investigating the question of black walnuts and also have a number of trees of that walnut which is growing in Texas, and are going to graft on to it this coming season. The trees, as I understand it, are much like the type which we have in southern California.

MR. RIXFORD. I have grown the Præpeturians for twenty-five or thirty years. It is a success as a regular and profuse bearer. It is a fine nut, but it has this serious fault, that it is small size.

MR. POWELL. I would like to ask for some information in regard to pruning French walnuts.

MR. RAMSEY. As a rule, pruning has not been done very extensively, except in the south. The practice has been to keep the lower limbs cut away so that you can cultivate underneath the trees. That has been very nearly the whole extent of pruning. I have no doubt but what some good work could be done along that line as to the best methods of pruning.

MR. SWINGLE. I would like to have Professor Ramsey give an expression publicly as to whether the Franquette will come true to seed. I believe there are thousands planting them under this expectation.

MR. RAMSEY. I can answer that in a very few words. No, it will not come true to seed any more than will any other variety of walnut. I don't care what variety of walnut you plant, you will not get them true to seed. If you plant a hundred walnuts from the Franquette you will have one hundred different varieties of walnuts.

MR. RIXFORD. What method is most successful in grafting the walnut?

MR. RAMSEY. There are a number of ways of grafting a walnut which are very successful. I will just give you briefly our experience as to nursery graft. We used a modified tongue graft. In top grafting, where the limbs are larger, we find that a modified cleft graft does a whole lot better than the tongue graft. It is really a modified Whittier graft, something on the old style of apple graft, only instead of cutting across, as in the apple, you just slice off a portion of the side. It is cut straight across and with an incision, making a tongue in the side, and another cut is made downward where that cut has been made before, and the two tongues of the stock and scion are fitted in that way. You have just a little slanting surface on the side and the rest of the stock is cut across square. In the south that method has produced 90 and 95 per cent stand, but in commercial practice I should say about 80 per cent of the grafts take and make good trees. In the top grafting this graft has not been quite as successful as the modified cleft graft, because it does not connect as well, but does in the young stock in the nursery, and they are a little more liable to dry out; so the cleft graft, as far as top grafting is concerned, seems to be more advisable. I have not hardly the time to go into details on that. Here in the north a modified cleft graft seems to be very successful. In fact, it is a universal proposition in some of these valleys. Instead of cutting clear across, an incision is made on the side.

Mr. Mills stating his inability to act as chairman of the Committee on Resolutions, the President appointed in his stead Mr. George H. Hecke.

The members of the convention then proceeded to the State Insectary on the Capitol grounds, where the following proceedings took place:

PRESIDENT JEFFREY. Ladies and gentlemen, I will explain briefly that we have asked you down here to see the setting of the little tablet which we have arranged in the front part of this building. We are here to pay a brief tribute to Ellwood Cooper, to whose efforts is due the fact that we have this building to-day, and to hear a few words about the object of this institution, and, in brief, just a simple, short address. That will fix the dedication of the insectary in the horticultural literature of the State and give you an opportunity to examine everything. I have asked Mr. Mills to address you briefly on this matter.

MR. MILLS. Within the last sixty seconds I have been notified by the Chairman of the Commission that I would be called upon to perform this important duty. I can assure you that I might well have wished to have been given longer time to prepare the remarks that should be made at so opportune a time as this in the dedication of so great an institution—an institution that will mark an epoch in the affairs—has marked an epoch in the fruit affairs of this State.

In being called to, in a measure, express a tribute to so great a man as Ellwood Cooper, a better voice than mine ought to be heard. There are all too few of the citizens of this State, and of other States, who are like-minded with Ellwood Cooper, who are willing to give of their lifetime, of their younger days, of their mature days, when others are seeking rest and leisure—I say there are all too few men like Ellwood Cooper who through many years have given the very ripest of their talents to the service of the fruit-growers and the agricultural people of this great State.

Words are too few, words are too unthoughtful, if I might say it that way, to express the admiration that I have for the noble man who formerly was head of the Horticultural Commission of this State, and who for so many years of his life has given the ripest talent of his mind, of his soul, to the service of his fellow men.

You and I—in the twenty years and odd of my life at least in this State—have observed his actions. I went over twenty-two years ago his great orchards in Santa Barbara County and marveled at what he was accomplishing, studied his life and marveled that he was so generous. I would that we might here to-day draw a lesson from the life of Ellwood Cooper and that we might be willing, ready, yea, glad, to give up our time, our energies, our substance, our wisdom, if we have any, to the service of our fellow men. Let us to-day draw the lesson that service of our fellows is the greatest and grandest thing that man may give of his life here below and that will fit him now here for the better service, the better enjoyment, the better life beyond the grave to which we are all journeying and which we will reach so very soon. I glory in the fact that we have one man like Ellwood Cooper in this State, and I would rejoice, as few men could rejoice, if we could to-day inspire others among us to do as he has done.

Ellwood Cooper made it possible for us to be here to-day at the dedication of this State Insectary, which will do great things for the agricultural and horticultural interests of California. Here we will have those who will study the insects, beneficial and otherwise. You know that Ellwood Cooper was the first one to send abroad men who would seek out in foreign lands the enemies of the scale that devastated our orchards, and he brought to our shores beneficial insects that have done wonders.

Take, for instance, that insect which drove absolutely from our orchards the cottony-cushion scale. It was worth, in that matter alone, millions of dollars to the State. The wisdom of the man who thought out that idea has been worth millions to us. Well may we to-day, upon the tablet at the front door, place his name. Well may we take off our hats to him and rejoice in his wisdom and in the breadth and depth and glory of his soul. I to-day beg of you again that you will emulate the grand and glorious and beautiful efforts of this man Ellwood Cooper, whose name we honor here to-day.

PRESIDENT JEFFREY. Before leaving your places I will appoint voluntarily, without any motion, a committee of five to unveil this tablet, in behalf of all who are here. Then when you pass out you can see the inscription as it reads. I will appoint Mr. Edward K. Carnes as Chairman of that committee to unveil this dedicatory tablet and Mr. C. B. Messenger, Mr. Craig, Mr. Pease and Mr. Maskew. The others of you here will immediately disperse yourselves around through the insectary and let us explain it.

EVENING SESSION.

The Convention was called to order by President Jeffrey at eight o'clock P. M.

MR. KING. Mr. Chairman, I move that we tender to the Chamber of Commerce a vote of thanks for the use of their hall last night.

MR. JUDD. The Committee on President's Address is ready to report.

PRESIDENT JEFFREY. If there is no objection we will have that read now.

Mr. Judd read the report of the Committee on President's Address, as follows:

REPORT OF THE COMMITTEE ON PRESIDENT'S ADDRESS.

To the California Fruit-Growers' Convention:

We, your committee appointed to consider and report on the annual address of the President of this organization, respectfully report as follows:

We find the President to be in hearty accord and with a broad policy, covering all of the interests of the fruit-growing industry of California. We approve his hearty coöperation with the State University, in his favoring their policies, and we note particularly, with the highest commendation, his recommendation for liberal appropriation by our Legislature, to advance the greatest interests of California, by strengthening the quarantine service, as well as to be in sympathy with previously expressed reforms of former conventions, in the matter of reduced freight rates, quicker and better service.

Also we want to call special attention to the specific points in the address of President Jeffrey, touching the insufficient and unfair division of the taxes upon fruit trees and vines in this State, the unfairness consisting in the fruit grower getting no returns, practically speaking, from this great and exorbitant tax for his own benefit in the protection of the great industry that makes California prosperous to-day.

We also indorse his suggestion in asking the State University to take up the economic question of freight rates, market and distribution.

In conclusion, we commend the entire document as timely, progressive, and worthy of the thoughtful consideration of all our people.

We further indorse our worthy President's suggestion advocating amendments to present laws that will strengthen and fully protect us from incoming pests, to the end that adequate protection may be had for all fruit growers of the State.

Respectfully submitted.

A. N. JUDD.
GEO. E. KING.
S. A. PEASE.

Vice-President Cutter in the Chair.

On motion of Mr. Judd, duly seconded, the report of the Committee on President's Address was unanimously adopted.

The Committee on Resolutions, through Mr. Judd, reported the following resolution:

Introduced by Prof. E. J. Wickson:

WHEREAS, Since the last meeting it has fallen to the lot of our old friend and associate, Mr. Alexander Craw, to answer the final summons which removed him from his earthly sphere of activity, we members of the Thirty-fifth Convention of California Fruit-Growers assembled in Sacramento, December 1-4, 1908, desire to place upon record a heartfelt tribute to his memory; therefore,

Resolved, That we look upon the career of Alexander Craw as one of the greatest achievements of California horticultural development, because such development gave opportunity for him to devote his native talent, energy and unselfish spirit to the formation of a noble character, and to successful performance of great public duties, both of which are attributes of the highest manhood and citizenship:

Resolved, That while we regard the production of a man like Alexander Craw as one of the greatest gifts which a great industry can give to mankind, we desire to inscribe upon the records of our Association a tribute of profound thankfulness for his nobility, self-sacrifice, and distinguished service in the hope that such a tribute from us may be accepted as an honor to his memory.

Resolved, That our love for his memory prompts us to express our deep sympathy with those to whom his removal brought deep bereavement, and to assure them that we count as one of our earthly blessings the remembrance that we had the friendship of such a man as Alexander Craw and the privilege of association with him in his life and work.

G. H. HECKE,
Chairman.
A. N. JUDD.
P. D. FOWLER.
JAS. MILLS.
G. H. CHAMBERS.

Mr. Judd moved the adoption of the resolution, which motion was duly seconded.

MR. JEFFREY. I would like in a few words to express the feelings of this convention and my own feelings as a personal friend and associate of Mr. Craw in the work now being considered by this Convention, to indorse the resolution as read. I have known Mr. Craw for many, many years. I have been out with him in the orchard many, many times. I found him always conscientious, where if he had not been conscientious no one would ever have been the wiser. Mr. Craw was the personal friend of most of the delegates to this Convention. In all his goings about the State, instead of loafing like some men who get to be high up in office sometimes do, Mr. Craw's mind was always on his work. He would come to Los Angeles on some mission and instead of going to some hotel and resting and perhaps getting something to eat, he would come first to the horticultural office—"Boys, what is there to-day? How can I help you? Let us go out to such and such a place"—always ready, very industrious, very conscientious, very able, and altogether a man. (Applause.)

President Jeffrey in the chair.

MR. WHEELER. May I say a few words in regard to Mr. Craw? I found him a kind hearted, conscientious man. He loved his fellow man, and that, I think, is the greatest tribute that can be paid to any character, and when I read of his death I felt as if I had lost a friend. We differed on many things, but it was the differences which can exist between man and man and which lead to the progression of the world and lead to better feeling and better acquaintances between men. Mr. Craw was of a genial nature, he was of a kindly nature and he was of a sympathetic nature, and therefore I feel proud to-night, I feel glad that I am able to say a few words of a gentleman that may have differed from me, but that I can always recollect as an honorable, pleasant, genial opponent.

MR. MILLS. I do not desire often to be heard. I can not refrain, however, from adding my word of tribute to the splendid character who has gone hence from our midst. What a tribute is offered to him by this gentleman over there—"He loved his fellow man." The greatest man who ever lived, the one whom we count divine, loved and loved only and loved always and went about doing good. Alexander Craw was an inspiration and will ever be an inspiration to those who knew him—yea, to those who heard of him, to those whom he served. He went about everywhere doing good. God give us a few more of such men as Alexander Craw, who honors his God and his fellows and who adorned his place here, and who surely has on his forehead that crown that shineth unto the everlasting days, with many jewels on it. I do wish to say here that he has been an inspiration to me, and in his loss I feel that I personally, and all of us together, have lost the truest friend the fruit-grower ever had. I know not where they can get a greater one. All honor to the noble soul who is marching on.

The resolution was adopted unanimously by a rising vote.

Mr. Judd read the following resolutions, which were adopted:

WHEREAS, The principal markets of the products of California are found in the Eastern States, and at a great distance from the place of production, and for the reason that the transportation between California and the Eastern coast of the United States becomes a factor of paramount importance in the economic advancement of our entire State; therefore, be it

Resolved, That this Fruit-Growers' Convention does most earnestly favor the establishment by the National Government of a line of steamships plying between New York and California ports in connection with the Panama Railroad, owned by the United States Government, to the end that the transportation facilities may be increased and freight rates may be regulated in the interests of the productive and commercial interests of California; and be it further

Resolved, That a copy of these resolutions be sent to President Theodore Roosevelt, and a copy to our Representatives in Congress, calling their attention to the fact that these resolutions are in line with the President's policy expressed upon the receipt of Commissioner J. L. Barstow's report exposing the reason of the high freight rates maintained by the allied railroad and steamship interests, and also call their attention to the fact that the immense vote for W. H. Taft in California fully shows a hearty endorsement of the reforms of President Roosevelt so dear to us.

G. H. HECKE,
Chairman.
A. N. JUDD.
P. D. FOWLER,
JAS. MILLS.

WHEREAS, There has appeared a new and insidious enemy of our deciduous orchards, known as the thrips; and

WHEREAS, This pest threatens this industry with heavy injury, and will, if not checked, largely ruin it; and

WHEREAS, In recognition of the seriousness of the injuries inflicted by this insect pest, the Bureau of Entomology of the National Department of Agriculture at Washington has directed one of its most efficient workers, Mr. Dudley Moulton, who has spent many years studying this insect, and an able corps of trained assistants, to enter the field against this foe, and to continue until it has been overcome; therefore, be it

Resolved, That we do heartily commend and endorse the spirit and enterprise directed by Mr. Dudley Moulton and his associates against the thrips; and be it further

Resolved, That we recommend most seriously that our Representatives in Congress direct their efforts toward securing sufficient increase in the appropriation for this purpose, in order that this most necessary work may be continued to final success.

Passed by the Convention without referring to committee.

Offered by Mr. A. R. Sprague:

WHEREAS, The reign of graft, bribery and other forms of corruption in San Francisco so long endured by that city has been overthrown by the courageous and self-sacrificing action of District Attorney Langdon, Francis J. Heney, Rudolph Spreckels and other patriotic citizens of that city; and

WHEREAS, We recognize that the good name of our whole State demands that there be no relaxing of the prosecution of the evident criminals; therefore, be it

Resolved, That this Convention expresses its entire confidence in the graft prosecutors, and congratulates the city of San Francisco that it has such able and self-sacrificing citizens as those who have been and are now devoting themselves to the defense of the vital interests of that municipality, and rejoices that the dastardly attempt to assassinate Francis J. Heney has brought to the support of the prosecution so large a number of the best citizens of the metropolis.

WHEREAS, The Great Northwest is becoming rapidly settled by America's best and most intelligent and enterprising young men; and

WHEREAS, Ere long, with their American instincts and patriotism, they will be clamoring for annexation, devoutly to be wished for by all right-thinking people of both sides of the line; and

WHEREAS, Our sons and daughters over there are clamoring for the rich and abundant fruits of the Golden West, to the end that fond memories of the old home may ever be lasting; therefore, be it

Resolved by the Thirty-fifth State Fruit-Growers' Convention of California assembled, That our Representatives in Congress be requested to have a general provision placed in the tariff law, which may be enacted at the next session of Congress, authorizing the Executive to make trade agreements with Canada in order to secure the abolition of the duties on green, canned and dried fruit, entering that country; be it further

Resolved, That a copy of these resolutions be sent to Hon. J. C. Needham, and each member of the Ways and Means Committee.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The Woman's Council of Sacramento, with such rare taste and consideration, provided a delightful entertainment for the members of this Convention on the evening of December 3, 1908, thus enabling the members to meet each other socially and to partake of the dainty refreshments and listen to the rare music; therefore, be it

Resolved, That this Convention tender the President, Mrs. J. J. Fitzgerald, and her efficient corps of assistants, and all others that made the evening so enjoyable, a rising vote of thanks, for the courtesies shown us while sojourning among them.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The civic bodies of this State, as well as its inhabitants, are working faithfully and at great expense to advertise the wonderful resources of this State by maintaining exhibits, distributing literature and other efforts to the good of all; therefore, be it

Resolved, That the members of this Convention respectfully request that all hotels and restaurants serve on their tables only such fruits as are calculated to create a favorable impression on their guests, and the stranger within our gates.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

Offered by Mr. Geo. H. Cutter:

WHEREAS, There are vast areas of rich agricultural and horticultural lands in the wide valleys of the State, and more particularly in the middle and northern part of the State, waiting for settlers and capital to properly develop them; and

WHEREAS, No adequate means of advertising these rich lands to the intending settler has so far been adopted or followed; and

WHEREAS, The wonderful possibilities of these lands need only be brought to the notice and knowledge of the intending settlers to secure their coming and staying; and

WHEREAS, Many, many thousands of tourists annually visit the State, but more particularly the sunny south land; and

WHEREAS, Many of these tourists did they know of the rich lands of the middle and northern valleys, and that these lands were available at exceedingly reasonable prices; and

WHEREAS, It will be greatly to the advantage and profit of the present residents in these valleys if more settlers are encouraged to settle among them; and

WHEREAS, A golden opportunity presents itself to the counties of the State to advantageously present their possibilities to tourists and others seeking homes in California at the State Agricultural Park at Los Angeles; now, therefore, be it

Resolved, That we, the horticulturalists of the State in convention assembled, do most heartily endorse the scheme presented here by Mr. Wm. Bowen of Los Angeles, to the end that our lands and products shall be more widely known, and we do commend the same to our legislators and ask their coöperation in making it an immediate and grand success.

Offered by John A. Livingston of Placer County:

Resolved, That this Convention send a delegation of three (3) members to represent the fruit-growers of the State at the meeting called for December 5th at San Francisco, to discuss the proposed raise in freight and express rates.

A. N. JUDD.
JAS. MILLS.
P. D. FOWLER.

Offered by R. G. Williams:

Resolved by the Thirty-fifth State Fruit-Growers' Convention, That a committee of three be appointed to communicate with our Congressmen and members of the Ways and Means Committee of Congress and the Treasury Department, for the purpose of endeavoring to prevent the reduction of duty on Almeria grapes entering the United States from Spain, or the arrangement of the measuring of the barrels containing said grapes.

WHEREAS, The press of San Francisco deem it advisable to confine itself to the publication of its own peculiar internal affairs, than to disseminate the fact that the bone and sinew that produces 90,000 cars of fruit annually in this State is being ably represented in convention in Sacramento, by the grower, university and scientific departments of the State and Government; and

WHEREAS, Said journals evidently think the slow process of the distribution of the vast amount of valuable information through the channels of State bulletins and the regular annual reports of the Horticultural Commission is amply sufficient; therefore, be it

Resolved, That this Convention ask the influence of said papers in the interest of a greater publicity to intercede in our behalf with the incoming Legislature for an increase in the appropriation to the end that the many valuable and scientific papers may be put into every man's hand as speedily as possible.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The development and use of water power in California concerns very directly the future prosperity of the fruit-growing interests;

Resolved, That the policy of the Forest Service in its control of the privileges granted to power companies is thoroughly commended;

Resolved, That the Secretary of this Convention be instructed to mail a copy of this resolution to our Senators and Representatives in Congress.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, There are likely to be immense tracts of land in California devoted to cereal culture, and the average production of cereal per acre is extremely low, and the quality of varieties now being commercially grown are so low as to render it necessary for our milling interests to import over 100,000 tons of wheat annually to maintain the quality of our flour; and

WHEREAS, Under an appropriation made by the State, the University of California has established a very complete and systematic line of investigation to introduce and develop more desirable varieties, and has already obtained some promising results; therefore, be it

Resolved, That this Convention do approve of this work and appeal to the members of the coming Legislature to continue this line of investigation, and so extend it that it may include the improvement of other field crops, fruit, and green manure plants.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The Chamber of Commerce of Sacramento have kindly assisted in every way in making the Fruit-Growers' Convention a success; therefore, be it

Resolved, That the Thirty-Fifth Fruit-Growers' Convention take this method of thanking them heartily for said assistance in making our stay pleasant and profitable.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The general publicity well distributed over the State of the proceedings of the Fruit-Growers' Convention adds very materially to its value to the general public; and

WHEREAS, The horticultural and agricultural papers of the State and the daily press of Sacramento have been giving a fair and impartial report of this Thirty-fifth Fruit-Growers' Convention; therefore, be it

Resolved, That the thanks of this Convention is extended to each of them for their many courtesies.

G. H. HECKE.
A. N. JUDD.
G. H. CHAMBERS.

WHEREAS, The manifold advantages to the people of the State of California, brought about by the session of the Thirty-fifth Fruit-Growers' Convention, are enhanced materially by the presence of the many professors and scientists from the Department of Agriculture at Washington, College of Agriculture at Berkeley, State Farm at Davis, Polytechnic Institute at San Louis Obispo, and State and County Horticultural Commissioners; therefore, be it

Resolved, That the members of the Fruit-Growers' Convention most heartily thank the various professors and scientists for their valuable assistance in making our meetings the success they are; and be it further

Resolved, That the assembled fruit-growers commend and appreciate the untiring efforts of J. W. Jeffrey, the executive head of the Horticultural Department of California, as well as that indefatigable worker, E. M. Ehrhorn, whose presence at the Golden Gate is a much-needed menace to the ever-threatening pests.

WHEREAS, The expedition of the business of fruit-growers' conventions, parlimentarily and otherwise, devolves upon its officials; and

WHEREAS. The thirty-fifth session of the fruit-growers of California, in convention assembled in Sacramento. December 1 to 4, 1908, have been fortunately situated in having a corps of efficient executives; therefore, be it

Resolved, That the members of this Convention tender our most hearty thanks to Mr. J. W. Jeffrey, our President; to Geo. H. Cutter and A. R. Sprague, our Vice-Presidents; to O. E. Bremner, Secretary of the Convention; to E. K. Carnes, Superintendent of the Insectary, and to the affable official reporter, Chas. H. Adams, for their courteous treatment and kindly consideration.

MR. DARGITZ. I desire to say a few words on the questions that were touched upon in the President's address, emphasizing the necessity of the fruit-growers taking up and considering the economic side of our business, which has been more or less neglected, especially in the conventions and in our praise for the professional side of the work. We have all laid a good deal of stress upon the idea of producing better fruit and more of it. We can go on producing beautiful fruit and swell our professional pride along this line, but, after all, it is dollars and cents that count in the matter of the fruit industry of this State. If it is only professional pride, it is only a question of a little time until our fruits will be grown in our door yards. But if it is a matter of economics, if it is a matter of dollars and cents, then the commercial side will come to the front. I heard some one say—I think standing well up in the front, too—that to invite people to come to this State and help us to grow fruit by increasing the number of orchards and acreages without at the same time taking steps to develop markets for that and increase the commercial value of our products, was doing the State an absolute injury. I believe it is true, and, by way of illustration, I hope you will pardon me for saying that it is sometimes asserted that a preacher is a very poor business man, that he doesn't know much about finances. I want to say that one preacher went into northern San Joaquin County and took charge of 800 acres of orchard which had been the rock that had blasted the financial hopes of at least two corporations and several individuals, and that preacher has made it pay. Now, I have made a success there by working largely along the economic lines. It has been a question of rooting out undesirable varieties, of working over other varieties which might be made to produce better and pay better, of carefully selecting the men that would do the work, and placing them where they would work to the best advantage, and in the marketing of the fruit. You know the labor people of the country are getting pretty well organized. They have seen what was good for themselves. The merchants of the country are organized pretty well. They know what is good for themselves. The manufacturers of the country are organized. They know what is good for themselves. But when it comes to the average farmer, he doesn't know what is good for himself. When things are presented to him that are proper and right and good for him, he is a little bit inclined to turn them down. Even in the last political campaign a problem was presented to us to vote upon that had been submitted to us by our Legislature, which proposed the changing of the tax arrangements, and relieving somewhat the tax burdens of the farmer. It was number one among the amendments that we were to pass upon, and to my intense surprise and disgust the farming community practically turned it down. They didn't know what was good for them. In the matter of the marketing of our fruits, as at present constituted, we are going at it backwards. Whenever you go to a store to buy anything from a merchant, the merchant fixes his price on what he has to sell, and you can pay his price or you can let it alone, just as you please. When we produce our fruit and have it ready to sell, the fellow that is going to buy comes around and tells us what he will give, and if we don't want to take that, we can keep it. It is all wrong. The man who produces the fruit is the man who should have the say as to what he will sell it for, and if the grower hasn't got common sense enough to place a reasonable price upon his fruit products, so that the people can afford to buy them, then he will have to keep them. Now, take the dried fruit, for instance, and how does it work? Up to the present time the packing houses have served a very good purpose for the people in marketing our fruits. The packing houses will send their agents throughout the East before they buy fruit, and in competition with one another they will try to sell the fruit short to the Eastern consumers, the wholesalers, the jobbers, the dealers, and by competing with one another and cutting prices as low as possible they finally make sales, and come back to the purchaser here, and after taking off the price they have sold for and the matter of transportation and packing and a profit for themselves, they offer the grower what is left, and the grower can take it or he can keep his fruit. The system is entirely wrong, because it tends to reduce the prices instead of elevate them. It is making the packing houses the agents of the Eastern people instead of the agents of the producers here.

PRESIDENT JEFFREY. My attention has been called to the fact that there is a part of our programme that we have omitted.

MR. DARGITZ. I can take this us at some other time.

MR. MILLS. Mr. Chairman, I do wish that the discussion that this gentleman was just leading could be followed up. There is nothing that you gentlemen in the north need more than the doctrine he is giving you. We in the south have learned the lesson. We are the dictators as to what the price should be. You need it here. It is more important than getting your fruit into Canada. (Applause.) Those of us from the south can bring you courage and give you courage, for we have solved our difficulties, and in a year of panic we did what no other industry has done in this State, marketed the fruit in the face of it, and got a better price than before. You need information, direction, instruction, leadership, in the marketing of the fruit you are growing.

PRESIDENT JEFFREY. This subject is provided for in the programme for Friday, and we will take it up then.

The Convention adjourned until to-morrow at 9:30 o'clock A. M.

PROCEEDINGS OF THIRD DAY.

SACRAMENTO, CAL., December 3, 1908.

The Convention was called to order by President Jeffrey at 9:30 o'clock A. M.

PRESIDENT JEFFREY. The first number on the programme this morning is "The Minus Quantity in Soils, Humus," by Professor G. W. Shaw of the University of California.

PROFESSOR SHAW. Mr. Chairman, I feel a little diffidence in speaking at a horticultural meeting, on account of the fact that most of my work has been along the line of general agriculture rather than horticulture, but inasmuch as President Jeffrey has asked me to speak along a certain line, and he has assigned to me "The Minus Quantity in Soils, Humus," I desire to present to you some facts which have appeared during a somewhat careful study of the soils of California during the last seven years; and I may say that this conclusion which I have reached here, and which I shall attempt to present in this paper, has not been hastily drawn, but has been the result of rather a careful study of the situation, brought about particularly through a study of why it was that our soils were giving such low average yields in general field culture; why it was, for instance, that our soils are failing to produce 30 or 40 bushels of wheat per acre, as they did years ago; why it was that our farmers have changed from wheat to barley in recent years; and during the course of this investigation I have been impressed with the fact that the horticultural people are up against a proposition somewhat similar to the grain men, and unless we mend our ways, particularly in the northern portion of this State, we are going to be continually worse up against it than we are at the present time. I am going to speak especially with reference to northern California, because I realize, from having traveled over the southern portion of this State, particularly, that the particular point which I wish to bring up at this time is much better understood in southern California than it is in northern California; and you gentlemen of northern California will have to wake up to the situation; you will have to wake up to the reason of why you have clods as big as your fist and as big as your head and as big as a washtub, and why you do not produce the same crop with the same amount of moisture that you did twenty years ago. It is some of these things that I desire to speak of in this paper.

THE MINUS QUANTITY IN CALIFORNIA SOILS.

BY PROFESSOR G. W. SHAW.

Under the above title the writer proposes to set forth what he believes to be the most vital question confronting the farming and horticultural interests of California to-day. I may perhaps be pardoned for saying that this impression has not been formed hastily, but is the crystallization of a somewhat careful study during the past seven years, both in the field and laboratory, of the soil conditions as they obtain, if not in all, still in most parts of the State.

While these investigations have had mainly to do with the underlying causes for the low average production per acre of field crops, particularly grain, yet in the prosecution of this special work I have become impressed with the unmistakable fact that many fruit and vine growers in northern California are facing much the same problem.

In the case of the general farmer, the gradually reduced wheat yield per acre leading to a change from wheat growing to barley growing, and the subsequent gradually diminished yield of this crop has forced him to ask the very pertinent and fundamental question, "Why are soils which in our fathers' hands were so productive now giving so meager returns?" This is still more evident in the case of the fruit grower by his blind rush to the commercial fertilizer market for some sort of a cure-all to remedy a condition that he sees is already upon him or one which he wishes to avoid.

The Popular Explanation.—The general supposition, although erroneous, is that that plant food content if not absolutely gone is reduced to a minimum—that the soil is exhausted. Both the supposition and the usual conception of the term *fertility* are incorrect.

The chemical phase of the subject is overemphasized. The terms plant food and fertility are not synonymous. The latter refers only to the ability of the soil to produce crops, and the plant food of a soil is only one of the attributes, and often not the main one in crop production. Moisture, warmth, and aëration; soil texture, soil fitness; its tillage, drainage, and irrigation, are all quite as important factors in the productiveness or fertility of a soil as are fertilizers. The crop-producing power of a soil constitutes its fertility and not simply the three or four forms of plant food present, and the maintenance of fertility involves such an all around handling as will conduce to maximum effectiveness. Both science and the better practice is laying more and more stress to-day upon the direction of natural forces, the same that built the soil in its pristine vigor of years ago, on the conservation of the inherent richness of the soil, and on the acquirement of plant food supplies from the air and the subsoil, but the popular mind is still fixed on the idea that a fertilizer is a panacea for all soil ailments. The purchase of plant food when needed is an important matter and should not be neglected, but no fertilizer can act as a substitute for proper soil management.

There are, of course, soils and soils; some which, from the outset, are relatively unproductive unless assisted; others which are at first fertile, but which become rapidly depleted; and still others which maintain high productiveness for many, many years. But the best of them show wear if improperly managed; yet, even though they may have been grossly abused, most of them may be renovated.

Neither the cereal nor the horticultural soils of California are exhausted or worn out—*many are depleted*, but there is an immense amount of inherent richness in most soils, even in the poorest. In a certain table which is supposed to show fifteen representative samples of so-called "worn out soils," the nitrogen content in but one sinks below 1,100 pounds in the top eight inches, and but twice below 1,500 pounds; the phosphoric acid content but once falls below 1,000 pounds, and but three times below 1,500 pounds, while the two lowest potash contents are 1,000 and 1,200 pounds and the next lowest is 4,000 pounds. The average nitrogen content of these soils is above 3,000 pounds, 5,000 pounds phosphoric acid, and 17,000 pounds potash in the top eight inches, and these figures may be ordinarily doubled, for the next eight inches will usually show as much as the top, and is available for most crops. If we compare these figures with those indicating the draughts made by most crops, the supply of plant food would not be exhausted in five hundred years.

The figures express for the most part *latent* rather than potential plant food and are merely given to enforce the thought that soils are seldom if ever denuded of their plant food entirely. The causes of lessened crop production lies partly in a shortage of *soluble* plant food, for only a small amount of the total plant food is potential at any one time; but it is more often the result of a wretchedly bad soil management on the part of the grower himself. We have not given the ounce of prevention, and consequently we must pay for the pound of cure. Nature made the soils of our valley friable and absorptive, but we have sacrificed this condition for the immediate dollar, and now we must pay double the price to restore it. Nature will restore the condition, but she is unrelentingly slow.

This minus quantity of our soils lies not so much on the chemical side of the soil as upon the wretchedly poor physical condition induced through the lack of any attempt to return to the soil that vital attribute which makes for productiveness, *humus*, which, together with rational tillage and the use of manures, constitutes the best keys for the unlocking of the latent plant food mentioned previously.

Failure to realize the importance of this most vital question, the restoration of humus, has led to lessening the retentiveness of our soils for moisture, especially in the upper layers, a very serious matter in our climate of fickle rainfall; a lessening of available plant food; the making of the soil colder, and the increasing of the cementing action in the case of heavy soils and increasing the tendency of light soils to drift.

The maintenance of fertility or productiveness of soils is very largely a matter of the up-keep of its humus content. The "first aid to the injured soil" abused and depleted should invariably be to supply it with a good quality of humus. We shall not attempt at this time to go into a scientific discussion of what humus is, but shall pause only long enough to say in this connection that humus is a variable, indefinite sort of matter, difficult to classify, chemically complex, sometimes highly nitrogenous and sometimes nearly nitrogen-free, composed of mixed animal and vegetable matter—mostly the latter—in its intermediate forms of decomposition. far along in decomposition, but not complete. It is the result of the partial decomposition of the organic matter of soil, leaves, sticks, straw, stubble, roots, sod, green crops turned under, and the like.

During its process toward final destruction, and while being made into mold, this material is useful to the soil. It was that which gave the lightness and tilth to it in the earlier days through its accumulation for countless years, and which when man began to cultivate the soil was rapidly destroyed. During its formation it acts both in a chemical and physical capacity, which may be summarized as follows:

It benefits the soil chemically:

1. By supplying nitrogen directly;

2. By supplying phosphoric acid, potash, and lime indirectly.

It benefits the soil physically:

3. By augmenting its water-holding capacity;
4. By increasing its warmth;
5. By bettering its texture.

It benefits the soil biologically:

6. By affording food materials for micro-organic growth.

Humus as a Supply of Nitrogen.—The nitrogen of the soil other than that captured from the air by means of leguminous plants is of humus origin. It is a raw material from which nitrates are formed. Humus obtained from different sources carries different percentages of nitrogen, that obtained from stable manure and from leguminous crops being of the most value. It is generally stated that the humus content of the soil extends only to a depth of eighteen inches to two feet, but extensive experiments recently conducted in California on soils which have been cultivated to grain for many years show that the humus content extends very much deeper than this, even to the extent of six or eight feet. But the important fact is also developed that in this soil, which has been cultivated for so many years, the top foot carries only about one half as much humus as does the second foot, and is in much poorer tilth than the second foot. This means that from a chemical standpoint so far as nitrogen is concerned, in the case of deep-rooted plants, if we take pains to maintain the humus already there found and restore the content of the top foot, we shall continue to have soils which are well supplied with nitrogen. The top foot of this soil, however, is in extremely bad condition, which becomes evident from its great tendency to dry out rapidly and to become very cloddy and heavy.

Humus as a Supply of Mineral Plant Food.—During the processes of humification acids are formed capable of dissolving more or less mineral matter. The weight of evidence seems to show that potash, lime, and other mineral forms of plant food are combined with the humus, and in this form nourish plant life. It is altogether probable that these plant foods become available to plant life through the agency of the humus compounds.

Humus as a Soil Sponge.—Humus acts as a sponge in the soil in its water absorbing powers. Like all other kinds of organic matter, it holds water very much better than does mineral matter. A soil well supplied with humus may hold nearly twice the water that a medium sand will carry, and one half as much again as a medium sandy loam. When we remember that plants use from 250 to 800 times their dry weight of water during the growing season, and that under the California conditions it is of extreme importance for us to care for all the water which falls, it will be seen how vital the question of maintenance of a good humus supply is. Under the present conditions it requires a greater rainfall to produce the same amount of dry matter than it did twenty years ago on account of the lessened humus content of the soil. Not only does the humus absorb a greater quantity of moisture and hold it against drainage losses, and for the use of the plant, but it assists greatly the capillary rise of water, thus promoting growth in dry season, the moisture being more slowly and evenly conveyed to the plant roots. *The presence of ample humus supplies in the soil means success: its lack* *means disaster. The water-holding capacity of the soil may be lowered a quarter by reducing its humus contents by one half.* The original moisture capacity of the soil and its pristine vigor may be largely reëstablished by restocking the soil with humus.

Humus Increases the Warmth of the Soil.—As black clothes are warmer than white ones, so the dark color imparted to the soil through the presence of a liberal quantity of humus will render the soil warmer, consequently the crop is thus made earlier and frequently frost injury warded off, although it is admitted that it might happen that so much humus was in the soil as to actually cool it on account of the slowness with which the water held by it tends to evaporate, so that in cases of soils very rich in humus the cooling effect might overbalance the increment of temperature due to the change of color. This latter condition, however, is seldom found in agricultural soils.

Humus Betters the Soil Texture.—By the incorporation of this organic matter in the soil, the porosity of the latter is increased and soil aëration bettered, and the weight of the soil is lessened and thus the increased pore space and lessened weight tend to promote easier tillage. As contradictory as it may seem, *sandy soils* are *made more compact* and retentive of moisture, *while clay soils are made more mellow and porous* by this vital thing, *humus*. It must always be remembered, however, that this easier tillage leading to a cleaner culture serves rapidly to deplete the soil humus supplies, and special pains must be taken to restore that which is constantly used up, owing to tillage.

How May the Need of Humus Be Diagnosed?—First, by one's general knowledge of the past history of the soil; second, by observing the relative action thereon of farm manures and of commercial fertilizers. By the tendency which the soil has to bake or to dry out rapidly, or in the case of lost soils the drift, will be vastly improved by the addition of humus.

It would require too much time to enter into a discussion of the effects of current agricultural methods upon the humus content of our soils. The condition of many of them is a standing commentary upon such methods. Suffice it to say that clean culture, while conserving moisture culture, tends rapidly to burn out the humus and thus rapidly deplete the soil, and with this loss the humus goes, also a serious loss of phosphoric acid, potash, and lime.

A grower, if he is wise, will keep some sort of track of the plant food outgoes and so adjust his procedure as to maintain the plant food, or at best to minimize the losses. There is much difference as to the effect of the character of farming upon the soil losses. In *grain farming* there has been a very serious loss of nitrogen, phosphoric acid, potash, and lime, especially from the top foot, in addition to rendering the top soil extremely refractory in cultivation. It is neither the time nor place to discuss the methods of restoring these grain lands.

The horticulturist is engaged in special farming, one which constantly withdraws plant food from the soil, and he has no recourse to any great extent to farm manures to assist him in the maintenance of the fertility of his soil. He is forced then to a more natural system, on the one hand, to maintain the humus supply by the use of green manure crops to be turned under, and by the artificial application of plant food on them through the use of commercial fertilizers. But right here comes a source of danger, for the continued use of commercial fertilizers alone tend to aggravate the trouble by the exhaustion of humus. They supply little or none.

The function of fertilization is to augment crop growth, which means the use of humus. If we are to maintain soil productiveness by the use of commercial fertilizers alone, special measures must be employed to maintain the humus content, else rapid deterioration in this direction occurs. This should not be construed, however, as an argument against the usages of commercial fertilizers, but rather a plea for their proper usage in *connection with* and *not in lieu of* humus material. No one can hope to secure maximum returns from commercial fertilizers unless there is a reasonable amount of humus existing in the soil.

This brings us to the question as to how one may maintain and augment the soil humus. This may be accomplished by these procedures, all practicable, standard and long practiced by the best farmers, viz., (*a*) crop rotation, (*b*) the use of farm manures, (*c*) the practice of green manuring. While the first-named, *crop rotation,* is not available in orchard practice, yet on account of the fact that many fruit-growers are also interested in other farming operations, it is pertinent to say that *crop rotation* retards, where continuous cropping hastens, soil deterioration. The one maintains a higher degree of fertility, assists in the regulation of labor, aids in the combat with weeds, and makes for success; the other lowers fertility, reduces yields below the point of profitable farming, and is a spendthrift of humus. Rotation should be short and include leguminous crops. The fundamentals for this practice are to select three classes of crops, one which will sell well, one which has fertilizing value, and one tending to free the soil from weeds, money, manuring and cleansing crops.

As to the second method of securing humus, viz., the use of farm manures, I assume that no one before me is so foolish as to neglect their use when obtainable at a reasonable cost. Rich in organic vegetable matter, already partly decomposed in condition for and containing agents inducing rapid decay, it is ideal and rich humus of the best sort. No one gets its maximum value; many get but half.

PROFESSOR SHAW. Now, I have come to the end of the place to which I have written. I have not touched upon the other point, the matter of pre-manuring. That is the resource which the horticulturist has. I have occupied, perhaps, more time than I ought, yet I want to speak of this particularly. I am not a pleader for any particular kind of pre-manuring; I am sort of eclectic along this line. Get humus. I don't care whether you use pease, whether you use rape, whether you use various other corps which are valuable, but get it if you can, only get a small crop of it. Don't stop if you can only get three feet of growth. Get one if you can. Some people say, "I can only get pease to grow 8 or 10 inches." That is 8 or 10 inches better than nothing. And don't despise the burr clover as a green fertilizer. I am not particular as to whether you turn that crop under green or whether you allow it to grow dry during the season and turn it under, except that you will probably pay for the crop a little bit if you turn it under dry, but it will improve the crop the second or third or fourth year. I would prefer, from my own experience, to turn it under green; I think I can get better results from it.

Now, as to green manuring. There are certain crops which are valuable to the grower in California for the improvement, by the addition of this humus, of the soil. I would say first of all, in northern California, and perhaps in southern California; in fact, I don't need to say much about that section, because they use it all the time down there. They would almost think as much of not picking their oranges. We must have a winter crop primarily. The Canadian field pea is quite the best success on our experiment station.

MR. ADAMS. May I interrupt you? There are about sixty varieties of field peas, and I was wondering whether you would name that variety.

PROFESSOR SHAW. Any of them. I realize that you horticulturists, in many cases, are in a very much better situation to handle these things than a common farmer, where he does not irrigate, but in most cases you can irrigate. These can best be seeded in October. You will get a satisfactory growth by the first or middle of February to turn under and vastly improve the soil by reason of these legumes, which reach out into the air to take the nitrogen. Rape makes a most excellent fertilizing material. *Vicia sativa* makes a satisfactory growth. All these plants are understood in the south, but in the north we have not understood the importance of these things. In the cereal industry we have got to do that, and I am constrained to think that in the horticultural industry we will have to do the same thing.

PRESIDENT JEFFREY. The Secretary of the Convention has made arrangements with Mr. Geraldson to present his views on this matter, as they are somewhat different from the ordinary views.

MR. GERALDSON. It is a pity that circumstances were not such that we could devote a whole day to this question. It is really the most vital question that can come before a convention. The foundation of all agriculture and horticulture is soil, soil, soil. If we have no soil we do not care about pests, we do not care about tariff. We might just as well get down to this question of soil and consider it seriously. You all really know, if you stop to think, how soil was made, yet probably not thought of. Originally this earth was one great big rock, and there was a lot of water on it. Then there came ice and snow at the poles and rain and wind in warm places, and the sun and wind broke the rock into sand, and then the rain fell and carried these rocks down the watercourse, and the rock broke into smaller pieces and became pebbles and sand, and then bars formed, and the lower forms of vegetation grew, and the seed dropped down and formed humus, and the next year it went through the same process, and formed more humus, and the humus and the sand formed soil. That process has gone on from the beginning until now, and now anywhere in the world—I don't care where you may be—the soil consists of pulverized rock and decayed vegetable matter. The Professor has stated plainly the importance of humus, and he has also shown you the absolute ruination following its departure from the soil. He has done it better than I possibly could. The whole question resolves itself right down to the best way to retain humus in the soil or get it back into the exhausted soils. The trouble with our orchards is due to the loss of humus, and absolutely the falling off in our grain crops and all our crops is due to the loss of humus. Soil does does not lose humus; it is built up from year to year as long as we don't interfere with nature. As long as there is grass or a covering the humus increases. The policy of cultivating the soil is precisely on the same footing as the absurd policy of insane deforesting our mountains; the same policy of excessively overgrazing our hillsides. The three all come exactly under the same head, and lead to bankruptcy, ruin, and desert. Right now, all over California, up and down for hundreds of miles, the hillsides are as bare as this floor, and the cattle are licking the roots out of the ground. When the grass is all taken off the rains run down the hillside, and the green grass does not start. Keep your soil covered, keep your mountains covered, and new trees will grow up and keep us in lumber forever. Keep your hillside stocked with grass, and when it rains the new grass will come up quickly. Keep your orchards covered. Let nature's process of making humus go right on. The matter of stable manure and the matter of chemical manuring are makeshifts. Chemical manuring will lead us to bankruptcy first; stable manuring will lead us to bankruptcy second, and green manuring, where there is clean cultivation of the orchard, will lead us to bankruptcy, anyhow. They don't see what is coming after it. Nature did not make humus out of green grass or green leaves; it always took the dry, matured article. Green grass is all water. It is nothing, nothing. You bury it in the ground and you have nothing left. You turn under grass up to your knees and go under that ground in a couple of weeks and turn it over and put your nose to it and it is bad; there is a stink there.

I have a better plan to offer, a plan that lines up with nature's methods, gets natural, normal, sane, unlimited results, and is subject to none of these criticisms. You don't have to spend hundreds of dollars plowing and seeding and cultivating in the fall, and then plow it under in the spring. Cultivate alternate tracts in alternate years, and let the land that you don't cultivate this year go. Don't pasture it. Let the native grasses grow. You don't have to employ vicias. Nature will soon supply on this soil the grass that this soil needs, and on the other the grass that that soil needs. I believe the whole thing is automatic, and that nature is amply able to handle the thing. When soil reaches a certain point one sort of grass disappears and another comes up. That must be due to natural chemical conditions, making that grass necessary for the time and later on unnecessary. This applies to any kind of cultivation you can take up in California. It applies to orchard culture much better than grain. I come from Newcastle, up here in the hills, where the ground is sloping. We have something like 30 inches of water; it is all simply a matter of rainfall. Your humus is cultivated out of the ground, but a large percentage is washed out of the ground.

We call the space between two rows of trees the middle. One year we plow middles numbers one, three, five, and seven, and leave the others in grass. The next year we plow, two, four, six, and eight, and leave the others to grass. We started that six years ago. The first time we irrigated we ran trenches along to irrigate the trees. The first time we irrigated our water would soak probably two or three feet. The second time it would soak a foot, and the third time it would go right straight through the bottom of a ditch, and the tree would show distress all the time. If you put humus in Portland cement it won't stick together. When we started this process, after a long lot of worry and consideration of the matter, we could grow perhaps two inches all over the soil. At the end of two years, instead of having two inches of scattering vegetation, we had grass as high as my head.

MR. MILLS. You mean between two rows of trees?

MR. GERALDSON. Yes; between the trees, the strips, we call them middles. At first we didn't see much difference in the ground we had plowed up, but as soon as we began to get a little grass growing on the ground—and the grass re-seeded itself. Nature re-seeds itself. She knows what seed she needs, and she puts a seed in that ground that has nitrogen in it. That is the way nature got nitrogen into the ground originally. As this process repeated itself it built itself up, just like an electric generator; the more you have, the more you get. When we get a little grass, conditions are better, and we get a little more. The hillsides around us are now bare, and in our orchard, where last year we had a good crop of grass, we have now 6, 8, or 10 inches coming up. That process will go on indefinitely, and will build up your soil indefinitely, and at the same time you can take off better and better crops, just as the German forest service is constantly taking off more lumber and having more and more on hand. As the professor says, it betters the soil in every way. We once irrigated every week. Now, if we do not irrigate for three weeks our trees don't show distress. Formerly our soil baked like rock; now it is perfectly crumbled. Formerly you could not put enough fertilizer on; we would put on chemical fertilizer and the trees would jump, and the next year they stood stock still. Now we don't use any chemical fertilizer. We use manure to get the grass started. We had worn 18 inches of top soil off trying to get good results. Now we have an unlimited supply of green grass. We have a fine big supply of dry grass to put in the soil to make the real humus. During the past summer our trees made the finest growth they ever made; our crop was the best. While much of our crop is on ground forty years old, it is at least equal to any ground up there. You all know the old story of diligent cultivation; you all know the defects. As long as you can get good results through diligent cultivation it is simply because there is enough old original humus in the soil. By adopting this plan nature does it all, and you go on from better to better, I believe to infinity. I can see no point where we are not better off than we were yesterday. (Applause.)

MR. MILLS. Do you say that you could not get barnyard manure enough on your ground to keep it in humus?

MR. GERALDSON. In the first place, there isn't enough barnyard manure to go around for all of us.

MR. MILLS. You gave the impression a moment ago that all the barnyard manure you could haul on to your ground would not reclaim the ground. You don't want that impression to get out?

MR. GERALDSON. I do. I make that now, that our ground will go to ruin with all the barnyard manure I can afford to put on it.

MR. MILLS. Do you say you are using no chemical fertilizers?

MR. GERALDSON. Not for seven years.

MR. MILLS. What are the grasses growing on your soil?

MR. GERALDSON. A bountiful collection. Burr clover is a very important part, and broncho grass.

MR. MILLS. Burr clover is the standby?

MR. GERALDSON. Yes; it seeds itself all over.

MRS. YATES. I can support this gentleman's theory perfectly. I abandoned plowing eight years ago, and have not had one bit of manure except what the cows made, and I think I have as find a stand of grass as the State can show on a hillside, and the trees are all irrigated in a basin shape. I have never sowed one ounce of seed. The soil is decomposed sandstone, and had but very little humus in it at the beginning, but it seems to be taking care of itself. I abandoned plowing for the reason that the plowing was done so very poorly. The people would plow up hill and down, and I had no teams of my own, so I abandoned the plowing system entirely. I like the system very much. Now I have a beautiful field of green grass and my neighbors have none. They have harrowed their land to death and washed their lemon trees out of the ground. (Applause.)

MR. PEASE. I want to ask Mr. Geraldson if he irrigates in the section where he lives?

MR. GERALDSON. Our plowing is done across the rainfall; across the water flow. We irrigate right across a plowed strip and then across an unplowed strip. It prevents wash, both by rainfall and ditch water.

PROFESSOR SHAW. I am very glad to hear that Mr. Geraldson is getting humus. I very much doubt, however, if he knows how he is getting humus. I don't care whether he plows it under dry or green, but I do want you gentlemen to understand this, and I don't believe Mr. Geraldson really wants to go on record as saying that stable manure is not a good humus forming material; and furthermore, I don't believe he wants to go on record as saying that green stuff plowed under is not a humus forming material. That is a pretty broad statement, and it is positively untrue.

MR. MILLS. As Mr. Geraldson said, this is vital, more vital than anything else for the north. I have talked with gentlemen in this house who have made a failure, and that is their failure. Mr. Geraldson has made some statements dogmatically, that if followed will be ruinous to Mr. Geraldson. The fact that he is not using any phosphates in soil will land him or his descendants in ruin. This thing ought to be discussed. If there is a place on earth that needs it, it is right here around Sacramento.

PRESIDENT JEFFREY. We can hardly give any more time to the discussion now.

MR. KING. Mr. Chairman, I move that this be given discussion on Friday afternoon.

The motion was duly seconded and carried.

PRESIDENT JEFFREY. The next number is "Local Value Forestry Work," by Mr. F. E. Olmstead.

LOCAL VALUE FORESTRY WORK.

By F. E. OLMSTEAD.

MR. OLMSTEAD. I should much prefer to let this discussion go on and defer my own talk. I want to speak very briefly about the mountain regions of California and their influence on agricultural interests below. It may seem like a pretty far cry from fruit-growing in the Sacramento Valley, for instance, to the care of the trees and the protection of the timber in the high Sierras, but, as a matter of fact, I think the relation is pretty close, and, at any rate, it will be very much closer in the future.

The national forests in California, as well as elsewhere, and the work of the Federal Forest Service is designed first of all to benefit the agricultural interests of the immediate vicinity, and as fruit-growing in California is, of course, the dominant agricultural interest, the work of the forest service should benefit you above all others. If it does not, in the future at least, something is wrong.

The history of all mountain regions the world over shows that the resources of the high ranges have always been neglected until they have had to be taken care of through necessity. Settlement, of course, in the first place has always been in the valleys when the country is opened up, and in many cases timber and the various resources of the high ranges have been impediments rather than anything else. California in a way is unique, because a great deal of the first settlements, of course, were made in the foothills and the mountains. But that was merely a scratch and the real settlement came afterwards through the building up of argicultural interests in the great valleys. In this State, as well as in most parts of the West, the need for some kind of systematic care of Government forests was first felt about 1890. From then on, what were then called forest reserves were created in California. They now include practically all the great mountain ranges of the State. They begin at the Oregon line and run south along the entire crest of the Sierras and on the other side along the entire crest of the Coast Range, with some few exceptions, so that the agricultural lands in the Sacramento and San Joaquin valleys are wholly surrounded by forest reserves almost without a break. In the first place, the forest reserves were created and nothing was done at all for their administration and use, and that naturally brought out opposition, and a great deal of it. It was like taking the resources and locking them up absolutely. That opposition brought about a very good thing, which was a law providing for the use of all the resources of the forest reserves, and a short time ago the very name was changed to get away from that idea of reserve. They are not reserves any longer; they are national forests, and the timber, the range and the water, and everything in the way of resources, is for use and is used.

Now, let us take up the resources, very briefly. First is the timber. There are about a hundred billion feet of merchantable timber in the national forests of California. Most of it, of course, is in the northern part of the State, some of it in the south, but not much. If these timber lands had remained in the public domain and had not been thrown into national forests, what would have happened? They would have passed very quickly from Government ownership to private ownership, and, as many of you know, the tendency has been, and probably still would be, for private owners to gradually form large holdings and monopolies. That has already happened in some parts of the State. In other words, the interests of the people, so far as the timber resources go, would be in danger of not being properly guarded. As it is now, the Government owns, of course, only a small proportion of the merchantable timber in California, but it owns enough, at the same time, to have a very strong influence on market conditions. For example, there is no question whatever but what it could control local market conditions in the great valleys of Sacramento and San Joaquin, because the Secretary of Agriculture is empowered to sell timber at whatever price he thinks best and whenever he thinks best, if it is found that through monopoly of any kind the price of timber in any particular region is being held up at an exorbitant price; that monopoly can be broken, or at least very much modified, by the Government selling its own timber if any such necessity should ever arise. The first thing to do, of course, is to protect the timber we have, and the main thing is to keep out fire. It is pretty hard, but we are doing it better and better all the time. It is simply a matter of keeping enough men employed and keeping those men traveling the mountains in the fire season and jumping every fire at its start. As soon as a forest fire gets a good start it is almost hopeless to control it before immense damage has been done. The main thing is to stop the little fires at the start. A great part of the work had been to create a good public sentiment in regard to the fire question, and that has already been done, and California in that respect is away ahead of the rest of the country; they are very much more careful here than in any other part of the West.

Forestry is a sort of agriculture, and we treat it as you would treat an agricultural crop. The object is to make that land produce that crop of timber which is most valuable and which that land can best support, and to keep that timber growing continuously. For instance, we are selling timber all the time, but the trees are cut in such a way that instead of the lands becoming barren, burning up and becoming waste, a certain proportion of the stand is left, trees of all ages, and fires kept out, so that those trees that are left set up the land again and you have new trees coming all the time, and thus you are always assured a continuous supply of timber. That is the object in the timber business. Not only do we want to keep timber growing on the land, but we want to improve its kind and its quality and its quantity, and we can do this by very careful cutting, which we always insist upon. That applies, of course, particularly to the Government, because the private holder must get certain returns upon his capital and he must get them in the immediate present. With the Government it is quite otherwise. The Government can be satisfied with very low returns at the present time, and it can wait years and years for second crops, so that conservative forestry is very much more easily handled by the Government than by private owners, although it is possible for private owners to do very much more than they are doing at present.

Now, as to this timber matter in its relation to fruit-growers. You need, and always will need, lumber and timber for your houses, fence posts, stakes, shakes, wood for all kinds of uses. The agricultural possibilities in the great valleys of California are in their infancy. They are nothing at present compared to what they will be. There will be two or three times as many homes. The demand for lumber will always be increasing. It is pretty important in that connection that you be assured an accessible supply of wood at reasonable rates. Wood is a necessity; we will always need it, and that is the cardinal principle in the management of the national forests of California, to always keep enough timber on hand for local use. If there is only enough timber in a certain national forest to supply the future needs in that given locality, we do not sell a stick of it for export. We keep it right in that locality for present and future use by the ranches. We try to work to the end that local interests will never have to go outside and import timber which, of course, would be very expensive and inconvenient, so we are keeping the timber right in the country for continuous use in the future, and it will never be shipped out unless there is a surplus which can not be used locally, and then, of course, it will be sold and not allowed to go to waste.

Then about the water; that is another thing you need. You will find more and more water, and you want a steady supply. The national forest will accomplish that, simply in this way. Forests do not make any more rain—at least, nobody has ever proved that they do. What they do is to hold the rainfall when it comes and regulate its flow down the mountain slopes. That is the main influence they have. If the whole Sierra range were smooth and barren the rains would rush off quickly in flood waters, and a great deal of it would be waste. With a forest cover, with a brush cover, with a good grass cover even, when the rain comes it forms a reservoir and lets the water run off slowly, and especially holds it for the latter part of the season when, as I understand it, it is needed very badly indeed.

There is another thing connected with the water supply of the national forests, and that is the power question. The power resources of California are as but yet very little developed. They are likely to be enormous in the future. It is simply impossible to figure to-day what they might be. The policy of the Federal Forest Service in regard to the power question is simply this. We believe that electric power generated from a flow of water is so very important now, and will be so very much more important in the future, that the power companies should be under some kind of control by the Federal Government. The water, of course, is appropriated wholly under State laws, but the land belongs to the Federal Government; the reservoir sites belong to the Federal Government. The rights of way for ditches, conduits, power lines, belong to the Federal Government, and the sites for power-houses, also; and further than this, the fall of water, which is due to the configuration of the land, belongs to the Federal Government. It is not one thing alone which makes power, it is a combination of all those things; it is not the water alone, not the land alone, not the protection which we give the land, not the fall alone, but it is a combination of all those things; and our opinion is that it is only fair to keep the title to the land with the Government; give the power companies long leases, 30 or 40 or 50 years, for their power-house sites, their reservoir sites and their rights of way and to charge them a reasonable rate on the total amount of power developed. Of course, there has been a great deal of opposition to this. There was an attempt last year to pass a bill in Congress granting patent and fee simple to the power companies of the necessary land, and there will probably be another attempt at this session. But the power question is likely to be very important also to the agricultural interests in the valleys below. You will use it more and more for light and heat and pumping and mechanical power of all descriptions, and what we are working for in that respect is to see not only that we keep a general control of the whole situation, but that whatever power is taken out of the mountains is utilized completely and to the best advantage, and there is another local question. We want to look out that power is not taken from one locality completely out of it, to the detriment of local interests, and we expect to see very carefully to that.

Now, the range. The range, of course, does not affect you directly. It is only a small fruit-grower in the foothills that is concerned, so far as the agricultural interests go. He has an apple orchard and a few head of cattle usually, and the range in the immediate vicinity of his ranch is kept for him against outside cattle or sheep—at least, that is the intent. It is the man with a small holding who is making a home who is always favored in all these things, so far as we are able to do it. Of course, the prosperity of your fruit-growing industry depends directly on the prosperity of the stock-growers, because if one thing is prosperous everything is prosperous, and if the stock business goes to pieces you are bound to feel it more or less. The intent of the national forests is not to overstock the ranges, but to keep just that number of cattle and sheep on them which the range will support, and to gradually improve the various kinds of grasses and other forage. So far as the use of the land goes, the forest reserves do not shut out homestead entries at all, which is often misunderstood. There is a law now, which applies the homestead act inside of national forests, and if there are little patches of agricultural lands lying around in the meadows and valleys inside of the national forests they can be settled up and homes established.

You have a State Forest Service here which is a mighty good one, and we are coöperating with it in every way we can. The California fire law is the best in the whole country. It is very much better than the Federal fire law, much easier to work with and very much more effective, and we use it a great deal. Our officers are deputy state firewardens. The State of California could do a little more along that line, however. We ought to have State forests and State parks, a good many of them. Of course, it is a great shame that the school lands and State lands have slipped away in the manner in which they have. If the State still had possession of those it would have hundreds of thousands of acres of State forests and State parks, but it is not too late to begin.

Then it is also a question which seems to me a very important one as to whether there can not be some slight State control of lumbering on private lands. You have a State control of placer mining; that is controlled by private interests. The effect of logging and lumbering on private timber lands is just as important, if not more important, than the effect of placer mining on the lands below, and is there any more reason why State control should not be extended to private timber lands as well as to private mineral lands? It is bound some day to be of very great importance, and it seems to me it is a question which is surely coming up for your solution.

Now, just a word about the organization of the service. There is a new organization just gone into effect. Of course, the ranger is still the man who does the work. The forest rangers are sprinkled all over the mountains with little cabins and meadows and pastures of their own. They get the brunt of the fight. They patrol for fires, they make small sales of lumber, they look after the stock, they keep two or three horses and get very little in the way of salary. Most of them are in it because they like the life. There is a supervisor on each of the ranges and he does the business in his office, locally. Just recently there has been an office established in San Francisco, of which I have charge, which has direct control of all the national forests in California. That is an advantage. Formerly the control was in Washington, D. C. Now it has been moved West. The whole national forest business in California will hereafter be done from the San Francisco office; that is, the control of the thing. That, it seems to me, is a mighty good idea, because you get a certain man in that San Francisco office who will stay there. They become familiar with California conditions; they will make their homes in California; they will be California citizens, and their work will be permeated with the California atmosphere, which is absolutely essential to success.

It is not an easy matter to show clearly in a brief talk like this just how the national forests affect fruit-growing, but I have tried to show you that it affects it, at least indirectly, in a great many ways. The big holdings in the valley will be divided up as time goes on; the farms will become smaller and smaller, and the cultivation more intensive all the time. That means more people and more homes, and I know you will not forget that in that connection at least a part of your future prosperity will depend upon an accessible supply of timber and wood ready at hand always at reasonable cost, an ample flow of water and a regular flow of water for irrigation and domestic use, and a wise and fair use of that same water for purposes of generating electric power. I thank you very much. (Applause.)

PRESIDENT JEFFREY. The next number of the program will be by State Forester Lull, who will present a paper on the local aspects.

STATE WORK IN FOREST PROTECTION.

By G. B. LULL.

Mr. Olmstead has covered this field so thoroughly that I do not feel it is necessary for me to take much more of your time, particularly as when I came in I noticed you were very much engrossed in an interesting discussion which you propose to continue later. I shall take but a very few minutes. Mr. Olmstead has told you that the national forests in California, situated on the steep mountain slopes, cover an area of approximately 23,000,000 acres. He has told you about the policy of the forest service; why those reserves are being maintained; why the timber and grazing interests are being protected, and so forth, and has mentioned, incidentally, the State forest laws of California. It is the operation of the State forest law that I want to talk particularly about. In the first place, this law applies to the State, whether the land is included in national forests or not, and, as Mr. Olmstead has said, the law is more workable and more effective than the Federal forest law, and for that reason is used more widely by the Federal men themselves than is the Federal law. In the national forests the rangers and employees of the Federal service, in the first place, are made firewardens; and this is for the purpose of giving them control not only of the public lands which they would have control of anyway under their ranger appointments, but in order to give them control of the private lands, for on these 23,000,000 acres there are a great many large private holdings which the rangers would have very little control of except through their appointments as firewardens, which give them power to handle them promptly.

This law provides numerous things, but most important among them is the power of a firewarden to arrest for any violation of forest law and the violations that fall under these headings. First of all, for use of fire in the dry season without a permit. It may seem rather hard, at first glance, to require a man to get a permit before he burns brush on a little ranch next to the foothills, but the idea is not to work a hardship on that man, but to protect his neighbor, because he might use poor judgment, start that fire on a hot day or when a strong wind was blowing, and it would escape from him, and it does damage to his neighbors and to the watershed. The idea is protection and not persecution. The burning permit, then, is required. In addition, the firewarden is vested with authority to compel assistance in putting out fires. The State requires its citizens to act in case the public safety is jeopardized by hostile forces or anything of that kind, and the same principle is followed out in exacting help from the citizens in time of fire. The idea is, the firewarden should have the means of getting help quickly in case of fire in order to stop what might turn into a very serious conflagration. These firewardens, then, are appointed on the forest reserves and they cover this 23,000,000 acres. But outside of that we have in California an area of about 77,000,000 acres that have no Federal men patrolling and watching for fires. Of course, a large part of this area is not subject to fires, but a considerable area, covering the great grazing areas and the foothills, brush lands and timber lands in private holdings, are subject to very serious fires, and the only way we have at present of controlling fires on those large areas is through these firewardens. At the present time we have about 725 firewardens in the State. They are distributed everywhere from San Diego to the Oregon line, and are working in most cases without pay, because the State has made no appropriation from which these men may be paid for their services. The appointment is conferred upon them; they are given a badge to show their authority; they are given fire warning notices to post about their district to show what the forest provisions are; they are furnished with the law printed in separate circulars, so it can be distributed well, and with blank books containing burn permits, in order to enable them to conduct from their home places an educational campaign to advise the people of the State what the law prohibits, what measures must be taken to prevent fires. From every one of those 725 firewardens there radiate these educational notices to advise what may and may not be done. We have been at this work now a little less than four years, and in that time these firewardens have been appointed and the educational work has been extended to the point that I doubt if there are very many well-read people in the State who do not know practically what may and may not be done without the risk of punishment. Through these firewardens we have brought a great many careless and malicious fire setting cases to trial, and in the majority of cases we have secured convictions and fines. This is not done in the way of persecution in any case, but as a warning; to get a more livable condition in the State. We have had in the past year something like 900 fires, and the average size of the fire is something over 350 acres. You can see how necessary it is to have men thickly scattered over the State who are interested in suppressing fires, and who will get there quickly. In a great many cases I have gone through the country and found fires smoldering after they had been burning a week, and no one paying attention to them, and when I asked the reason it was said they were doing no damage. Look at the damage done by the Humboldt fire last summer, when not only were millions of dollars worth of property destroyed, but two or three lives. It is those things that we must expect from every fire, and means should be taken at once when a fire starts to put it out. We are then dovetailing this work in with the great work being done by the Federal service, in order to protect the forest areas of the State, and Mr. Olmstead has outlined to you how necessary those forest areas are to you from the standpoint of timber and water.

Another point which may be of interest to you is the use of windbreaks as a protection to your orchards. Going through California, and particularly southern California, where the horticultural activities have become highly intensified, I have noticed that there is probably no orchard which does not have it windbreak of eucalyptus and spruce trees. We are prepared to give what information is available on the methods of best propagating those trees, and will be very glad, indeed, to aid you in whatever way we can in that direction. The State makes a very small appropriation for our work, and we have no seeds to distribute—I say this because we receive frequent requests for them—but in the way of advisory aid we are always glad to give whatever time we can to it.

I think that practically covers the ways in which we are now striving to bring about better conditions. I mentioned a few moments ago that our firewardens are unpaid. I think this is a serious mistake the State is making. You can not expect effective work from an unpaid man, whether he is a firewarden or a governor, and we want some means devised by which the firewardens can be reimbursed at least for the expenses which they personally incur in putting out fires. We can not expect their enthusiasm to last long enough to give permanent protection to the State unless they are encouraged in some way. Last year the Federal Forest Service offered to contribute toward the support of firewardens that they would put on in counties that have foothill forests adjoining the national forests, if the county in which that forest was located would in turn appropriate an equal amount. That offer held good during the latter part of the summer, and I personally went to San Diego, Kern, Tulare, Fresno, and Madera counties and secured from those counties appropriations sufficient to pay two firewardens during the dry season. The Federal Government put on two men in each case. The work that has been accomplished in those counties has proven that the system is a good one to follow, and we want more of the same kind of work.

But why is not the State prepared to go in and take the place of the Federal Government in this case, or why don't the State, the county, and the Federal Government go in together? So far, the State has stood back, and the only money ever paid for fire protective work in this State has either been done by the county units or by the county and Federal Government together, except in the case of the institution at Riverside; but we want some recognition on the part of the State of our interest in these things, and we want some appropriation from which these firewardens may be paid for their services. It won't be expended, probably, to pay 720 firewardens, but it will be expended to pay 70 of them. Let these be the ones detailed to do the work. Let one man in each county who is at the head of these firewardens, and whose duty it is to go about the county throughout the dry season and educate the people in the forest law, take charge of fires and do that sort of work. I see no reason in the world why the State should not put up an appropriation that would enable the forest officers to say to any county: "If you will appropriate $250 for fire work this summer the State will meet you with an equal appropriation. I see here an Assemblyman, and I hope that he will lean kindly toward that idea when it is presented later. I thank you. (Applause.)

MR. LIVINGSTON. I was very much pleased with Mr. Olmstead's address. I have noticed our new power lines coming down through the valley and several other places, and I have been somewhat worried, thinking it would be but a short time before all our power sites and water power had been gobbled up by private corporations, and I am much gratified indeed to understand that the Government holds the key to the situation, and I hope that the office having been moved to San Francisco will not be permeated by any of that atmosphere down there, and they will stay straight. (Applause.)

MR. KING. Here is an opportunity for this Convention to act; here is one of the principles presented to you that is important. Private enterprise is a menace to some of these public utilities. If the General Government in years gone by, in 1843 and 1845, had said, "We will not give rights of way for the railroad companies, but if there is a necessity for that kind of transportation the Government will furnish it," you would not face the problem which you are against to-day in the matter of transportation. Now, gentlemen, public utilities are still on sale. They are in the market to be auctioned off, and if the horticulturists and the agriculturists of the State of California want to do a good work here, here is an opportunity to memorialize Congress that they do not become a party to giving up these public utilities. Now here is your opportunity to have your Committee on Resolutions formulate a resolution which might properly go to Congress, asking Congress that they give up no more rights of water for power or anything else. (Applause.) I agree with what the last gentleman has said, that it would be proper for you gentlemen in the conservation of your own interests to go before the Legislature of the State of California with a resolution that the forests should be protected by paid employees. You can not get any man to work for nothing. I have been an employee all my life; I have been on salary; but I never would consent to work for any man or any corporation without remuneration, and you can't get protection in your forest reserves unless you come to that point. Of course, that means taxation for you and me; but we want to look into the future and see what it contains. America is growing by leaps and bounds, and there is a population to come into California one day that will surprise the world. Here is the empire State; here is the biggest and most important State, and I think there is no area in the world that has so many possibilities as the State of California; and it remains for you and me, having that in view, to conserve all its interests and not give them up to private enterprise. (Applause.)

MR. SWINGLE. I only want to take one minute of your time to call attention to a fact which perhaps as an outsider I can see more plainly than some of the later residents, and that is, that the great interior valley of California is only imperfectly settled; that it will some day become the seat of an intensely wealthy population, and also in my opinion the foothill region of this State is destined to become one of the best fruit-growing regions of the world. To vote away the Federal control of the power of franchises would be a grave danger to the future of this State, because it is in the foothill region that Federal control is apt to be of importance to the fruit-growing region.

MR. SPRAGUE. To emphasize the necessity for being able to command assistance in forest fires in expediency, I want to give just a moment of experience in a forest fire myself this summer at Lake Tahoe. We do not know how the fire started, and all the force that was available in the immediate vicinity was at once called out, and I took a shovel with the others—a shovel is the way we fight fires mainly—and we worked as I had never worked before. I would drop down, and after resting a moment get up again and go after it, and we gained the best of the fire; thought we would be able to stop it in about half an hour, and all at once it jumped in three places immediately. Then, of course, we had to go and fight those before they got started very much, and we were just on the point of failing and the fire getting into a great forest that would sweep away hundreds of acres when two men unexpectedly came to us and they took shovels and with their aid we stopped the fire then and there; but had not those two men arrived there would have been a tremendous loss. The necessity of being able to command any assistance at critical times, it seems to me, can not be questioned. We ought to have this aid given by the State.

MR. DARGITZ. Just a word additional to stow away, by which we can give practical aid to the matter of compensation to firewardens. Every one of us is more or less acquainted with the Assemblymen from our districts. We can give them a word of suggestion that will probably bear hard. In our district the Assemblyman elected this year is a fruit-grower. I am sure that the horticulturists will be able to get a hearing with him.

MR. LIVINGSTON. I would like to ask if Professor Shaw will be here to-morrow afternoon.

PROFESSOR SHAW. I will not be able to be here.

MR. LIVINGSTON. I want to ask what you consider the relative value of a cover crop plowed under green and that same crop left to dry and plowed under. What is the relative value as a humus producing food?

PROFESSOR SHAW. The ultimate result will probably be the same. There will be a more immediate result on account of the more rapid action from the plowing under of that crop green. The action would be slower and you would probably get less results from the first year or second of that plowed under dry.

MR. LIVINGSTON. Would we get the same percentage of humus from the green as from the dry crop?

PROFESSOR SHAW. Probably not in one year.

MR. SPRAGUE. Mr. Chairman, I think it seems to many of us that Mr. Geraldson has introduced something of fundamental importance. How much of cultivation the method needs for particular places and crops is a matter to be determined, but it is very important that it should not be misunderstood, and lest there be some here now who will not be here when it is discussed to-morrow I would like to ask one or two questions. I would like to ask if it is not true that he uses all the water he can get the ground to absorb during the entire growing season, both on the middle space which he tills and that which he does not till.

MR. GERALDSON. I know I am going right straight against popular opinion and popular ideas. We buy water by the miners' inch; we do not buy it by the cubic yard. We take a certain stream all summer. Formerly, we turned the water in and it would soak out through the bottom to the ravine. The first year we started the new plan we had to buy 20 per cent more water. Now we don't buy any more than we formerly did. Where formerly we had to irrigate the trees every three or four days or a week and they showed distress, now we irrigate them every two or three weeks and they show no distress.

MR. SPRAGUE. The question was, Does he not use all the water he can get his land to absorb, both the plowed and unplowed space, during the season?

MR. GERALDSON. No. For instance, we use eight inches of water on seventy acres of orchard. We could run that eight inches on five acres all the time if we wanted to, so we are only using it on 1-35 of our land.

MR. SPRAGUE. You aim to irrigate the unplowed space?

MR. GERALDSON. We plow across. The grass on the unplowed strips prevents wash, and also we have got enough humus now in the ground so that it won't wash much. Formerly we did not dare run it down, because it would cut a deep ditch. Now we have so much of last year's grass, and it is all caught in the next middle.

A MEMBER. What is your object in plowing at all?

MR. GERALDSON. To prevent fires, mainly. We have got so much grass there that if it was not plowed it would all go up.

MR. LIVINGSTON. Then you irrigate in ditches across both the plowed strip and the unplowed strip?

MR. GERALDSON. Yes.

MR. LIVINGSTON. You irrigate opposite the way you plow?

MR. GERALDSON. Yes, at right angles.

MR. MILLS. Do you cultivate the plowed portion of the orchard after each irrigation?

MR. GERALDSON. No, we do not cultivate in the summer.

MR. MILLS. Leave your furrows open after irrigation?

MR. GERALDSON. Yes.

MR. MILLS. And you irrigate seventy acres with eight miners' inches?

MR. GERALDSON. Yes.

MR. ADAMS. You have a pretty heavy rainfall?

MR. LIVINGSTON. About thirty inches.

MR. MILLS. That is deciduous crops?

MR. GERALDSON. Yes.

PROFESSOR SHAW. I want to point out, if I may, just this fact, that I don't think this gentleman and myself are in very great contradiction. He believes first in getting humus in the soil. I believe in getting humus in the soil, but there are some vital things which I believe are wrong, practically and scientifically, in certain statements which were made. He is following a practice which will get humus in the soil undoubtedly, but there are other things which have to be taken into consideration.

MR. MILLS. I hope next year, Mr. Chairman, that there shall be given to this very important question a whole day, if necessary, to get into the minds of the people a knowledge of the soil that they have not got, because they have not studied it. Those of us who have been put up against disaster and have had to study it for our bread and butter can bring you something. You are in a like condition now and you must begin to study. Every farmer ought to be like a lawyer; he ought to have his library, to which he would go when difficulties confront him, and dig it up. You are not doing that.

A recess was taken until 1:30 o'clock P. M.

AFTERNOON SESSION.

The Convention was called to order by President Jeffrey at 1:30 o'clock P. M.

PRESIDENT JEFFREY. The first paper this afternoon is "The Invasion of Noxious Weeds," by Professor Elmore Chase.

THE INVASION OF NOXIOUS WEEDS.

BY PROFESSOR ELMORE CHASE.

During the past two years, dating from the flood period of 1906, we have had in this valley the greatest invasion of noxious weeds known to horticulture. There are also many kinds of weeds that may be called standard weeds, always on hand and ready to do the service they are so well qualified to perform. These, also, seem to have received reinforcements, so that to-day we have an army of weeds marching triumphantly into fields of our most valuable land.

But in considering noxious weeds we should not overlook the fact that they have a valuable mission. Some one has said, "It would have been a sorry time for agriculture if there had been no weeds. They have made us stir the soil, and this stirring of the soil is the foundation of good farming. Good farming and judicious tillage should always keep the weeds down."

A weed is a plant that is not wanted. There is, therefore, no species of weeds; for a plant that is a weed in one place may not be a weed in another place. A plant that is a weed in an orchard may be a useful plant to the stock-raiser. There are, of course, species that are habitual weeds, but in their wild state they can not be called weeds.

The following are some of the most troublesome weeds, each of which will be so treated that they may furnish a topic for discussion on the floor rather than an exhaustive treatment.

Bermuda grass (*Capriola dactylon*), when it grows on pasture land, is not a weed, but a nutritious food, especially for horses, but in cultivated lands with abundant moisture it is very difficult to destroy; but by clean cultivation and frequent use of the spade it will give but little trouble. The most effective method is to turn the soil upside down by means of plow or any tool, leaving the roots exposed to the sunshine, especially during the dry season. One such treatment will completely destroy the plant.

Cockle-bur. There are two species of this weed, *Xanthium strumarium* and *Xanthium spinosum.* The strumarium has green on both sides of the leaves, which are rough and irregularly toothed. The burs are three fourths of an inch long, with two stout beaks. The spinosum, however, has branching stems, very spiny, with long, triple spines by the sides of the leaves. The former has ovate-cordate shaped leaves, and the latter lanceolate and white on the under side. These weeds appear later in the season and do not attract the attention of the weed killer till the season of orchard cultivation has passed. Both are annual plants and are easily destroyed by good cultivation, but they grow by the wayside and in neglected places in the fields; hence, in order to exterminate these weeds, every nook and wayside place should be examined, and by skillful use of the hoe before the plant has reached the blooming age, one season is certain to exterminate both species of this very troublesome weed.

Horehound (*Marrubium vulgare*) is so well known that it needs no description. It is grown in some places for its bitter aromatic juice, which is used in candy and in medicine for coughs and colds. This is a perennial herb and is making great strides in meadows, pastures, and byways all along the coast, especially in Oregon and Washington. In sheep pastures it has become the most troublesome weed in the field. Sheep feed upon this plant, especially upon the seed vessels, and the bracts of the seed vessels cling to the wool and the seed is scattered wherever the sheep wander. The seeds are also disseminated by the water, hence all overflowed land is badly infested with this weed. It is easily destroyed by cutting down the plant before it blooms. Well cultivated fields are not much infested with this weed.

Crab grass (*Syntherism sanguinalis*) is an annual, the seeds of which are disseminated through the water for irrigation purposes, but it is not difficult to keep down, especially where the irrigation is moderate and cultivation frequent.

Star thistle (*Centaurea solstitialias*). This pest is quite troublesome in Butte County. It is an annual, branching widely, covering much space in pastures. It belongs to the same family as the bachelor button. There are many species of this plant cultivated in flower gardens. This *solstitialias* is not so common as many others of this class and less ornamental. It has conspicuous yellow flowers tipped with from three to five prickles palmately spreading, the middle bracts also having stout spines. No one seems to know how to eradicate this, but being an annual, if it can be prevented from going to seed, it will soon disappear. It does orchards but little harm, but it is troublesome in all grainfields, and there are several thousand acres along the river.

Wild morning-glory has given a great deal of trouble and expense in this valley, but its destruction can be accomplished by careful cultivation and judicious tillage. If a good weed cutter is used, cutting a plant a few inches below the surface as often as the plant shows itself above the ground, it will be destroyed in one season. It is distributed in wheat and barley, which often contain many seeds of this weed.

All these weeds have been introduced from other states. It may be added in regard to Bermuda grass and crab grass that their presence in alfalfa is due largely to excessive irrigation.

The limits of this paper will not permit even a brief discussion of any more noxious weeds, and these have been mentioned for the purpose, as was said above, of calling forth discussion from the floor. There remains one which is said to be the most troublesome weed in the United States. It was introduced into North Carolina from India some sixty years ago. From North Carolina it was introduced into Alabama by a man named Johnson, and from this introduction it has found its way into more than half of the territory of the United States. It is known in botany by the not very euphonious name of *Androphogan halepense*, but in our statutes as *Sorghum halepense*, otherwise Johnson grass and wild millet This plant is a stout perennial with smooth erect culms, and in its native state in northern Europe grows 3 to 6 feet high, but in this State it reaches 10 feet in height. It has a strong creeping root-stock which penetrates into the soil from a few inches to even five feet, according to the mellow condition of the soil. The flowers are on a variable panicle somewhat resembling the head of oats, but more branching, much longer and somewhat drooping. Its blossoms have a showy purple appearance, ripening into a hardy seed resembling millet, so much so that in some localities it is known as wild millet. It is abundantly grown in the Southern States for hay, where it makes a very rapid growth, but when it has once been established it becomes a very serious pest. In Europe it is much admired as an ornamental grass, and in the north it is cultivated for that purpose. During the high water period of 1906, along with several other weeds, it has made an invasion into the rich soil along the banks of our rivers.

Recent investigations concerning the extent of territory now more or less occupied by this weed which immediately concerns the farmers in the Sacramento Valley reveals the fact that it has a vigorous growth in the orchards and fields in Yuba, Placer, and Sacramento counties. To such an extent has it taken possession of the soil that in many cases fruit-growers have abandoned their orchards. Placer County supplies the seeds for distribution through the irrigation ditches and the North Fork of the American River. During the flood periods of the latter, large quantities of seed, not only of Johnson grass, but of nearly all the other weeds mentioned above, are left upon the overflowed ground, both on cultivated fields and uncultivated banks.

From the statements of the owners, many interesting accounts of its origin are given. In Placer County it is stated that a great spoonful of

Johnson grass seed, some fifteen years ago, was sent to the subscribers of some San Francisco paper as a premium. Several purchased twenty-five cents worth and planted it both for hay and nursery stock. One nurseryman did a large business in shipping the root-stocks to New Mexico and Arizona. In Sacramento County, beginning a short distance above Folsom and extending as far as Perkins, which covers the territory recently inspected, there are not less than one thousand acres which have been more or less infested. A larger portion of this territory was planted with seeds by means of the American River through the irrigation waters and the overflow. Some three or four fields were stocked with it for the purpose of furnishing food for cattle and hogs. From reliable sources, information has been received that this weed pest is found in increasing abundance on the rich lands of the Sacramento River bottom subject to overflow. It is growing with great vigor in Yuba County, in and about Biggs, Marysville and on the fertile lands on the banks of the Feather River. It is alleged that on these rich lands the stalks grows to the height of ten feet and the root-stocks are larger than a man's thumb and reach from a few inches to ten feet in length. To such an extent has Johnson grass become a serious menace to cultivated fields that the Agricultural Department at Washington, through the Bureau of Plant Industry, began investigations and experiments in 1902 for a method of eradicating it. In 1907 the results of these experiments, conducted by J. S. Cates and W. J. Spillman, were published in a Farmers' Bulletin, No. 279. These bulletins can be obtained from the Department of Agriculture by asking for them.

In order to exterminate all noxious weeds, there should be a distinction between annuals and perennials. But a more important distinction should be between roots and root-stocks. The want of a clear distinction between these two has rendered the task of eradication difficult and expensive. The function of the simple root is to hold the plant in place and supply it with food. The function of a root-stock is entirely different from that of a root. The root-stock is an underground stem for storing up starch and sugar for the nourishment of the future plant. It has none of the offices of the root. The common Irish potato is a condensed root-stock or underground stem. The eyes of the potato are simply leaf buds, so also are the joints in the root stocks of Johnson grass. If you cut a potato into as many pieces as there are eyes, each eye will send forth a stalk. Plant a potato whole, only the more vigorous eyes will send forth stalks. Plow up and cut up by cultivation the root-stocks of the Johnson grass and every piece thus cut will send up a stalk of grass. It has been found that these root-stocks do not live over from one year to another; that these root-stocks are dependent for their growth in a year upon the amount of top which the plant is allowed to produce. If you were to keep the potato plant cropped close, you would not expect it to form very many potatoes, so if you keep Johnson grass cropped close to the ground, it will not form a very extensive root-stock system. It has been found if the land be pastured closely for a whole season, that the root-stocks, instead of being many feet deep and as large as your thumb, are confined to the upper few inches of the soil, and very small. If the land then be broken shallow and given careful, clean cultivation for a few times, the Johnson grass will be killed out. If the pasturing fits in with the cropping system, the grass can be killed out with practically no additional expense. If lands are put to meadow, the same result will follow, provided the hay is cut sufficiently often during the season. Potatoes begin to form about the time the vines begin to bloom, so the root-stocks begin to form about the time the plant begins to bloom. It is therefore important that the grass be cut before it comes out in full bloom. This kept up for one season, the root-stock system will be very small. If the grass is not cut, however, until it gets out in full bloom, the plant will form large root-stocks, and you will have accomplished but little. If it is not practical to pasture orchard lands, the grass can be killed out in one season by careful, clean cultivation, if pains be taken not to let it get more than one foot high at any time and simply keep persistently at the job. This can generally be done at the cost of from $5 to $10 an acre. For making meadow of Johnson grass alfalfa is the best thing to plant, for it must be cut so frequently that the root-stocks can get no start.

One means of eradicating is by plowing a field in the fall and sowing barley, and after the barley is 8 or 10 inches high, pasture it for a season, then remove the stock and allow the barley to mature. After the harvest of the barley, turn in the stock for pasturage.

Lands liable to be infested by irrigation or the overflow of the river can be kept clean by prompt cultivation as soon as the soil is dry enough. Though this weed is one of the most difficult to eradicate when once established, the young plant is one of the easiest to destroy if taken before the root-stock has begun to develop.

It will be seen that all weeds can be destroyed by good tillage and clean cultivation persistently followed. But every man must take care of his own weeds just as faithfully as he must take care of his own cattle. No one has any moral or legal right to permit his weeds to invade his neighbor's fields, whether the neighbor lives just over the fence of in Yuba or Placer or Sacramento County. Nine tenths of this weed invasion is due to neglect on the part of the cultivator, and to the extent of that neglect he is robbing his neighbor of the products of his own labor. So serious has the matter of noxious weed invasion become that some vigorous action is demanded. (Applause.)

MR. RIXFORD. I rise to make what might be called a personal explanation. If the Bulletin distributed Johnson grass, I am responsible for it. I was business manager of the Bulletin at the time, and I wish to say that the Bulletin never distributed Johnson grass. If this man says it came from that office, there is some mistake about it. I presume all of you may have bought alfalfa seed that contained something else. Every seedsman doesn't always furnish pure seed.

PRESIDENT JEFFREY. When we went out on the demonstration train the other day up as far as Anderson, every farmer who came in that car was interested more in the display of noxious weeds we had than in any other thing, and they told us it was an enormous peril.

MR. PEASE. Mr. Chairman, while the gentleman has dealt with the Johnson grass, he has almost entirely left out the morning-glory, which is taking the lower part of California. The morning-glory is our worst pest. In fact, there are a great many orchards in Santa Barbara County and in Ventura County that are entirely given up on account of the morning-glory. It is the hardest thing we have to contend with. We have tried all sorts of experiments to get rid of the enemy, but it is still growing and gaining on us every day. There is one gentleman in Carpenteria, Santa Barbara County, who has started in there experimenting and made a success of it, by losing the use of his ground for one year and cutting four inches under the ground twice a week during the summer season. He was so afraid that he would forget to cut it that he put a notice over his door as he went into the dining-room, and it said: "Cut your morning-glory," and he cut it every Tuesday and Friday, and the morning-glory never showed up the next year. I know another gentleman that lives close to me that three years ago only had a small piece of about thirty feet square. He said, "I can get rid of the morning-glory; I will smother it out." He put on six or eight feet of mustard straw over this morning-glory. He left it all through the summer and in the fall he set fire to it. The next year he had a beautiful crop of morning-glories, not only in that spot, but it had run out six or eight feet. Then he plowed it and harrowed it, but he harrowed it right across his forty acres. The land was worth $300 an acre, and I don't think it can be sold for $50. The farmers are afraid to lose a dollar; they want everything they can get hold of, and instead of setting aside five or ten acres each year and working that out and killing it, they are farming it all and cultivating the morning-glory at the same time.

MR. RUDDER. Fifty-one years ago I moved out to Florin. I had a good many flowers, and among them was tame morning-glory. I have been troubled with the morning-glory ever since I have been there, but the tame morning-glory rivals the wild. It climbs the vines and it is a perfect nuisance, and the wild morning-glory is a nuisance, but not so much so as the tame morning-glory.

PROFESSOR CHASE. Cut the morning-glory before it comes up.

PRESIDENT JEFFREY. I am pleased now to introduce a paper by a gentleman from San Francisco, Mr. Wetmore, who will discuss the market question from his standpoint.

BAY CITIES MARKETS, DEALERS' VIEW.

By JOHN G. WETMORE.

Mr. Chairman and Gentlemen of the State Fruit-Growers' Convention.

I have been asked by your Mr. O. E. Bremner, Deputy, State Commissioner of Horticulture, to present to your Convention my views as a commission merchant on the retail fruit market of San Francisco. This I will endeavor to do from a practical standpoint, and as briefly as possible. I might say, to commence with, that in dealing with the retail fruit market of San Francisco I am obliged to consider the whole trade, from the largest wholesale dealers to the smallest fruit venders, for the reason that it is very difficult to distinguish where the wholesaling stops and where the retailing commences. In this connection I shall endeavor, as far as possible, to classify my replies to the several questions upon which I have been asked to present my views.

First, the expediency of an organization to regulate fruit shipments to commission men to be distributed in a particular section or market, and its probable effect. It would certainly be a desirable thing if such an arrangement could be made, and whenever you can get a very large proportion of growers in any section to agree to have their products distributed in this way, the effect would be most beneficial to the growers and of great advantage to all markets. This, however, is something which can not be forced upon the growers, either collectively or individually, and would not be practical, excepting with a product such as oranges or raisins, the great bulk of which is produced within comparatively small sections of the country. Experience has proven that even in these commodities where it would seem that the total output could be controlled by combination of all the growers, that there are always a certain percentage who want the movement to hold the umbrella for them and protect them in a general way, while they sell their own product to suit themselves. To my mind the question of regulating the shipment of deciduous fruits as suggested would be practically impossible, as the production extends over so great and diversified a territory.

The question has been asked, "How can San Francisco secure a better grade of local fruit for the retail fruit market?"

San Francisco is the greatest distributing point on the Pacific coast for deciduous fruits. Fruits are not sold alone to retailers and canners, but large quantities are shipped from this point to all sections of the country, as well as Mexico, Hawaii, Australia and the Orient. That the reputation and standing of our fruits in foreign markets should be maintained is vitally necessary to the growers as well as the wholesale merchants. And it is equally important that the quality of the fruit should be maintained in the distribution to the retail trade. There is only one way that I can see where uniformly good grades of fruit can be placed on this market, and that is by the members of this Convention using their influence to repeal the law which prevents a county from having an inspector of the State Commission of Horticulture, excepting where petitioned for by a certain number of fruit-growers from within the borders of the county asking for the same. You probably all know that San Francisco has no orchards or farms and consequently is not entitled, according to the law, as it now stands, to a deputy fruit inspector. The result is that her market is made the dumping place for all the fruit and produce that can not be sent any place else, and there is no limit to the amount of inferior fruit which can be sent into San Francisco under the law as it now stands, and I would like to say right here that if the very large proportion of very inferior, scaly, wormy, undergrown, and overripe fruit were eliminated from the San Francisco market shippers would get better net returns for a tremendous lot of their fruit than they will get in any other market they may ship to. Taking the expense of packing, freight, etc., and the cost of boxes and commission from the very inferior fruit sent in, leaves very small returns to the shipper. It will always be so as long as this market is made the dumping ground for all that can not be disposed of elsewhere. Eliminate the trash, ship to San Francisco reasonably good products, and shippers will have their very best market at their very door, for there will not be only as much fruit sold as there is now, but there will be a great deal more sold, and with much better results to the growers. If every grower who ships to San Francisco would dump his inferior fruit at home and ship the balance, he would realize better net returns than though he shipped the entire crop, regardless of quality. This proposition can not be made too strong. It is an absolute fact, and if there is any way that the members of this Convention can control the shipments into San Francisco, whereby inferior stock will be destroyed before being shipped, the shippers will have a greater lump sum of money for their net returns for their season's shipments.

The question has been asked me, "Would there be any advantage in having the retail market centered as in Los Angeles, where they have a market as an incorporated company, composed of retail dealers and commission men, all located in one large building?"

In answer to this I would say, most emphatically, no. The topographical feature of San Francisco is such, being composed of hills and very little level ground, that it is impractical to center so large a business in the manner suggested in the query. The fact is that it is absolutely necessary for the successful marketing of fruit that there be fruit stores in every section of the city. There are at the present time, I believe, between four and five hundred retail fruit stores situated all over the city, in some cases several to the block; in hardly any section of the city more than two blocks apart. Just imagine attempting to do the retail marketing of a city like San Francisco, covering the area she does, in a few blocks. It would be a physical impossibility. In Los Angeles there are many commission houses, in addition to any that may be in the market referred to, and all the commission houses send solicitors all over the city and outlying districts to take orders for fruit, afterward delivering the fruit by wagon. In San Francisco the four or five hundred retail fruit dealers come to the wholesale district and purchase their fruit each morning anywhere from 4 to 7 o'clock, and have the fresh berries and fruits on display at their stores in time to deliver to the good citizens of San Francisco for their breakfast. In addition to the retail storekeepers there are perhaps a hundred retailers who sell altogether from their wagons, called vegetable peddlers. These men take an assortment of vegetables and fruit of all kinds, have regular customers whom they call on daily. After the retail fruit stores and vegetable wagons come the fruit peddlers, from two to three hundred of them. They buy loads of fruit, whatever they can buy cheap, and hawk this fruit all over the city, generally among the poorer class of people. They take a large load, and usually dispose of a full load in a day, selling it at small profit over the cost of each article.

In order that the products of the growers may reach every consumer, the eight hundred retailers and peddlers are an important factor in the distribution of these products among the people. In addition to the general retail dealers and the peddlers there are at present several so-called free markets, one built by the State on East and Pacific streets; one called the Sacramento Valley Farmers' Free Market, situated on Mission street, in the Mission district; another called the Bay Counties Free Market, situated on Market and Gough streets; and one on Clement street, called the Richmond Branch of the Sonoma County Free Market. The first named was built and is supervised by the State; the second and the third were built and are run by private parties; the fourth has just been opened, and I do not know who the proprietors are, but all are welcome. They all help distribute the fruit, and generally are heavy purchasers from the commission merchants, and when overstocked consign their surplus to the commission houses for sale. This latter applies particularly to the State free market, and without doubt this will always be the case with markets of this sort. Oakland has had a free market for many years, and although Alameda is an agricultural county, I believe fully ninety per cent of the fruit and produce sold at this free market is bought from the Oakland and San Francisco commission merchants.

Much has been said about the large percentage of profits imposed by the retail fruit dealers. Assuming that in some cases the percentage of profit imposed by the retailer is large, conditions must be considered. Without doubt, in some sections of the city the percentage of profit of the retailer would seem to be very large, especially if you take the low selling price for the poorest fruit in the market and figure it up with the highest selling price of the retailer for a fancy article delivered to the purchaser's residence, it would seem to be very high; but any one who will take the trouble to honestly investigate the selling profit of the retailers of San Francisco will find that the average profit is not great, excepting in some sections where customers demand only the very best there is, and where they order small quantities delivered at their houses, but through the greater sections of the city the profits are reasonable. This is best demonstrated by the fact that a very large proportion of the retail fruit dealers of San Francisco occupy premises, with the store in front, one, two, or three rooms in the rear, where they live in the most economical manner, a large proportion of them being run by a man whose wife assists him in selling at the store, and their only help being a man or boy to drive the wagons. Notwithstanding the economical manner in which these people live, they do not accumulate, as a rule, and very few of them are able, after years in this line of business, to build a place of their own, as almost all of the corner grocerymen do. We never hear any complaint about the corner groceryman who accumulates enough to buy a lot and erect a building, but there is a constant and everlasting cry against the fruit dealer, which I think is not justified by the facts.

The San Francisco Board of Health during the past few years has done good work in the supervision of the conditions covering the places where fruit is handled, and in the condemnation of fruit when in unfit condition for consumption, but they have no power to regulate the entrance of wormy, scaly, or other undesirable fruit into the city of San Francisco, and were they to be asked to do this work they would of necessity have to have a force for that special purpose. The only protection, so far as I can see, to prevent the dissemination of insect pests and diseases through the medium of just such a market as San Francisco must of necessity be through proper legislative enactments. The members of this Convention could arrange a law, if they saw proper, so that a deputy or deputies could be appointed in San Francisco with full power to prevent the entrance into this market of scaly citrus fruits, scabby and wormy apples, pears, apricots, and other fruit in undesirable condition.

At the present time we have shipments of lemons coming into the city which are absolutely covered with scale. We have apples coming into the city which at their point of shipment are lovingly called "our wormies." Every apple in the box will contain a worm, but the shippers are so anxious to gain something for their "wormies" that they deluge our market with them. This should be stopped, and the man who sends in good fruit will get good prices.

In answer to the query whether there would be any advantage in having an all free market, have to say that San Francisco, at the present time, is one great big free market. It is too free. There is too much freedom of access for the undesirable, good-for-nothing fruit which is now poured in there. Eliminate that freedom, and you will have the best market in San Francisco that you have anywhere for her proportion of your good stock.

There is not a man, woman, or child in San Francisco who, if they want to buy a box of fruit, can not buy it from any dealer.

The so-called wholesale houses will not break boxes, but they will sell a box of fruit to any one who wants it and is willing to pay for it and who will take it away from their premises.

About the only people who could take advantage profitably of a free market are the Colma and San Mateo Italian vegetable-growers, and they now have a market of their own, between Davis and Front, Pacific and Oregon streets, which they open at 2 or 3 o'clock A. M. and close at 11 A. M. There they sell to any and everybody who wants anything in the way of vegetables. They will sell 10 cents worth or as much more as any purchaser wants. Just imagine such a way of supplying a market like San Francisco. Even if we were situated in the center of an agricultural district, the population could not be so supplied. Steamships and railroads have to bring the products which are handled in this market, and the producer of to-day is too much of a business man to think that he can individually sell his goods in a market in which he is only an occasional visitor as well as the business man who is on the ground every day of the year.

San Francisco is the largest market in the State, centrally located, and the natural market for growers whose output is not large enough to ship East or to contract to canners or dryers. Every grower watching the markets can take advantage of the best offering at all times. Get in touch with dealers in every market, keep posted, and if too small a shipper, combine with his neighbors to keep posted and take advantage of the best market.

If the shippers who use the San Francisco market would get in touch with one or more of the many reliable commission houses there and keep themselves posted regarding conditions and prices, they will find it very much to their advantage. Shippers should get close to the man who is selling his goods. Don't treat him as a last resort, where you can dump your refuse, and then condemn him for not getting you good prices for poor goods, but remember your interests are his care, and he is usually working from 4 o'clock A. M. to 5 o'clock P. M. trying to place your goods to the best possible advantage for you.

Being so centrally situated, San Francisco is a very large distributor of products. Thousands of packages of fruit are reshipped from this city almost daily in addition to sales to the local trade. The commission houses thus become the clearinghouse for the fruit shippers, and in order to make this great distribution of products it is necessary that the markets in other sections be closely followed. The commission merchant is necessarily forced to keep in touch, not only with the productions at home, but with all points where it is possible to distribute such products as may be placed in his hands. This involves a great deal of work and requires the employment of many people. Although but a small portion of the goods are sold for cash, the bulk being sold on credit, ranging from fifteen to sixty days' time, the commission merchant assumes all responsibility of sales, and makes returns promptly upon the sale of the growers' productions, and returns payment therewith, thus insuring the shipper against uncertain collections and bad debts. (Applause.)

PRESIDENT JEFFREY. Now we will hear a paper from Mr. Edward F. Adams, editor of the San Francisco Chronicle, on the market situation in San Francisco.

MARKETING PERISHABLE PRODUCTS IN SAN FRANCISCO.

By EDWARD F. ADAMS.

In requesting me to prepare an address for this occasion Commissioner Jeffery wrote me that he desired that at this time "the subject of the San Francisco fruit markets may be discussed from all standpoints calculated to conserve the interests of the fruit-growers and consumers." As it is a matter of common knowledge that some other topics are to be considered at this Convention, I fear that I must confine myself to a rather less ambitious programme. There will not be time to fairly consider even the interests of the producer with which those present are most directly concerned, but producers and consumers are alike interested in having the promptest and most economical distribution of perishable products, and to that extent both interests will be considered in what I shall have to say. And what I have to say will deal mostly with what can be done to promote that end by public authority under the legal and physical conditions actually existing in San Francisco. More than that, I shall for the most part consider only the transfer of perishable products, from or for account of first hands, in unbroken packages to those who will retail them to consumers. So far as public authority is invoked to facilitate retail trade in these commodities of daily consumption, I apprehend it to be a matter between the municipality and its citizens, with which neither the State or the producers are directly concerned. And I say this, although I assume that my invitation came by reason of the general interest in the alleged "free market" established last summer by our present vigorous and effective State Harbor Commissioners, on State property in San Francisco, in a belated effort to comply with the so-called free market law enacted in 1907 and reënacted with amendments in 1903. There is no reason why there should not be one or more retail markets on the State property in San Francisco, if they can do business to justify it, but no retail produce market on State property, no matter where located, can do any business worth doing under the law as it now stands.

I conceive that I shall be most likely to interest this Convention by reciting the history of the so-called free market movement. It covers twelve years, and the recital will be hard to condense into the limit of the very longest paper admissible at this meeting. It will necessarily, however, bring out the most important problems connected with marketing perishable products in large cities, and especially in San Francisco. And it will bring out a lot of other things, quite as useful to be known and quite as interesting. Incidentally some parts of the story may afford amusement. I have come to think that I am the only living person who understands that "free market" subject, and in taking this course I am influenced by the selfish motive of having, in due time, a printed record to which I can refer anxious inquirers, who from time to time torment me with requests for enlightenment, and with whom I have spent hours upon hours of precious time in which I might have been enjoying myself.

THE STATE WATER FRONT PROPERTY.

The submerged and tidal lands of the seacoast and harbors of this country between high-water mark and deep water, or in case of harbors, the pier head line fixed by Federal authority, is public property. It can be alienated only by authority of the State. In most of our harbors this property long ago passed into private ownership. There was originally a large area of these State tide and submerged lands in San Francisco, most of which was sold for a nominal price, filled in by the purchasers, and some of it is now very valuable. Nearly the entire water front itself, however, belongs to the State, which builds the seawall, piers, and bulkheads, and collects tolls on merchandise passing over them and berthing charges for ships making use of them. When specially authorized by law, the Harbor Commissioners may lease the docks for fixed periods, but otherwise the occupants are tenants only from month to month, and may be evicted or moved at any time by the Harbor Commissioners if the space occupied is required for some use more advantageous to the public. Immediately back of the seawall and bulkheads there is a wide street, which at all points with which this paper is concerned is called East street, and which for the entire distance is the property of the State, and in some places there are still on the west or landward side of East street certain blocks or fractional blocks of made land belonging to the State and subject to the jurisdiction of the Harbor Commissioners under the same conditions as the wharves. The blocks or parts of blocks, forming a triangular tract bounded by Pacific, Davis, and East streets, were the object of the controversy, whose history I propose to relate, in which the farmers were completely beaten by strong corporations, although nothing could have prevented them from winning had they used even ordinary diligence and energy in trying to get what they said they wanted. The lessons of the contest ought to be quite as valuable as the information which can be gained about marketing fruit in San Francisco. Upon the smallest of these fractional blocks is located the alleged retail free market which has been operated the past season by the State Harbor Commissioners.

THE BELT RAILROAD.

It is contemplated that the State shall own and operate on East street and its extensions north and south what is called a belt railroad for the purpose of connecting all the railroad terminals of the city with each other and the wharves, and also, by spur tracks, with the warehouses and industries in the vicinity of the water front. A portion of this road, with some spur tracks, has for years been operated on East street from about Pacific street to a considerable distance north. Another portion will soon be constructed south of Market street. The problem of getting across Market street in front of the ferry building is left for the future. At present, as in 1896, cars destined for points north of market street are landed at the Lombard street slip, about half a mile north of the present alleged free market, where the State belt railroad receives them. I may assume that most present are familiar in a general way with the geography of this portion of San Francisco lying a short distance north of the ferry building and carry these details in their minds.

THE TONNAGE OF PERISHABLES.

Perishable products include fruit, vegetables, poultry, and other commodities, including fish. The tonnages of fruit and vegetables are not segregated in the records, and are considered together in this paper. The work of collecting the data of the tonnage of perishables reaching San Francisco is considerable, and for the purposes of this paper it will be sufficient to use those very carefully assembled more than twelve years ago by the late C. F. Smurr, then freight traffic manager of the Southern Pacific Company, for a period extending from May 1, 1895, to April 30, 1896. The relative quantities delivered at the different terminals are doubtless about the same now, although the actual tonnage is probably 50 per cent greater, and may be doubled. These data formed the basis of the main argument made twelve years ago for the establishment of the free market. They are as follows:

Deliveries.

	Tons.
Fourth and King streets, for ten months, actual	30,324
Market street, by rail	10,917
Market street, by steamer	4,649
Lombard street	13,531
Total for ten months	59,421
Estimate for March and April, 100 tons per day	5,200
Total for year, Southern Pacific Company	64,621
Arriving by river steamer, estimated	150,000
	214,621

The data of the arrivals by steamer were formulated by Major P. J. Harney, a well-known river man and then a member of the Board of State Harbor Commissioners. Of the river tonnage 90,000 tons were the ascertained deliveries of the largest river company and 60,000 tons by careful estimate of the deliveries of other companies, segregated as clearly as possible from the total deliveries of all merchandise as shown by the books of the Commission which collects tonnage.

THE CARTAGE PROBLEM.

Virtually all perishables reaching the city by rail and a very large share of those arriving by water are subject to cartage from the terminals at the expense of producers. All shippers to San Francisco are familiar with drayage charges on their accounts of sales. Keep an account some year and see what it costs you. At the rate per package in force in 1896 the drayage charge as charged by commission men to producers figured out, per ton, as follows:

Drayage.

	Per Ton.
Oranges	$0 75
Apples	1 11
Grapes, plums, peaches, etc.	1 60
Strawberries	2 00
Cantaloupes	2 00
Vegetables	90

The low rate for vegetables was because the traffic would not bear a higher rate. The still lower rate for oranges capable of carying about the highest rate of all was obtained because the orange growers of southern California were smart enough to organize and stay organized, and the exchanges made a contract with a single draying firm to do all their hauling at the rate which figures out as specified. Unorganized orange-growers profited because those who hauled the outside oranges could not charge a higher rate than the organized growers received.

As nearly as could be calculated the average drayage paid on all perishables hauled from terminals was about $1.25 per ton, which for the drayage of 214.000 tons a year would be an annual payment of $266,000 and regularly increasing with the growth of the city, paid by producers for hauling their products from terminals of the carriers to the stores of commission men. Not all those perishables paid drayage. Carload lots consigned to canneries were carted at the expense of canneries unless delivered on their spur tracks. A great deal of produce was sold on the Jackson and Washington street wharves—about 600 feet south of the block sought to be obtained for the so-called free market, and upon which the State always has and does still maintain an unregulated free wholesale market. Whether river growers shipping to the city usually got accounts of sales with no cartage charged, they know—I don't. It was alleged in 1896 that much cartage was charged that was never paid on fruit sold on the wharves or from the platforms of the North Pacific and South Pacific Coast railroads, whose freight cars were received at the Lombard street slip and delivered by the belt railroad to the terminals adjacent to the blocks desired for the free wholesale market, with the exception of what was shipped in carload lots to canneries and sold on the Jackson and Washington street wharves, the fruit was hauled from the terminals of the carriers to the stores of the commission merchants and there sold. I suppose the actual cash paid by producers in 1896 for drayage on perishable products was not less than $200,000 a year, and yearly increasing. With higher prices now, and necessarily, prevailing and the vastly increased volume of trade, the amount now annually paid for this service must be between $300,000 and $400,000. The actual amount could be closely approximated if one had several days to devote to it, which I have not. And it would be of no use except to determine the value of a lost opportunity. It used to be said that commission merchants got a commission on cartage, and I had reason to suppose they did.

WHAT THE PROPONENTS OF THE FREE MARKET WERE AND WERE NOT AFTER.

We are now in a position to understand the precise object sought by the Producers' Committee, of which I was chairman and the most active member. It was:

1. To save the greater part of this drayage by providing one central spot, in close proximity to the existing commission produce district and conveniently accessible to all puchasers, where all perishable produce entering the city by rail or steamer could be delivered by carriers without drayage charge and there sold in original packages.

2. To save the damage to tender fruits from hauling over rough streets from half a mile to a mile and a half.

3. To secure the supervision by public authority of the commission sales of perishable commodities—an occupation which requires public supervision quite as much as banking or insurance—and to do it as thoroughly as it is done in the municipal markets, say, of Paris, where any producer can send any commodity dealt in there and have it sold for his account, either by a public salesman, or at the same rate, by any broker whom he may select, in either case being perfectly sure of an accurate accounting. In most American cities this would be very difficult to accomplish by reason of the lack of the non-political and very effective administrative systems which exist in continental Europe. In San Francisco, however, in the State Board of Harbor Commissioners, we have the one thoroughly effective administrative body in the State. Its powers are ample for the administration of the State property for any legitimate commercial purpose, and it can enforce its authority because nearly all occupants of State property are its tenants at will. If they do not comply with its rules they can be bounced. It is not, however, non-political. It is strictly political. No member of the party not in power need ever apply for a job. That, however, the people can change whenever they choose, and the present Board is demonstrating, so far as the powers above it will permit, that honest and effective work can be done through employees chosen wholly from one party.

4. To render possible the collection and daily publication of receipts and sales of all perishables sold in the market.

WHAT WAS NOT THE OBJECT.

5. Emphatically it was not the intent or expectation that producers would come to the market and sell their own products, although they would have the privilege. At least, it was not supposed that any individual producer would try it more than once. Nor was it expected that they would combine in associations and do so. The Producers' Committee knew the farmers too well. Nor, as a matter of fact, would it be profitable for them to do so. It was supposed that the sales would be made through commission merchants as now, because under proper regulation that is the cheapest and best way to sell perishable products.

WHY PRODUCERS NEED MIDDLEMEN'S SERVICES.

As, unfortunately, the theory that producers and consumers would meet in the "free market," where the honest farmer would personally meet the guileless consumer and the two dicker together for truck, was the one picturesque feature which caught the public imagination and served the purposes of the public press, it was the only idea that the general public ever got into its head. The city press and people were possessed of the notion that the farmer was yearning for the chance to sell his products at the lowest rate which he could induce consumers to pay—a notion whose unsoundness need not be demonstrated to this assembly

—while the country press, on the contrary, seemed equally firm in the conviction that all city consumers desired was the chance to pay the horny-handed farmer the very highest prices which he could be induced to accept—an hypothesis whose accuracy would be promptly attacked by any producer or producer's agent who sold produce in the State retail "free market" last summer.

I fear that it is not safe to assume, even with this audience, that all understand the unwisdom of fruit-growers of the State undertaking to sell their own produce in the San Francisco market, and I may briefly explain.

First. So far as meeting actual customers, that can only occur in a retail market. There was no available State property large enough for a retail market, and the water front is as far as possible from the residential parts of the city. The retailing of fruit is a trade of itself. It involves the ability to get regular customers and keep them. It requires a delivery wagon and driver. There must always be full assortment of fruit and vegetables in season, or you can get only transcient trade. It involves giving credit and collections. There is a large wastage, which takes off profits. It is a business for a farmer to let alone.

Second. As for producers of fruit and vegetables undertaking to sell even in unbroken packages and to retailers, it is to be said that almost none of this business is done for cash, and a stranger would promptly get all the bad debtors in the city on his books. A trade of this kind is like any other trade—customers are gradually accumulated by tact and fair dealing, readiness to extend credit when deserved, good salesmanship, and large and varied assortments of the most desirable commodities always in stock at all times of the year. Very few fruit-growers have any great variety of produce at any one time, or produce of any kind for sale for more than a few months in a year, or sufficient output to assure daily shipments, even during the season, in quantities large enough to pay, if they could always be sold, the salaries and expenses of a salesman and bookkeeper out of 10 per cent of the gross proceeds, which he would pay the commission men. As to the fruit-grower himself, he is needed at home. As to farmers joining together to sell, they could not more than individuals get and hold trade without a variety of seasonable products the year round, which no association in a single district could supply. Besides, you all know that if such an association were formed, half of them would fly the coop the first time they heard of any outsider some day getting 5 cents a box more for peaches than they got. Such propositions are trivial. There is but one way to handle produce in the quantities which reach large cities, and that is to dispose of them at wholesale in unbroken packages to retailers who will take them to their stores or to retail markets where consumers can get to them, and where there is room to display them and help to sell them and deliver them. The wholesale and retail middlemen perform functions which are absolutely necessary and must be paid for. The producer, or an association of producers, may, if they choose, undertake these functions themselves; but unless they are keen salesmen and alert collectors, if they try it they will wish they hadn't. Incidentally, the bulk of this produce is delivered by the carrier, beginning about 5 o'clock in the morning, and the farmer who undertakes the function of a commission man would discover that the hours he must keep are shocking. The late D. E. Allison, a commission merchant well known in his lifetime to all our older growers, once told me that for years he got out of bed regularly at 3 o'clock in the morning. I believe they have a "combine" now, which enables them to sleep longer. They all agree not to get up so early—an agreement which I imagine is better kept than most others.

The Producers' Committee which endeavored to secure the establishment of a great wholesale market had not in mind, as they declared and reiterated time and again through the press and in all other possible ways, the puttering of fruit-growers with trying to sell their own products, but, on the contrary, a great business enterprise involving a certain saving to producers of hundreds of thousands of dollars a year and of vast and yearly increasing benefit to all connected with the trade in perishable products, whether as producers, consumers, or honest middlemen. It also necessarily involves the dedication, on fair terms, to the producing interests of the State, three blocks of very valuable State property, which certain corporations also desired for their own purposes. In the end the corporations got the blocks, because they attended to their business, and the farmers lost them because they didn't, and could not be prodded into doing it.

Bearing in mind what the Producers' Committee was really after, and remembering that the Harbor Commissioners understood it from the first as well as we did, the recital which follows may not only enlighten you about marketing fruit in San Francisco, but as to political pull, the methods of applying it, and what it will do for the fellow who has it.

THE COMMISSION MERCHANTS.

But before beginning the story, I may refer briefly to the attitude of the commission merchants. In private conversation with some whom I knew well, they heartily wished us success, and incidentally told me many things which I was not authorized to repeat, which showed very clearly the necessity of publicity in the commission trade. As a body they were sullenly hostile. They refused to form any committee to confer with the committee of producers, and privately used whatever influence they had to defeat us. Their most effective work against us, doubtless, was through draying firms, who did not wish to lose business, and the landlords owning their stores, who feared loss of rentals. Both those classes privately lobbied against us. They were not, however, the influences which defeated us.

And I wish to add this about the commission men. For a quarter of a century I have sold fruit in a small way in San Francisco, and I never had reason to believe, and do not believe, that I was ever robbed of a cent by any commission man. There are as honest men in that trade as in any other. But it is also true that any business which affords such opportunities for cheating as the commission trade offers will attract a certain number who will lose no chance of profiting by these opportunities. And it is the competition of the tricky which gives honest commission merchants most trouble, as any good man among them will requires publicity, regulation, and supervision—which it is not likely to get.

And now for the story.

THE GENESIS OF THE FREE MARKET.

The genesis of the San Francisco free market agitation was a lurid newspaper story some time in the autumn of 1894, in which the navigation of the bay was almost claimed to be impeded by an alleged Saragossa Island of watermelons dumped therein by extortionate and conscienceless "commission men" for the alleged wicked purpose of keeping up the price of that toothsome commodity, while the entire colored population and all the small boys of San Francisco were hopelessly hungering and thirsting for the red and juicy product of which they were thus ruthlessly deprived, in order that sordid and unrighteous commission men might roll in ill-gotten wealth. What foundation there was for the story I do not know. I suppose there were some watermelons dumped, but they did not belong to the "commission men," but to some unfortunate farmers of somewhere—probably Lodi. It is an experience familiar to most of us. But from reading the stories in the press one would have got the impression that he could have walked on watermelons from San Francisco to Oakland.

"GOOD STUFF" FOR THE PRESS.

From the standpoint of journalism the story was "good stuff," and the enterprising reporter who struck the trail made the most of it. Various official and other persons were "interviewed," and the then president of the Board of State Harbor Commissioners declared that rather than have such horrible conditions exist he would favor the establishment of a "free market" on the State water front, which the Commissioners had—and still have—the power to establish whenever they choose without any legislation whatever. The watermelon story, therefore, turned out to be not only good stuff, but good politics. The late Commissioner Colnon was not only a good newspaper man, but a good politician, and the term "free market," which he struck off in a moment of inspiration, has stuck, although there never was, and ought not to have been, any intent to create a real market, with proper equipment and supervision, without in some form collecting revenue from it to pay expenses.

A CASE OF FALSE RETURNS.

About a year later it was proved that a commission house had, in at least one instance, sold some packages of fruit to a householder for 40 cents a box, and accounted for them as sold at 25 cents. That was published, with the name of the firm, and at once renewed the talk about a "free market." The transaction could not be denied, but the firm defended it by saying that this fruit was sold at "retail" at 40 cents, and was properly accounted for at the "wholesale" price of the day, which was 25 cents, and offered to prove that it was the "custom of the trade," which perhaps it was, although a misdemeanor or felony under the laws of California, according to the amount involved.

HIGHLAND GRANGE TO THE RESCUE.

Highland Grange—now defunct—one of whose members was the injured party in the fruit trade above mentioned, addressed, under date of December 22, 1895, a letter to the State Board of Harbor Commissioners asking whether the Board had power to establish a free market on the State property, and was inclined to do so. The Commissioners replied on December 26th in the affirmative to both questions, and a little later officially requested Highland Grange to send a representative to confer with them. I, being a member of the Grange, was appointed such delegate, and that is how I came to get into the mess. I attended a meeting of the Commissioners, and stated to them that what producers needed was a central market to which all carriers could deliver perishable products direct from the cars, without drayage, and where the products could be sold under public regulation and supervision. At that time I did not know anything about the location of the State property, other than the wharves. The Harbor Commissioners knew that, but had not the slightest conception of the problems of fruit marketing. Their idea seemed to be to set aside a little corner of some dock, to which fruit-growers could personally conduct their stuff and try their luck at coaxing customers to come and buy it. Their notions were trivial and silly. Their talk had been and continued to be political rot. Finally, after long talks, and many of them, producers were offered space on section 4 of the seawall, which was a grainshed about 500 feet long, about one half mile north of any wharf where perishables were landed, three fourths of a mile from any street car line, and a mile north of the commission district through which nearly all the produce arriving by rail must be hauled to reach the free market. We—for by this time I was consulting with others, I can not now say whom—of course positively refused to even consider the tomfool proposal. So there was nothing doing.

But Highland Grange was a rustler while it lasted, and by that time—for this talk had lasted for some weeks—had begun to get its back up. By that time we had found the State property we wanted. It was a triangular piece bounded by Davis, Pacific, and East streets, adjacent to the terminals of the North Pacific and South Pacific Coast roads, connected with the belt railroad, and a short distance north of the Washington and Jackson street wharves, where the river produce was landed.

THE PETITION OF HIGHLAND GRANGE.

Highland Grange therefore decided to press things. It prepared a petition to the Harbor Commissioners, from which I quote the essential features of the market desired:

First—It must be the usual and ordinary terminus for perishable products of all transportation companies, at which all such products will be delivered unless otherwise ordered by the shipper.

Second—The sale must be conducted under such regulations as shall insure to all shippers the opportunity to know, without expense to themselves, whenever they so desire, the particulars of the disposal of their products.

Third—To accomplish this purpose there must be competent inspection under the control either of the Harbor Commissioners or a State organization of producers.

Fourth—There must be the authority to levy upon all produce delivered to the market whatever additional tolls to those now paid which may be required to defray the expenses of proper supervision.

The first requirement was fundamental. Neither Highland Grange nor the Producers' Committee, subsequently formed, would consider any market which was not the common terminal of all important carriers to which all perishable products were delivered, and from which, if they were to be sold elsewhere, they must be carted away by producer or buyer. It was perfectly understood, and frequently stated in public, that the only way to change the existing methods of selling perishables from first hands was to create a new center from which they could be sold more promptly and economically than from any other place in the city, and that if that were done no power on earth could prevent the trade from going there. The fourth stipulation proves that we were not after anything "free"—that word was more political rot—but that we expected that the market would be made to pay expenses. This petition was signed by sixty-nine producers of products whose names I have recorded, dozens more of which I have no record, and the largest river steamer company. The entire press of the State was enthusiastic, but unfortunately, foolishly enthusiastic over the absurd notion that the producers were at last to get rid of those awful middlemen. The Harbor Commissioners stood pat. Under date of March 26, 1896, they replied to Highland Grange that they "have already offered section 4 of the seawall, which is provided with a shed 500 feet long, for a free fruit and produce market. The only remaining matter to be determined is the management of the market, which must be by the fruit-growers."

HIGHLAND GRANGE NOT SATISFIED.

Highland Grange did not think that was all the matter to be determined. By that time the Harbor Commissioners knew exactly what property we wanted and were determined we should not get it. We were determined that we would get it. The Commissioners won out. The fight, however, had just begun. The next step was to ask the State Horticultural Commission to call a State Convention, which it did. It met at San Francisco, April 16, 1896. Mark L. McDonald of Santa Rosa presided, and the late B. M. Lelong was secretary. It was a very large convention, with many delegates representing grangers, fruit-growers' exchanges, farmers' clubs, and other organizations of farmers from all parts of the State. The matter was presented precisely as I have presented it here, and after a day's discussion resolutions were adopted in language virtually the same as that of the petition of Highland Grange, especially in asking for a market "which must be the usual and ordinary terminal for perishable products delivered by all transportation companies in San Francisco." In due time the petition was presented to the Harbor Board. The Harbor Board again stood pat. Its only reply was that section 4 of the seawall had been offered. The petition was that of many thousands of fruit-growers scattered over the State. It had the backing of the entire press and of public sentiment. The Harbor Commissioners would not seriously consider it. Surely there must have been powerful, if unseen, influences opposing it. There were. What they were you will hear later, if you stay to listen. It is hard to compress the story of a ten-year fight into a paper for an occasion like this.

THE CALIFORNIA FRUIT EXCHANGE.

It was evident that the fight had got too strenuous for one little Grange to carry on, and Highland Grange, of brief but glorious memory, now disappears from the scene. There was at that time an active farmers' organization, called the California Fruit Exchange—now defunct—which had some good men for directors, and the State Convention requested that board of directors to take charge of the fight. Most of them were in attendance on the Convention, and with a special committee appointed for the purpose, went out to section 4 of the seawall, saw that a gold brick had been offered to the farmers—as usual—and so reported. The directors, however, scattered over the State, found that each meeting would cost them about $10 each, which the Convention—as usual with farmers' conventions—had provided no means of paying. Consequently, they promptly jumped the job.

THE FIRST COMMITTEE.

Before fading away, however, they appointed a committee, consisting of B. F. Walton of Yuba City, W. L. Overhieser of Stockton, and I. H. Begeir of San Leandro, with whom I, as representing Highland Grange, the originator of the trouble, was requested to act. The committee never met, presumably because nobody would provide for their expenses, but the members "consulted" as they happened to be in town, and I acted. I was much of the time in the city and could not get away. Nor, to tell the truth, did I wish to. I was enjoying the fight. The conclusion we reached was that of the farmer in the fable with a bad boy in his apple tree hooking fruit. Since neither words nor grass would make him come down, he decided to try what virtue there was in stones. We determined to get the Legislature to give us the blocks which we were after, but which the Harbor Commissioners refused us. A bill was drawn in such terms that if passed the Harbor Commissioners would be compelled to set aside the Washington and Jackson street wharves for a free market, and also the blocks bounded by Pacific, Davis, and East streets which, of course, was precisely what we wanted.

WHAT THE FARMERS WOULD NOT DO.

The only reason why that bill did not become a law as we drew it was the miserable stinginess of the fruit-growers and other producers in refusing, in spite of earnest appeals, to put up a dollar to pay a competent man to look after their interests at Sacramento. I suppose they thought the committee wanted the money for junketing. As a matter of fact, no member of the committee could or would have undertaken it, but if the fruit-growers had given us the money, we would have employed a representative as bright as any employed by the corporations, and in the state of public feeling at the time no adverse lobby on earth could have prevented the passage of the law as we drew it. There is not, never was, and never will be, corporation influence which can prevail against real outspoken public opinion, and public opinion was solidly with us at that time.

MURDERED BY AMENDMENT.

Such measures are not killed by open opposition, but by amendments made in committee or in the house. For that reason whoever desires such a bill to pass must keep some one in Sacramento, until it has passed both houses and been signed by the Governor. That is what the corporations do, and until the farmers do the same they need not expect to win. W. L. Overhieser of the committee went to Sacramento once or twice at the expense of the San Joaquin Pomona Grange, but Brother Overhieser was too good a man to cope on equal terms with the powers of darkness. He did not understand the game. Besides, he was there but little, and otherwise the bill had no promotion. It was amended by striking out the paragraphs making it obligatory to give us the blocks we needed, and leaving the location right where it was before—with the Harbor Commissioners, which meant—nothing doing.

THE PACIFIC COAST STEAMSHIP COMPANY.

The trouble with the bill was that the greater part of the blocks we wanted were occupied for a coal yard, laundry, small repair shops and similar purposes by the Pacific Coast Steamship Company, represented by Goodall, Perkins & Co., who desired to keep them. And Goodall, Perkins & Co. had more influence with the Harbor Commissioners than all the farmers in California. But they, also, lost out to still more powerful forces, as we shall see a little later.

On the day before the Legislature adjourned I happened to be in Sacramento and naturally dropped into the Legislature. One of the members in charge of the bill—I have no idea who—saw me and came to me with the amended bill, which had just come from the Printer. At the same time there happened to come up the legislative representative of Goodall, Perkins & Co.—Milton S. Green, if I remember correctly—to whom I was introduced and who told me that he had suggested to the committee ''a slight amendment'' which he thought would make the bill ''better''—as, indeed, it did for Goodall, Perkins & Co. The member then took me aside and told me the bill had been amended by the committee and could not then be changed. It could be passed in the form it stood—for it had passed one house and there was no chance of any change at that stage of the session—or be dropped, and he would do as I said. I read the amended bill, saw that its only value to the farmers was that it established the principle of the free market and cleared the way for the fight in the next Legislature on the single issue of location. That, however, I thought worth while and told the gentleman to run it through the mill. He did so, and as reënacted with amendments as approved March 2, 1903, it is the law still. If I ever knew how it came to be amended with no material change in 1903 I have forgotten. That, however, merely ended one stage of the fight.

NO FAULT WITH THE STEAMSHIP COMPANY.

It should be said right here that I never had any complaint to make of the attitude and action of the Pacific Coast Steamship Company for their part in the performance. They were using the property which was nearly opposite their wharf for the legitimate purposes of a steamship company engaged in commerce in a large way, and they did not want to move to accommodate the farmers or anybody else. They did precisely what I would have done, or any of you would have done, in their place, and won out as they deserved to because they attended to business, while the farmers did not. To this day Senator Perkins and I occasionally joke about it when we meet, and he evidently thinks he had the laugh on me, while I maintain that if I, or any other alert person who understood the machinery of lobbying, had chosen to spend our time and money in staying at Sacramento and watching the bill, in the existing state of public opinion, all the corporations in the State could not have prevented its passage. The laugh was on the farmers who refused to provide means for their own defense. It was a fair fight, and the weaker political guns won because they were kept on the battlefield, were loaded and brought into action precisely at the right time and place. I had no malice towards any one. Of course, I had contempt for public servants who, while pretending for political purposes the utmost anxiety to benefit the farmers, never for one moment intended to give them anything of value which was desired by any important corporation. As a matter of fact—and it was clearly shown at the time—the time had come in the history of the city when the property in question could no longer properly be devoted to the uses to which it was then devoted. It was needed for more important purposes, and has since been devoted to them.

THE LAW OF EIGHTEEN HUNDRED AND NINETY-SEVEN.

The law as enacted required, and still requires, the Harbor Commission to set aside a "sufficient number of docks and piers, which must be contiguous to each other for the reception of all perishable products arriving by rail, boat or other conveyance * * * and shall permit the sale of such products therein by or for account of producers only under such regulations as may be prescribed by the Harbor Commissioners." It does not require that any blocks of land whatever shall be so set apart. The paragraph requiring that was stricken out, as we have seen, in committee at the request of the Pacific Coast Steamship Company. The Commission had authority to assign such blocks, but we knew it would never voluntarily do so. The law, however, required that they should provide space for "all" the perishables, which, although it was provided that the docks should be "connected with the belt railroad" was impracticable as to produce arriving by rail, without either assigning State land for a terminal, or unreasonably obstructing other commerce. After passage of the law the Harbor Commissioners voted to set apart the Pacific street wharf for a free market. That was at the time the best wharf in the city, easily accessible for river craft, and immediately opposite the block we were after. There was no way of getting produce arriving by rail there except by team. The railroads had no object in delivering there, and would not have done so. Besides, there was no room for it. Regardless of the repeated declaration that no sane person expected produce to be sold there in any quantity, except through commission men, the Commissioners insisted on pretending to think that producers were eager to come to the market and sell their own produce, and sent out 1,000 circulars to producers, inviting them to apply for space. To these but twelve replies were received, only eight asking for space. Instead of accepting this as evidence that producers were not crazy, they called it evidence that they did not desire to save drayage and have their produce sold in a regulated market. They still refused to give us the land for a terminal. There was nothing doing except talk. At a later date the Harbor Commissioners formally adopted a set of "regulations" for the "free market," which were printed. The first section reads as follows:

> **The free public market consists of Market street, Clay street, Washington street and Jackson street wharves with their bulkheads, and such other blocks and wharves as may be hereafter added thereto by resolution of this Board.**

The action has never been repealed that I know of. But the Harbor Commissioners have never done either of the following things required by the act of 1897, still on the statute books:

> "Construct car tracks to connect the docks and piers so set apart with the belt rairoad."
>
> "Construct suitable tramways and tracks and other devices for the rapid conveyance of perishable products to the stalls in the free market and operate the same."
>
> "Adjust the tolls to provide the necessary revenue" for such operation and the superintendence.
>
> Appoint the "Superintendent and Assistant Superintendent" required by the Act.

And except on the general principle that all laws should be obeyed by those sworn to execute them, there is no reason why they should. But the law is there.

A funny feature of the passage of the law of 1897 was that the legislators went home and claimed credit—and generally got it—for magnificent work in providing a free market in San Francisco, where the unfortunate, oppressed, and downtrodden farmers could go and peddle their own fruit and "garden truck."

THE SAN FRANCISCO FARMERS' CLUB.

At this juncture Highland Grange butted in once more by requesting the San Francisco Farmers' Club to take charge of the movement. At that time—I had entirely forgotten it until I overhauled my old papers for this address—a rather active Farmers' Club, now defunct, all the good seem to die young—was in existence in San Francisco. It had, I see by its first annual report before me as I write, sixty-three members, including many well-known men. How it came to be born, what it did, or of what disease it died I forget, although I see that I was chairman of its executive committee. There is every reason why there should be a farmers' club in San Francisco. There are more farmers there than in any other county in the State; they doubtless operate more land than the farmers of any other county—and at far greater expense to themselves. In 1898 this club, at the request of Highland Grange, jumped into the breach. It appointed a Free Market Committee consisting of Edward F. Adams, E. A. Denicke, I. J. Truman, and T. L. O'Brien—two bankers, one lawyer and mining man, with a real farmer as chairman. The committee had full power to act, and at once began to again stir up the animals. Probably the prodding of this committee led the Harbor Commissioners to appoint January 18, 1898, as a date at which representatives of farmers, carriers, and commission men were invited to appear and discuss the subject. I have no doubt that our committee was there, although I have no record of it. My only record is that neither carriers nor commission men appeared. The Commissioners, however, continued to be bombarded with "resolutions" by the State Grange, State Farmers' Alliance—now defunct—the State Fruit-Growers' Convention, and numerous less important bodies. Still nothing doing.

THE SECOND STATE CONVENTION.

Under authority, therefore, of the San Francisco Farmers' Club, a second delegate convention was called and met in the hall of the San Francisco Chamber of Commerce on February 23, 1898. It was attended by delegates from granges, fruit exchanges, and other farmers' organizations, and boards of supervisors from all parts of the State. Edward F. Adams was chosen president, and Victor L. O'Brien, secretary.

AN INCIDENT OF THE CONTEST.

How I came to be president of that convention is rather interesting as showing some of the methods of warfare practiced by commission men of the day who did not wish to be "regulated" and supervised. It had been planned to ask one of the representatives from the Tulare County board of supervisors present to take the chair, but when the assembly convened they found in every chair a copy of the Bulletin of Commerce, a trade paper then, and perhaps still—published in San Francisco, of date of February 17, 1898, containing on the front page a three-column article of which the following were the scare-heads:

THE FREE MARKET. ITS TRUE MEANING.

ONE OF THE MOST BAREFACED POLITICAL JOBS EVER ATTEMPTED TO BE FASTENED ON THE PEOPLE.

ADDITIONAL TAXES ON FARMERS.

The Leading Agriculturalists and Horticulturalists of the State Oppose It. We Have a Free Market Already.

A VERY ADROITLY HIDDEN SCHEME.

The scare-heads sufficiently indicate the nature of the article, but you would enjoy hearing the whole of it read if there were time. The free market plan was described as a deep and dark plot, contrived to entice the honest farmers to forsake their faithful commission men, come to San Francisco to sell their own produce to their utter disgrace and ruin in order that a "so-called farmer" named Adams might roll in the luxury of a $1,500 job on the water front, surrounded by an army of satellites also drawing "fat salaries" at the expense of their misguided and wretched dupes. The only effect of the document was to induce some one, I don't remember who, to upset the programme by nominating me for president of the Convention, and I was unanimously chosen, with great applause.

THE PERMANENT COMMITTEE.

The convention discussed the subject of the free market during the morning and afternoon sessions and appointed a "Permanent Committee," consisting of Edward F. Adams of Wrights, John Sweet of Martinez, W. L. Overhieser of Stockton, S. S. Peck of Petaluma, W. P. Cragin of San Jose, J. M. Moore of Alameda and R. D. Stevens of Sacramento. Mr. Stevens did not accept. The committee received definite written instructions as to the kind of market to work for, which were identical with the plan originally outlined by Highland Grange, and were directed to accept "no moral responsibility" for anything less or different. Subject to those instructions, we were to exercise our own judgment and to serve until displaced by some convention or "equal authority'' with that of the convention which appointed us. As no such convention has ever met and acted on the subject, I suppose we are in office to this day. In accepting the appointment, the committee promised the convention that it would never meet after the meeting to be held that evening, except when there was money in the treasury to pay their traveling expenses—a promise, as I recollect, which was pretty faithfully kept. That it might have money in its purse—for each member declared he would never solicit a dollar—a finance committee was appointed, consisting of I. J. Truman of San Francisco, H. Meacham of Petaluma, and A. N. Judd of Watsonville. These gentlemen accepted, with the statement that as Finance Committee, they would estimate and report to the organizations represented at the convention what money was required. If they sent it, it would be used and accounted for. If it was not sent the Permanent Committee would have to go without it. Mr. Truman, then president of a bank, was made treasurer, and promised never to let the committee overdraw its account. All these financial engagements were faithfully kept. It was known that any further effort would mean another legislative campaign, and the convention was told that not less than $1,000, and probably more, would be required for expenses, including printing, probable traveling expenses, and the per diem and expenses of an experienced representative at Sacramento through the entire session or until we got a bill passed and signed by the Governor. And I may as well say here that of twenty organizations which sent delegates to the convention, fifteen sent nothing whatever in response to the appeal of the Finance Committee, two sent $5 each, and three sent $10. The boards of supervisors of San Francisco, San Joaquin and Contra Costa counties each sent $20, and the farmers' organizations and individuals not represented at the convention contributed from $2.50 to $5 each, the total amount sent being $147.50. Of this there was expended, up to July 14,. 1898, for traveling expenses of Permanent Committee—I was traveling on a pass in those days and got none of it—$23.75; for compensation of a very industrious secretary, $35; for printing and official history from which I have taken this record, $58.25 (3,000 copies), and for postage and minor expenses sums which bring the total to $138.75, leaving a balance in the treasury of $8.85, which, for all I know, Treasurer Truman may have yet. I guess we got it, although I have no record of it. The Permanent Committee was active enough. It presented a memorial to the Harbor Commission in which we went over the whole matter de novo, making it plain that we wanted those blocks of land in addition to the piers which the law provided for, and that we did not expect the farmers to sell their own products. John Swett and S. S. Peck, as a subcommittee, sought to reach an agreement with the commission merchants who, as an organized body, would have nothing to do with us. W. P. Cragin and W. T. Overhieser, as a subcommittee, called upon the carriers and found the California Transportation Company and the Southern Pacific Company willing to coöperate. Goodall, Perkins & Co. sidetracked the proposition that they should move, and suggested as an alternative that San Francisco should be made a free port by abolishing all harbor dues, which was interesting but hardly germane. Meanwhile, the Harbor Commission stood pat and did nothing. As a last resort the committee called twice on Governor Budd, who received us cordially and agreed to "look into it further." On June 27th the committee addressed a formal request to the Governor requesting him, as our last resort, "to enforce the law." To this a reply was received, dated June 29th, that the communication had been referred to the Harbor Commissioners "with the request that they attend to this at once." The Commission apparently understood the Governor's request in the Pickwickian sense, for it continued to do nothing.

THE RECORD ENDS HERE.

At this point, or rather at July 14, 1898, my record ceases, all subsequent records having been lost in the San Francisco fire. For the particulars of the closing episode I must rely on my memory, and can only vouch that in substance my statement will be correct. As the Permanent Committee did not meet for lack of funds I acted from this on alone, but with the approval of individual members of the committee, whom I consulted as occasion required. Although my home at that time was at Wrights, I was in the city two days in the week, and what I did, which was a good deal, took very little time and gave me much amusement. Beyond a fairly reasonable amount of time, and a very little money, it was impossible for me to go and I never did go, or intended to go.

AN EPISODE OF A LATER DAY.

I may digress for a moment at this point to state that in 1902 the fruit and vegetable dealers in San Francisco got very haughty. Combinations of all kinds were rampant and aggressive. There was a retail vegetable dealers' union, which decreed that no new fruit and vegetable stores should be opened within a "block," I think it was, of any established store. If an interloper should be so impudent as to start opposition within the prohibited limits no commission man should sell him a dollar's worth, under penalty of a boycott by every retailer. Nor should any commission man, under the same penalty, sell any produce whatever to any person not a member of the retailers' association. And this was enforced in the most drastic manner. The retailers had all the machinery, including the walking delegates, and any one who violated the rule could not stay in business. On the part of the commission men, they had an equally effective organization. No one was permitted to sell produce except to a member of the association or to a retailer. If he did he was boycotted, both by commission men and retailers. The two organizations were in cahoot. An association of Sacramento River growers came to the city and opened a store, but they could not buy from commission men to fill out their assortment, and if any retailer bought of them no other wholesaler would sell to him. It was a cinch. The newspapers roared with indignation, but the cinch held. When the Legislature met on the January following I drew up a bill providing that no one could sell produce on any State property in San Francisco without a permit from the Harbor Commissioners. No one could get such a permit except by application in writing on a form in which he expressly promises not to be a member of any association in restraint of trade, and that he will sell impartially to all persons wishing to buy in unbroken packages, whether in or out of the fruit trade. The precise form of the obligation is written in the law and is as binding a cinch as the produce trust had. I gave the bill to some member of the Legislature—I think it was Senator Woodward, but am not sure—and it went through with a whoop. It was "agin trusts" and needed no "promotion." It was approved March 2, 1903. It was sustained by the courts and broke up the San Francisco vegetable trust. It is very stringent in its requirements that the State Harbor Commission shall enforce its provisions, and when there is a public uproar about the abuses in that trade it does enforce them. Unless there is, I doubt whether the Commissioners bother much about it. Perhaps they do, I don't know. A funny incident in connection with this episode was the coming to San Francisco of that organization of a few Sacramento farmers, who had determined to get rid of the commission men and sell their own truck. They opened a store in the commission district and butted in. They had lots of stuff, but their variety was very limited and no commission man would sell them a dollar's worth to make up a variety. If a retailer bought a box of tomatoes of them he might go hang before any one else on the street would sell him anything. The honest river farmers made an awful roar, but it did no good. They were tabooed. Of course, they did get rid of some stuff when some retailer, attracted by price or quality could sneak it away, but they could only supply a few things. It made no great difference, for this particular bunch had plenty of money and could afford to run their store whether they made or lost. They got no end of free advertising as the fellows who were trying to "buck the trust," and the upshot was that so much outcry was made that the bars were let down for them and they were let into the combine, where they lived happy ever after. Farmers are queer.

AN ALLIANCE WITH A "MONOPOLY."

We, of course, knew from the beginning of the agitation for a "free market" that anything of importance was impracticable unless the Southern Pacific Company would agree to make the blocks bounded by Pacific, Davis and East streets their regular terminal for all perishable products which it brought into the city. There was no way of compelling it to do so, and while for many years I had found the traffic officials of the company very obliging—they gave me free transportation for years while I was trying to get the farmers to coöperate—but they could not control the operating department, which always desires to keep down expenses, and the additional cost of the proposed delivery would be considerable. The first thing I did when appointed by Highland Grange was to call on the Freight Traffic Manager of the Southern Pacific Company to ascertain whether it would deliver all perishables, without extra charge, at the proposed free market site. If they would not, I knew I need go no further. In due time I received verbal assurances that this would be done if the free market was established at the proposed site, and later the late C. F. Smurr, then Freight Traffic Manager, so stated to the Board of State Harbor Commissioners at a public meeting. They never told me their reasons, except a desire to relieve their congested freight terminal at Second and King streets, but the stronger reason was plain enough, although it never came up in our discussions. The Southern Pacific officials had had their eye on the blocks we wanted ever since that company purchased the South Pacific Coast road running to Santa Cruz, whose freight terminal adjoined those blocks of State property. In this desire they were backed up by the wholesale merchants then established on and near lower Market street, who very much desired to ship and receive merchandise from that terminal, which saved much drayage as compared with that to and from the more distant and crowded terminal at King and Townsend streets. They were able to get a few deliveries on the small trackage of the South Pacific Coast road, and the little they had made them anxious for more. They wanted to save drayage on merchandise just as we wanted to save the farmers drayage on fruit. On October 20, 1891, twenty-eight of the largest wholesale firms in the city had signed a communication to the Chamber of Commerce, asking that body to request the Southern Pacific Company to deliver unbroken carload shipments by the Lombard street slip to its tracks in that vicinity. The request was approved by the Chamber of Commerce and promptly forwarded to the Southern Pacific Company, where it slumbered until March 5, 1896, when it was filed with the Harbor Commission in aid of our request that the blocks bounded by Pacific, Davis and East streets should be assigned for the free market. During the height of the fruit season the Southern Pacific Company might bring into the city as many as twenty-five or thirty cars a day, while for months in the winter two or three cars might be the maximum. It was evident, therefore, that if those blocks could be assigned for the free market during much of the year, the tracks could be used for the receipt and shipment of ordinary merchandise. The Santa Fe railroad was by that time in active competition, and to the extent that these nearby tracks could be used for merchandise, it would provide for the Southern Pacific a more attractive terminal than it was possible for the Santa Fe to get anywhere. That was the real reason why the Southern Pacific Company would agree to make that proposed free market site the terminal for perishables. That was the reason why our project got the hearty support of the wholesale merchants and the San Francisco board of supervisors—not love for the farmers. The merchants really wanted the entire benefit of that small terminal, and the railroad company would have much preferred to use it to attract competitive business than to use any of it to give better deliveries for local business, which they would get anyhow. But half a loaf was better than no bread. We farmers were making an awful racket and might win out. Hence it looked good to the railroad men to help us for what there might be in it for them. I assumed at the time that they doubted whether our plans ever materialized, and that if they once got their tracks on to that property the future would be their own. I, on my part, counted on being smart enough to so draw the law that in any case all the Southern Pacific Company perishables would be forever delivered at that terminal. That, however, is more imagining. They were square people, and most of them my personal friends. We kept perfect faith with each other from first to last.

A CONCLAVE OF CONSPIRATORS.

I shall never forget the time when, early in the campaign, I first let my comrades into this secret. It must be remembered that this was in the middle nineties, when the farmers were at the bottom of the heap and the name of the "espee" was anathema maranatha. Brother Walton and Brother Overheiser and I were at dinner in a little half-lighted restaurant, whose gloom well comported with the concoction of some dark conspiracy. It was an awesome moment. There were we three horny-handed grangers considering what was almost a secret alliance with the arch enemy. Should we—could we—for sake of saving the farmers hundreds of thousands of dollars a year uselessly spent for drayage consent that that dreadful Southern Pacific Company should get anything on earth that it wanted? Would it not be doing evil that good might come? Was it not a sin? Was it not a mortal sin? Could we ever again look an honest farmer in the face without blushing or lift our voices in the grange without fainting from the sting of our own consciences? At the very best, did it not have the appearance of evil from which we are commanded to abstain? How long we pondered or how we reasoned and wrestled I forget, but our unanimous conclusion I remember. We would obey the command against the appearance of evil by keeping perfectly still. Having thus satisfied our consciences in that respect, we settled the main question much as Samuel Butler said the good deacons of evangelical churches in New York settled it for themselves and their daughters when invited to the great ball in honor of the young Prince of Wales when he visited that city in 1860. They would foot it that time anyhow and take their chances with the Recording Angel. And so our first campaign was conducted with the knowledge that we had the hearty good will of what was alleged to be a powerful factor in lawmaking in California, although from prudential reasons, not entirely connected with our own consciences, we refrained from asking active assistance. The conscientiousness of our constituents might be more robust than our own. So far as I knew, we got no help from the Southern Pacific Company during the first campaign. I never heard that the word was passed to fall in.

THE SECOND LEGISLATIVE CAMPAIGN.

In the second campaign it was different. It had become evident that the mass of the farmers in conventions assembled could be relied on to pass any "resolutions" which we might draw up and send to them; but not one dollar would they give to pay the necessary expense of fighting their battle. Personally, I was fully occupied and could not under any circumstances do much of anything which could not be done in San Francisco. No other available farmer was familiar with the art of lobbying, which is merely, when nothing improper is intended, going to the Legislature and never leaving until your bill is signed by the Governor. You employ your time in making personal friends among the legislators, and especially members of the committees, watching your bill through each legislative stage, getting your committee together—if you feel sure of a majority—quick and getting your bill reported back favorably before your opponents hear of it—the committee stage is the danger point—and getting it called up out of order, if necessary, the first time you see a good majority of your friends in the house, and the friends of your hated rival not present. In every Legislature from 1,500 to 2,000 bills are introduced. Each legislator is interested in his own bills. Some of them—probably most of them—do not even read one bill in ten, and know almost nothing about the merits of most of them. In all legislatures there is a majority of sensible and honest men. The art of honest lobbying consists in getting hold and keeping hold of the honest majority, inducing them to take time to understand your bill, and convince them that it is right. It is perfectly simple for a person competent to secure attention and respect, but demands constant attention, alertness, and tact. We could have employed an effective person, probably, for $500 or $600, and expenses, but we might as well ask the farmers for a million. It was of no use bothering any more in that line, and I agreed with the Southern Pacific traffic men that they should try to get some help for us. They seemed to think that somewhere in the bowels of that institution there was some one who could probably be of service. Who it might be I did not ask, and was not told. But the event proved that they were correct.

THE LEGISLATURE ASKS FOR THE CONGESTED BLOCKS.

I drew up a bill of one brief section providing in explicit language that the blocks of State property in San Francisco bounded by Davis, Pacific and East streets should be part of the free market and operated as much by the Harbor Commission in accordance with the act of 1897. I presume that I took it to Sacramento, but I do not remember. If I did it cost me nothing but my lunch, for I doubtless went and came back on a pass. It was introduced in the Assembly by Assemblyman Radcliff of my then home county of Santa Cruz, who had promised me to do it when he was in our precinct electioneering. It passed the Assembly, if I am not mistaken, without amendment. The "boys" stood in. In the Senate it was introduced by the late Senator Langford of San Joaquin County, who everybody liked, but who had lost his youthful alertness. W. L. Overheiser spent more or less time there again, if I am not mistaken, at the expense of the San Joaquin County Pomona Grange. Otherwise, the bill had no promotion other than whatever was given by the friend of the Traffic Department of the Southern Pacific Company, whoever that was. It was not enough. The Pacific Coast Steamship Company also had friends in the Senate and probably attended more strictly to business, for they amended the bill in committee by striking out the blocks bounded by Davis, Pacific and East streets, and substituting "Section 4 of the seawall," which made the bill nonsense and was an amendment intended to kill. The Senate adopted that amendment by a vote of 21 to 11. I have the roll call on that vote as sent me by Senator Langford. It is interesting. I am not sure of the details of the legislative history of the bill, but as I remember it, the bill passed the Senate in its amended form and then went to conference, and at the request of the members in charge of the bill I, with others whose names I can not recall, went to Sacramento and made an argument before what I supposed was a conference committee at which a considerable number of members of both houses were present. I stated my case as well as I could and handed the committee a letter from Julius Kruttschnitt, at that time General Manager of the Southern Pacific Company, stating that if the free market was established on the blocks we asked for all perishables reaching San Francisco by their lines should be delivered there as the regular terminal on condition that so far as there might be room the trackage should be available for the delivery of other merchandise, for which use of the trackage the company would pay. Our main opponent before the committee was the president of the Harbor Commission, who finally came out in the open and declared that it would be an "outrage'' to make the Pacific Coast Steamship Company move its coal yard and laundry, and William H. Metson, an attorney of San Francisco, who being asked, as I remember it, intimated but did not squarely aver, that he appeared for his ''aunt'' or somebody who owned a ranch on the Sacramento River and objected to any loss of the advantage which river produce had over produce arriving by rail by reason of the saving in drayage which this bill would give to shippers from interior points. But I always doubted whether Mr. Metson's aunt was the person who really paid his expenses—and Mr. Metson is not a cut-rate lawyer.

THE STEAMSHIP COMPANY WINS OUT.

I have no exact record of further proceedings, and the legislative history of that session is not available. The conference committee seems to have reported back our bill as we desired it, for on March 18th the Senate rejected by a vote of 19 to 14 the report of the conference committee, which finally killed the bill. By that time, of course, it was known that the Southern Pacific Company favored the bill and our opponents on the floor treated it as a Southern Pacific ''job.'' The then Senator C. M. Shortridge, in particular, is reported in a press clipping which I find among my papers as saying that ''it was a question of taking the property away from Goodall, Perkins & Co. and giving it to the Southern Pacific Company. Therefore, being opposed to the Southern Pacific, he wanted the market to stay where the Senate had put it—at ''section 4 of the seawall.'' So far as I can see when it came down to any matter of real value, none of the real ''politicians'' in the Legislature thought it worth while even to pretend to consider the interest of the farmers. From their standpoint I do not see why they should. Farmers will do nothing in any effective way to help themselves, exert almost no influence in determining nominations to office, and can usually be depended upon to vote their party ticket straight. Why should any politician bother about them! They will not, except just before election time, nor will they ever do so after election until they have learned by experience that their votes are watched by their constituents; that their misbehavior is remembered; that farmers recognize no allegiance to any party which nominates untrustworthy men to office; and that therefore square dealing in office is the best political policy. Farmers will continue to be fooled with until they learn to resent fooling at the polls.

WHY FARMERS LOST THEIR FIGHT.

Had the fruit and other produce growers of the State made half an effort to influence their own representatives in the Legislature; had they studied the literature which was so abundantly supplied to them so as to understand that the so-called free market was a legitimate business proposition and not a tomfool notion of getting rid of middlemen and peddling their own fruit; had they ever trusted the committees whom they chose to represent them and sent them the money to pay the necessary expenses, nothing could have prevented the passage of their bill either in 1897 or in 1899. They would to-day have been dividing $300,000 to $400,000 saved in drayage which they still pay, and would have had a regulated central wholesale produce market where every sale would have been a public record and where with no expense but a postage stamp any farmer could at any time have learned just what any lot of his produce was actually sold for. They lost because they deserved to lose, and the wholesale merchants of San Francisco are now enjoying the saving in drayage which the producers might have saved and which it was in accord with public policy that they should have saved rather than the merchants.

THE POWER OF CORPORATIONS EXAGGERATED.

The contest of 1899 showed, as is shown whenever such a contest occurs, that the popular imagination grossly exaggerates the power of corporations with legislators. Their greatest source of power comes from the continuous denunciations of the press, which the corporations could well afford to pay for. By making the public believe that the corporations are all powerful the press brings to the corporation back doors all the instruments needed for their purposes and whose services, for the most part, cost very little indeed. Their wide advertising as the dispensers of favors gives them easy control of conventions through county and state committees, thereby enabling them to get about whatever they desire and which can be got without attracting attention. The Southern Pacific Company is the largest corporation in the State, and, through its control of county and other political committees, controls a large amount of public patronage. It gets small jobs for heelers whom under no circumstances it would employ in its own business, and by their help controls nominations for more important positions. How much cash, if any, it disburses for such control no outsider knows—certainly as little as possible. It has a great amount of legal business to distribute among active attorneys, and its distribution of passes—now only within the State—pays wonderfully. But in face of public sentiment strongly expressed it can not hold its men—except the lowest class —in the Legislature a minute, and when opposed, as in this case, by any other important corporation whose agents skillfully make use of the prejudice against the bigger concern its chances of success are small. So far as I can see—or rather hear, for I only visited the Legislature to make one argument— the Southern Pacific people did all that they could be expected to do to help pass our bill, but they could control nobody except their ordinary roustabouts, who cared nothing for public opinion. The bill failed because not one legislator in ten understood its real object, and they did not understand it because the farmers had no alert and competent representative on the ground to inform them and interest them. That being the case, it was easy for the steamship people to defeat a bill which the Southern Pacific push was known to favor.

ANOTHER STRING TO THE SOUTHERN PACIFIC BOW.

It is possible that the political department of the Southern Pacific Company took less interest than they might by reason of another more promising plan. The press dispatch from Sacramento, before me as I write, which announced that the Senate had killed the free market bill, went on to state that the blocks in question were to be leased to the Southern Pacific Company. How the correspondent knew I do not know and probably could not find out. But he stated that fact, and from that day it was so understood. The farmers made no further effort to secure the property, and the next Legislature, by an act approved March 23, 1901, authorized their lease for terminal purposes for twenty-five years, and on July 18th of the same year the lease was signed at a rental of $980 a month, and the Southern Pacific Company is now in full possession, regardless of the statement made two years before by a Harbor Commissioner to the legislative committee that it would be an "outrage" to disturb the steamship company. The producers of perishable products could have well afforded to pay twice that rental.

With the signing of that lease all possibility ended of making the blocks of State property bounded by Pacific, Davis and East streets the common terminal for perishable products arriving in San Francisco by rail and established there, in connection with nearby wharves, a wholesale market for perishable products under public supervision. The property is more valuable to the company for other purposes, and as it pays rent for the land it will use it as it desires. The law remains on the statute books, and if I were a Harbor Commissioner I should deem myself bound to enforce its provisions in respect to produce arriving by steamer. I do not know that river producers desire it. I do not know that anybody desires it. But the law is there and should be enforced or repealed. But the city is growing, and the time will come when Washington and Jackson street wharves will be demanded for other purposes than the delivery and sale of perishable products. In my opinion that condition will be reached when San Francisco has 100,000 more inhabitants. The center of population, also, is drifting south. If the fruit-growers of the State were united; if they knew what they wanted and why they wanted it; if they were "scopy," as the late Mr. Huntington used to say, and could foresee the inevitable in the future and provide for it, they could cause to be set apart, possibly in the vicinity of Islais Creek, an ample tract of State land yet to be filled in, where a magnificent wholesale market can be established under public regulation and supervision, which shall be a common terminal nearer to the center of population than the blocks which we fought for and did not get, for all perishable products arriving by rail or water, without the expense of one dollar for drayage. The united farmers can get from any Legislature almost anything in reason if they spunk up and get it before it is known that some corporation wants it for the benefit of some more effective class. I have endeavored in this paper to make clear what seems to me essential for the satisfactory disposal by producers of their perishable products and to illustrate by the long story of the struggle for the terminal on East street what is necessary for farmers in order some time in the future to attain it.

THE EXODUS OF THE "FREE MARKET."

There is a finale to this history which must not be omitted. From time to time something occurs in the San Francisco produce market to cause the press of the city to jab the Harbor Commission for not executing the free market law. One of those jabs about something or other first called the attention of the present very effective, very honest, and strictly political Board of Harbor Commissioners, then newly appointed, to the existence of such a law. Reading the law, they proposed to execute it. Nothing on earth, however, could convince them that there was ever any intent or any desire other than that the farmers should come to San Francisco, or send a hired man, to peddle their own truck. A small triangle of the State lands which we fought over which was too small to be occupied by railroad tracks remains in the control of the Commission. There they determined to establish a free market in alleged compliance with the law. It was not a terminal. Everything brought there must be hauled in wagons. Its total area is but 2,747 square feet, about the area of a store of one of the smaller commission firms. It was quite out of the way of family trade. Nevertheless, the Commission erected a one-story building, divided it into seventeen little pens, and offered the building for a ''free'' retail market to the producers of California. No ''rentals'' were charged, for the law forbids it, but ''tolls'' at the rate of 2 cents a cubic foot were charged for all produce delivered for sale. The press of the State was wildly enthusiastic over the final delivery of the producers from the devouring jaws of the remorseless commission men, and the commission men laughed. Personally, I was glad to see it done, for the city is contemplating the establishment of a chain of municipal markets, and it was of great importance to determine by trial whether householders would go to market in the old-fashioned way, and this State experiment did demonstrate it. They will go, and go in great numbers. The State market was for a time crowded with those who came some distance until they discovered that it was wholly uncertain what they would find there and then most of them stopped. One producer of olive oil was there and stayed there, and told me he did well. One producer of lemons from San Diego told me he was taking in about $20 a day, and it was just like finding so much money, for most of the lemons he sold were those he would have had to dump behind the barn if he had relied on the ordinary channels of trade. And they looked it. Two or three producers' associations were formed with agents, either on salary or commission, and occupied stalls. Seven ''stalls'' out of the seventeen contained in the building were occupied on November 5th. One association was formed in the neighborhood of my little fruit farm at Wrights, and I sent a little fruit there. I am a small shipper, but my shipment on any one day when I shipped at all would have swamped the man with that particular variety of fruit. And my neighbors all ship about the same fruits at the same time. The crates and boxes, for the most part, were opened, and sold as at any other retail store in quantities as desired, and at about the same rate per box that the commission men were selling to retailers. When I—or my foreman, for I was in the city and knew nothing about it—shipped 5 or 10 boxes of plums, they competed at cutthroat prices with the 30 or 40 boxes which I probably sold the same day to some son of Italy through a commission man. If the son of Italy had known it he would probably have boycotted my fruit and served me right. I usually got about the same returns from those sent to the free market and those sent the same day to the commission man. Both got all they could, poor fellows. It was a hard market all summer.

''FOR ACCOUNT OF PRODUCERS ONLY.''

One of the funniest things about this free market was the working out of that provision of the law which says that produce shall be sold ''for account of producers only.'' That was a very proper provision in the law for the wholesale market, partly by reason of the limited space requiring the prompt removal of produce when sold and also to prevent the commission men from selling at what they called "retail" price, accounting for it at what they called "wholesale" price and pocketing the difference. It will be remembered that it was an instance of that kind which started the trouble. Under that provision produce would be accounted for at whatever it brought, and if the commission man wished to do business on his own account he must charge the produce on the market books to himself and haul it off somewhere and sell it. As applied to the retail market, where it was rigidly enforced, it merely prevented the poor fellows from attracting trade by buying what they needed to make out a variety of fruits in season. They could only sell what happened to be sent to them.

The Harbor Commissioners appointed a "Superintendent" at $125 a month, and as the State law would not permit him to hang around there more than eight hours a day—commission men work twelve and thirteen hours a day—a "janitor" was appointed at $75 a month. Between the two of them they kept the market in a pretty bad muss a good deal of the time. On the 5th of November, when I went to count the stalls, seven of them were occupied and ten were vacant—that is to say, filled with empties and other material. The cost of the building was $5,476. There was paid from the state harbor fund to November 1st for salaries to November 1st $975. There was paid into the state harbor fund from "tolls" on fruit offered for sale there $251.09 to same date. The building can be rented easily enough for other purposes. The market has been worth all it cost. It proved that householders would patronize a public market; that the seawall district is not a good place for a retail market; that no producers worth mentioning have any intention or desire to go to San Francisco to peddle their own fruit; that those who have that desire are easily cured by a little experience; and that it does not pay the producers of any commodity to sell to retailers who must make a profit if they continue to buy, and then go into the same market and compete with those retailers by selling at retail to consumers at the same price that the retailers, who must pay rent and stand a lot of waste, paid at wholesale. Possibly the most desirable thing about that retail market was what Mr. Dooley said was the greatest benefit to a city which had an international exposition—"you don't have to have another."

I do not wish to do the free market injustice. Some of those who sold there doubtless made a fair living, and one of them told me that he had established connections which would make an outlet in a wholesale way for the products of himself and his neighbors. He was evidently a good salesman and the chances are that he developed into a commission merchant. There seemed to be quite a trade in poultry and eggs, at what price or profits I do not know. The whole business was small. The market was never kept orderly and attractive. Rubbish and empties were allowed to accumulate in the unoccupied stalls in a way which would not be permitted in any private market in the city.

One thing not be to forgotten is that all fruit which is merchantable at all, but is not fit for canners' use or Eastern shipment finds its way to San Francisco. There are a great many very small growers who will not cull closely, and do not know how to pack, whose fruit reaches that market. The quantity of such fruit is sufficient to greatly lower the average quality and the average price of the fruit sold there. But there is never a time when good fruit well packed can not be had, as may be seen by calling at any good retail market. For a quarter of a century I have sold fruit there and been in the city to see it sold. Invariably when good fruit sold at unremunerative rates, if I have walked through the commission districts, I have seen the stores and sidewalks piled high with the stuff, far beyond the requirements of the market, and which commission men were doing their best to get rid of in the only possible way to get rid of it—by temptingly low prices. There is doubtless some dishonesty by some men.

I think I have made it clear that in my judgment the way to sell produce in San Francisco is the way approved by the experience of generations. The farmer who can succeed in selling his own fruit at a profit in a city market is an exceptional man. No ordinary farmers' association is likely to succeed or to hold together. Such an organization as the southern orange growers have could, of course, sell its own produce if it thought it paid to antagonize the trade. I should not think it would pay to do so. In my opinion, producers should sell their products at wholesale to retailers who will sell it again, and when they have sold it they should leave consumers, retailers and municipal authorities to deal with the final distribution. As a resident of San Francisco I favor the establishment of municipal retail markets, but as a country producer I should not care whether there are any such markets or not if I did not think the aggregate of sales would be increased. But I do think so. The ideal plan would be that proposed twelve years ago of concentrating all deliveries at one terminal and making that terminal the wholesale market, managed and supervised by non-political public authority—that to be supplemented by a chain of large municipal markets into which the fruit should be delivered by freight cars on street railroads operated for that purpose during the night. That, however, is a matter for the municipality and its citizens to settle. The concentration and the wholesale market might be arranged some time in the future on State property in San Francisco if the growers should take it up with the Harbor Commissioners. It would succeed if the place selected and the arrangements with the carriers combined to make it the place where sales from first hands could be most economically conducted. Otherwise, it wouldn't.

This completes my story of the great struggle for a "free market" in San Francisco. It reminds me of the story about southern roads which was current in the civil war among the soldiers who marched over them. A southern road of those days, so the story ran, started out as a noble highway, well drained, well metalled, delightful to travel on; from that you turned into an ordinary country road, ungraded, unmetalled and either muddy or dusty; from that into a plantation road, thence into a cart path, thence into a trail, thence into a squirrel track, and thence up a tree. (Applause.)

The Convention then adjourned to meet at the Crocker Art Gallery at eight o'clock P. M.

EVENING SESSION.

On Thursday evening the Woman's Council of Sacramento tendered to the delegates to the Convention a reception at the Crocker Art Gallery. After some time spent in examining the art treasures, listening to music, partaking of refreshments and in social converse, President Jeffrey called the meeting to order.

PRESIDENT JEFFREY. Ladies and gentlemen: In opening this meeting to-night, and before introducing the speaker of the evening, I wish to say a few words of appreciation—it would require a great many words of appreciation—of the kindness of the Woman's Council, the ladies who have met the delegates to this Convention and greeted them at the door, and I wish to express thanks to these ladies for their kindness. Most of the members of the Thirty-fifth Fruit-Growers' Convention have been upstairs seeing the beautiful pictures, and now we are assembled here to listen to a short programme.

We have been nicely treated in Sacramento. Why shouldn't we be? Sacramento is the center of the largest deciduous fruit section in the State. As a matter both of courtesy and business, Sacramento people have treated us well, and we appreciate it. I will say that it seems to be the voice of the delegates that this Convention has been a great success. You are more or less concerned in the interests that have been discussed at these meetings for the last three days, not so directly interested as the delegates who were discussing their troubles, their aspirations, their inspirations, and their business generally, but nevertheless you are interested. If all the fruit orchards that are tributary to this town were wiped out of existence there are many people of this town who would have a fit of blues; so I am glad you have encouraged us in meeting us in a social way on the streets, in the hotel lobbies, and in your homes, and in the kindness in which you have tendered us this reception this evening in this institution. Now, as we do not care to detain you any length of time, I simply close my remarks with a reiteration and expression again of the sincere thanks of this Convention to the people of this town, where this Convention was organized twenty-seven years ago with a very few pioneer fruit-growers, where this Convention was born almost a complete generation ago. Now, I will introduce Mr. A. R. Sprague, who will speak about as long as I have talked and choose his own subject. (Applause.)

MR. SPRAGUE. Friends, Mr. Jeffrey, I am sure, has quite overrated the amount of inspiration which I can command on a moment's notice for an extemporaneous speech. However, I do not like ever to refuse when any important task must be done, and so when he requested me to say just a few words concerning the Crocker Art Gallery, I am very glad to respond.

This gallery, as most of you know, is a result of the liberality of Mrs. Crocker, who formerly lived in the city of Sacramento. As you have seen, it is filled with the art treasures of all lands. Doubtless nowhere west of Chicago can be found a gallery more replete with rare gems of art than is the Crocker Art Gallery. I do not think the fame of this gallery has spread at all in proportion to its merits. I think there are comparatively few in this great Sacramento Valley know what a treasure we have here in reach. If it were generally known, there would be more pilgrimages from the various parts of the valley to see these treasures of art. It is maintained, as doubtless you know, by the city of Sacramento, which is proud that it possesses so magnificent a gallery; and although it is not quite so accessible as many of us wish, we can always get to it if we start.

We are very glad also to call your attention to the magnificent statuary at the door, which is the gift of our distinguished citizen, Colonel Weinstock, who is now journeying in foreign lands. (Applause.) Doubtless nowhere can be found at the present time on the coast a group of higher merit than that. This is the gathering place, as you see to-night, of the citizens of Sacramento whenever they wish to do especial honor to visiting citizens; and in these beautiful halls, adorned as they are with such rare treasures of art, we all feel free to enjoy each other's society and to catch something of the inspiration that comes from non-utilitarian things. To be sure, we are agriculturists; we are doers of things, the most of us, and we spend much of our lives with minds intent on that feature of it, and yet there is in us all something which demands something higher, and we doubtless will respond to-night, our souls will rise from the inspiration of these noble works of art. (Applause.)

PRESIDENT JEFFREY. I now have the very great pleasure of introducing one of your foremost citizens, Judge Peter J. Shields of Sacramento County, one of your honored men. (Applause).

JUDGE PETER J. SHIELDS. Life in the open country, under the clear sky and in the midst of green fields, has never failed to excite the praise and move the fancy of the world. There industry does not hum, but is full and abundant; life is peaceful, but of a measureless range; and the silent forces of nature stir only man's best impulses. Such a life requires no praise or appreciation.

Nor shall we here attempt any praise or defense of farm life, nor of the men who live it. With outdoor conditions have ever gone a type of manhood that was clean in its morals, sturdy in its courage, useful in its industry, and loyal in its patriotism. Country life has given to America its ideals, and our institutions are peculiarly its product. Its freedom and independence and repose are everywhere expressed in our Nation's aim and purpose. It has all of its strength and reserve and courage. While we remain a Republic, dedicated to justice and equality, we must remember from whence our strength and power came; and we must foster our country life that it may supply the influences which will keep our Nation ever vigorous and young.

But mindful of these conditions, we are mindful, too, that this life has its weaknesses as well as its strength, and our purpose to-day is not to rhapsodize or appreciate its better side, but to study its conditions as they are, to endeavor to determine its value, and to indicate, if we can, how its condition, good as it is, can be made better, and how its usefulness, great as it is, may be enlarged. On its weaker side it may be said of farm life that it lacks social advantages and educational opportunities. The life is too often solitary and isolated, and the range of its activities narrow and circumscribed. Too much of its labor is mere drudgery, and it lacks the alluring prospect of easy profits or large wealth; its earnings are often too small; its work hard, and its hours of labor long and monotonous, lacking stimulation or enthusiasm. Many elements of the home life are meager; the farm women lack companionship, their work is hard, routine, and uninteresting. A combination of these influences tends towards a general atmosphere of repression. Over wide areas these conditions happily do not prevail, and everywhere they are becoming outgrown. When we were going through that phase of our country life in which these conditions were most prevalent, our cities began to grow, and our youth in a steady stream left the, to them, unattractive farms for the pleasures and opportunity of the apparently larger life. Under the influence of this desertion rural conditions further degenerated, farm life languished, and cities grew apace. This disproportion, this condition of social and industrial unbalance, excited first interest and then alarm. Our people began to study the consequences to the individual and the State of rural decay. We began to see country life with a better understanding and consequently a new appreciation. We began to see that the country produced a different, although not necessarily a better, man than the cities, a kind of man indispensable to our social soundness. The full industry of the country, its beauty and its sweetness, its dignity and its peace, were reflected in the character and personality of the man who grew up there, and gave him a depth and earnestness and sincerity which make him big and effective.

We saw that the country was free from those temptations which beset the path of the city youth, and that a simple honesty was characteristic of it. Its industries were moral and creative; its wealth was cleanly realized from the very elements by the application of honest toil. With a new force we saw that its products fed the industries of the cities and created the commerce of the Nation. With the continued growth of our cities their social problems began to develop. Crime increased, and the overcrowded tenement districts and large numbers of helpless poor began to appear. The question of what to do with our great mass of dependent children began to press for solution, and divorces so multiplied as to become a national scandal. And we then observed that these conditions did not arise in rural communities, that their whosesome industrial conditions forbade them, that they were the sole product of the cities, and that the country's only part in their existence was to pay the price of their correction and support. We came early, too, to realize the political value of a country citizenship. It early appeared that it cast a steady and conservative vote; without passion or hysteria, having peculiarly high patriotic and moral ideals, it moves to the solution of governmental problems slowly but sternly. We saw that it was of the nation's hostages against the forces of revolution and unrest.

These considerations newly realized, or newly learned. gave to country life an enlarged appreciation and a new eminence, and lay at the base of a revived national desire and purpose to foster it as the very foundation of the Nation. As a result of these considerations the question is constantly, though crudely, asked as to the relative advantages of the two types of life. as to which produced the better man. This admits of endless discussion, but one without profit. It is readily apparent that both conditions are indispensable to a large national existence and symmetrical social growth. That a man should follow that life in which he can find the most happiness and do the best work is self-evident, and if that be a city life or a country life, that is for him the one to follow. There is enough in each to furnish the materials of a useful and happy existence, one of distinction and greatness. The one undisputed fact in their comparison is that success in either is a question of interpretation, of seeing large. Our great cities are rich in stimulation for those who can feel it. If the city boy once knows the thrill of the high life about him, he may pursue its best purposes to distinction. If the country boy once catches the inspiration of his noble surroundings; if he once sees the size of the factors with which he is dealing, the big thought makes him a big man, and masterfully and with an enthusiasm which ennobles his labors, his life tends naturally to fine achievement.

Manifestly the thing to do is to cease comparing the two and go about so controlling the forces back of each that the youth of both shall hear the right call and that their progression be directed towards the high places. Each at its best is good enough, and the Nation is more concerned in knowing that each is lived to its best than that either is the more meritorious. The general welfare is served when governmental and social forces are so formed that city and country life, each in its own field, shall be perfected, and that both working together shall round out a sound and useful society.

Growing out of this new national purpose to strengthen agricultural life, many influences conspired to effect its betterment. The city man regarded his country brother with a new respect; the country man felt a new pride in his calling. Having more friends, in its prosperity many strong influences combined to aid it. Commerce ramified and extended and the farmer learned business from the city merchant. Transportation facilities multiplied, and gave the farmer new and better markets and enlarged the range of his life. Agriculture was given a place in the President's Cabinet, and the Department in recent years has been doing a great good to the industry which it was created to serve. Agricultural newspapers have everywhere increased in number and improved in quality until they have become an invaluable aid in improving farming conditions. And then the improvement and multiplication of agricultural schools and colleges has come to do all that can be done to prepare the country man to live a country life.

The latest agency which has offered itself to the out-of-door man, the latest evidence of the Nation's concern for the farmer, was the appointment by the President of the Country Life Commission, which has so recently visited us. The purpose of its appointment was that it might study and observe all of the conditions applicable to, or operating upon, out-of-door life, and to recommend such direct remedies, or the pursuit of such general policies as in the judgment of the Commission promises to improve or correct them. The forces behind this commission include the nation itself, and whatever views we may hold as to the conditions, or how they may be improved, we must not undervalue its possibilities. That it can aid in the great work of improving rural conditions, the most superficial observer can easily see; that it must do so should be the determined purpose of every farmer in America. But we must carefully study the way in which it can be made useful, that it may not waste its powers, and we our opportunity in fruitless and ineffective activities; that it does not waste its energies in recommending legislation which can not reach the evils aimed at; that it does not concern itself with effects, rather than with causes.

To determine how this commission can be of help to country life, we have only to recall the unfavorable features of that life and inquire how they may be remedied. These disadvantages are pretty generally set forth in the letter of the President and the correspondence of the Commission. Happily they have little reference to California conditions. Among them is the isolation and lonesomeness of farm life. This the commission may point out, as it has been pointed out countless times before, but it can not recommend legislation for its correction. Nor can it favor laws abolishing unintelligent methods, long hours and heavy, unprofitable and uninteresting work. These are personal and industrial conditions, beyond the reach of legislation. Health regulations may be legally and practically enacted to improve city conditions, but if the rural sanitation is bad, laws promise little more remedy than their suggestion. The President suggests a study of the condition of the rural schools. They are now good and substantially meet the demands made upon them. Of what avail to improve a course of study if the school is open too short a time, or if the children, at work on the farm, do not attend it? Of what use to recommend a more capable teacher if the people can not afford to pay the price of his employment.

Our people are now building better roads as fast as they feel the need of them, appreciate the loss they sustain through the use of poor ones, and as fast as they can afford to pay for them. Laws in relation to good roads under present conditions would be largely temporizing, while the conditions which resulted in bad roads continued. We must change the condition. Our present mail facilities reasonably meet the demands of our farm people. In the main they are satisfactorily served with such mail as they have the judgment or taste to select, the means to pay for, and the time to read. It is suggested that the rural people should meet more frequently and coöperate more fully to effect the welfare of their industries. This, if only the repetition of an old saying, is as surely a wise recommendation. But if so, the farmer has to travel a long distance over a poor road, at the end of a long day's toil and on the eve of another; it is an obstacle which neither argument nor law will remove. He has been misled and injured by such means until he has grown suspicious; he has not been trained in such activities, and he does not make them interesting or profitable. And, so afraid, bored and without hope of advantage, he maintains his seclusion. It would be futile to point out the advantages of such meetings while these conditions continue. And the scarcity and unreliability and unintelligence of farm labor is beyond the reach of law to remedy; it is an evolution which can only be remedied by a correction of the forces which produce it.

I think it clear that rural conditions can not be corrected or even improved by laws directed immediately at its defects; we must go deeper and correct the causes, and this remedy can not be applied by some one else for the farmer; paternal law in his behalf would not only fail of beneficial results, but would work an injury and be resented by a man who is able to stand alone. The country man needs no legislation peculiar to himself; his wants are met in that respect when the people generally are wisely and justly governed. His interests are best served by those measures which are of general application and best serve the interests of the whole people. Given good general criminal, financial, and economic laws, and his condition demands no more, it does not permit of any other. To a greater degree than any other man he can work out his own progress. Firmly fixed upon the soil, controlling the very forces of nature, and bending them to his service, he is his own master. and is able to mould his own destiny.

But this does not acknowledge the existence of numerous grave limitations to rural life and despair of their correction. For there is a remedy, and it is easy of application and entirely adequate. It is as broad as the evils sought to be corrected, applicable to all conditions, and capable of accompanying agricultural life through all of its developments, and keeping it sound and making it supreme. And that remedy is education! Not general education, although that would be most helpful. Not educating the farmer, the outdoor man, to be a merchant, a journalist, or a physician; but teaching him to be a farmer; training him for the work he is to do, for the life he is to lead.

This will help the country in the only substantial and permanent way in which it can be helped, and start it on the road to an endless development. Agricultural education will not only refine and cultivate the country man, it will stimulate and energize his mind. Trained to know his soil, his seed, and his animals, he will use only the best, and those to best advantage. Growing only the best and the most of it, combined with business methods, he will make more money, and consequently have to work less hours. Leisure and wealth will give him time for new ideas and the means to realize them. He will add beauties to his farm and refinements to his home. He will farm more on fewer acres. His labor, to what is now regarded as its humblest detail, will become intelligent and enthusiastic. Cultivation will become intensive, farms will be subdivided and population will increase. Upon these conditions the farm meetings and farm organizations will follow naturally and be made to realize their fullest measure of social betterment and business advantage. The intelligent and prosperous farmer will see the advantages of good roads and will build them. He will demand better schools, which his children will have time to attend, and he will provide and develop them for himself. He will read more and better publications; he will have an increased correspondence; he will need better mail service, and he will have the power and intelligence to get it. To this well settled and prosperous country transportation facilities will come, and the whole life will go up. Country life will become attractive, and its labor problem will be settled. Better men will be drawn to it; they will be trained by it, and its discipline will make them efficient and dependable. There is no phase of country life to which education of this character does not apply, and which it does not improve. We should, therefore, urge upon every moral reformer, upon every humanitarian, upon every statesman and political idealist, that they advise and demand that immediate steps be taken to give to this country an enlarged and adequate system of agricultural education. We should earnestly recommend to the Country Life Commission that it bend its every energy in furtherance of such a national policy, and should point out to it that action in any other direction will be indirect and ineffective.

The Department of Agriculture should utilize all of its vast forces to the same end. The Davis bill, now before Congress, or some such similar legislation, should be enacted. Every state should be urged to do its utmost in this direction. Let us in California strengthen our College of Agriculture and make it fit our necessities. With particular emphasis let us go about the work of building up and supporting the School of Agriculture at Davis, and making its management practical and vigorous. Knowing the value of a strong rural population, of its necessity as a source of happiness, of wealth and strength, blind to consequences, we have been training our city man for all of his activities, and the country man for none of his. We have been teaching men to practice law, to conduct banks, to lay bricks; but we have asked this country man to grope amidst nature's mysteries without a ray of light. If our cities grew great under this treatment, while the country fell away, let us not be blind to the cause, nor hesitate now at its correction. This will require work and will take time, but it will be worth while.

Looking into the future, and seeing country life as it will develop under training, I see a field into which science has gathered all that is good, and from which progress has banished all that was ill. I see farm homes filled with the fruits of wealth and culture and moral purpose, set amidst the dignity and sweetness of nature; the kind of homes which shelter strong, clean, and effective men, and which nurture a youth fit for all the trials of life, equipped for effective industry and the kind of citizenship which this great democracy demands. (Applause.)

PRESIDENT JEFFREY. I very much appreciate, in behalf of the California Fruit-Growers' Convention, the remarks that Judge Shields has made. I again thank you, ladies, for the kind reception to-night, and extend the appreciation of the Convention to the city of Sacramento and to the magnificent donation that has made possible the holding of our reception to-night in this beautiful place. (Applause.)

PROCEEDINGS OF FOURTH DAY.

SACRAMENTO, December 4, 1908.

The Convention was called to order by President Jeffrey at 9:30 o'clock A. M.

The President appointed as the committee to attend the meeting on increase of freight rates in San Francisco, December 5th, the following: J. P. Dargitz, Chairman, and Messrs. A. Brinck, B. F. Watson, and J. W. Anderson.

PRESIDENT JEFFREY. I have a telephone message from Judge Norton stating that he will be here at 11 o'clock, at which time he will present his paper. In the mean time we might dispose of any business which suggests itself to the members of the Convention.

MR. DARGITZ. I have been requested by a person interested in the matter to call the attention of the Convention to the subject of dried fruit contracts. You are all doubtless aware of the dispute which has been going on between the shippers from California and the Growers' Association and the jobbers of the East in regard to the matter of the dried fruit contract; that is, what sort of a contract for sale should be accepted by both parties, and it would seem as if it were a matter in which the members of this Convention are particularly interested, and I therefore move the appointment of a committee to consider the matter of dried fruit contract and make recommendations.

The motion was duly seconded and carried.

MR. WALKER. There is a matter that has been brought to my attention in the last few days that I think might interest the grape-growers, and that is the duty on Spanish grapes. There is quite a serious attempt on the part of the Spanish importers to have the basis of measurement rearranged so as to let the cork dust in free. If that is permitted it will mean about a 20 per cent reduction on the duty, and we all know that if the Spanish grape can come in with an additional reduction in duty it is going to hurt us very seriously with our early grapes, especially on the Atlantic seaboard. This matter has gained considerable headway—in fact, the importers, I believe, have it up with the Treasury Department at the present time, and inasmuch as it affects interests, especially at Florin and other early districts, I think it would be well for this Convention to consider the matter very seriously.

PRESIDENT JEFFREY. Mr. George Hecke is on the programme for an address to the Convention, and we will hear him now.

THE PROTECTION OF VINEYARDS BY QUARANTINE.

BY GEORGE HECKE.

When the viticultural industry of our State was in its infancy, it found almost perfect conditions for rapid development. The supply of its finished products was insufficient to meet the demand, the climate was ideal, and serious insect and fungous pests had not then appeared on the scene. Few rules and regulations were needed to control the productions, and the marketing of the crop and the healthy conditions of the existing vineyards caused a feeling of security, so that no measures whatever were taken to guard against the introduction of insect pests.

This feeling of security was rudely shaken by the discovery of the dreaded phylloxera in the State about the year 1874 near the old town of Sonoma. Unfortunately no proper quarantine laws were in existence, and by 1880 the insect had spread through viticultural districts of the coast counties. It is estimated that approximately fifty thousand acres of vineyards, representing investments of many millions of dollars, have been lost through its ravages.

The only parts of the State that are now supposed to be free from the insect are some counties of the interior valleys and southern California. While southern California has so far escaped serious infection by the phylloxera, she had lost very heavily through the devastation of her great grape-growing districts by the Anaheim disease. In 1884 and 1885 the loss is estimated to have been about twenty-five thousand acres; if we add to this the acreage destroyed by this disease in 1889 and 1890 in the upper Sacramento Valley, amounting to five thousand acres, and the loss of approximately ten thousand acres in 1898 and 1899 in the Santa Clara Valley, we find that the great viticultural industry of California has during the last thirty-five years lost over fifty thousand acres by the phylloxera, and forty thousand acres by the Anaheim disease—a grand total of ninety thousand acres, which means a direct and indirect financial loss to the State and country from these causes of probably not less than seventy-five million dollars.

The figures are appalling and should demand the careful attention of every one interested, so that the industry may be better protected in the future.

Phylloxera and Anaheim have been so far the most serious pests that we have had to fight against, but by studying the Eastern and European records we find that there is much danger of introducing other enemies, only secondary in importance. The French grape-berry moth is causing considerable damage in the important viticultural districts of Europe, and if introduced here might develop into a very serious problem. In addition to the French berry moth, Mr. Ehrhorn, our Deputy State Commissioner, tells us of the grape-berry moth and grape curculio attacking berries, and of the grape-bud gnat attacking buds and blossoms. To guard against the danger of importing these dangerous insects into our vineyards, the introduction of all Eastern and foreign grapevines should be absolutely prohibited, unless the consignee should first obtain from the State Commissioner of Horticulture of the State of California, or his deputy, a written certificate indicating that the stock has been properly inspected.

The low prices at which Eastern and foreign grapevines are offered in California are calculated to appeal to the California grape-grower, who very often leaves out of consideration the fact and the danger that sufficient guarantee is not given him as to the clean condition of the stock he is importing. In the vineyards of our coast counties hundreds of thousands of these foreign grapevines have been planted, and in many instances complaints have been made that varieties received have not been the ones that had been ordered, and that in some cases phylloxera had been found on the roots. There is no redress against the foreign dealers after the vines have been accepted.

In counties of California where Anaheim and phylloxera are known *not* to exist, stringent measures should be adopted to provide for the prevention of the introduction of these pests. The importation of rooted vines and cuttings from other counties or districts should be absolutely forbidden, unless accompanied by a written certificate from the State Commissioner of Horticulture, or his deputy, stating that phylloxera or Anaheim is not known to exist in the county in which such grapevines are grown. This is an absolutely necessary ordinance in order to protect a county that is not infested. A measure like this, consistently carried out, may keep out the pests for many years.

If, however, the insects have obtained a foothold in a county that had previously escaped, the first step necessary will be to determine, as much as possible, the extent of the attacked area, and if it is found to be confined to a small vineyard, an effort should be made to completely eradicate the pest by destroying this vineyard. (Bulletin 192, U. C. Cal.) The vines should be grubbed out and burned upon the ground and the ground should be kept clean of all growth for at least one year; this must be done, so that any suckers that may come up from the root may be destroyed immediately. If the affected spot is not too large, it is advisable to disinfect the soil with bisulfid of carbon. Apply this by boring holes two feet apart over the land to be treated. These holes should be about one foot deep, and can be made with a small crowbar. After pouring in the liquid the holes should be closed by pressing the earth into them with the foot.

If, however, the pest has obtained a foothold in several vineyards of the districts, it is practically hopeless to attempt to eradicate it. In this case, all we can reasonably hope to do is to delay the spread of the pest as much as possible, and in the mean time to place all new vineyards on a permanent phylloxera resistant basis. The infested spots in the districts should be diligently hunted out and treated. The treatment consists in digging up and burning every vine, in each spot, which shows symptoms of attack, together with at least three rows of apparently healthy vines surrounding them. Disinfection of the soil of these spots by flooding or with bisulfid of carbon is then advisable, but in any case these spots should be strictly isolated in all farming operations. In cultivating the healthy parts of the vineyard, to pass through the infested spots with the plows and harrows is the most effective method of spreading the insects.

The search for the infested spots is most easily and thoroughly done in July and August, as at that time the shortness of growth is most readily detected and the insects are easily found, as they are in large numbers on the surface roots, and generally also on the trunk of the vines just below the surface of the soil. If this searching and destruction of infested spots is commenced in the early stages of infestation and prosecuted with sufficient thoroughness in every vineyard throughout the county, the life of the bulk of the vines will be effectively prolonged for many years. As soon as the actual presence of the phylloxera in a district is known, and all hope of permanently eradicating it is abandoned, the embargo could be modified to the extent of admitting all vine-cuttings, unless it were known that these vine-cuttings came from a district that is suspected to be infected by the Anaheim disease. The Anaheim disease will be invariably reproduced in cuttings taken from sick vines. Rooted vines should still be kept out, as they can not be disinfected with any degree of certainty.

But no matter how carefully and completely those measures are enforced, a time will arrive sooner or later when the cost of inspection and eradication will be greater than any benefit to be derived from them. We must accept the phylloxera as a permanent inhabitant of the district, and simply consider the best method of growing vines in spite of its presence. By this time all quarantine regulations are useless, and should be repealed.

The County Horticultural Commissioners will experience great difficulties, indeed, to determine how to proceed in the case of Anaheim disease. In spite of much investigation by Federal and State authorities, the cause and remedy have not been discovered. The first record was obtained at Anaheim in 1885. The malady became less virulent in 1890, and it is a matter of doubt whether the extensive destruction of vineyards in the Santa Clara Valley during the last decade may be attributed entirely to this disease, or to the combination of peculiar conditions, such as loss of vitality caused by overbearing ending fatally during the extreme dry weather of 1897-98. The earmarks of the Anaheim disease are found over all the vineyard districts of California, but they are so uncertain that I doubt whether even an expert can tell you with any degree of certainty that such or such a vineyard is harboring the Anaheim. The characteristics are uncertain. The leaves show a lack of coloring matter (chlorophyll) between the veins, turning vivid red in the colored and yellow in the white varieties. The growth is limited, commencing at the top, and the internodes become shortened. The body of the canes show irregular patches of unripened tissues, and the end canes, being last to ripen, remain immature and soon after the leaves fall these unripened parts turn black, and become dry so they can be snapped off between thumb and finger. Another peculiarity is the remaining of the leaf-stem, the petiole, on the cane, with the premature dropping of the diseased leaf. A healthy leaf unaffected by the Anaheim will always drop from the ripening canes with the stem. These to my knowledge are the outward characteristics of the disease. As I mentioned before, comparatively little is known and no remedy has been discovered. The course of the disease so far, however, leads me to believe that it is not likely to prove destructive to an alarming extent where vineyards are planted in good, rich soil with sufficient water supply, and where care is taken to keep the soil in good culture and to prevent the vines from overbearing.

The Anaheim disease is suspected to infest southern California, the Santa Clara and the upper Sacramento valleys. It is hard to determine, and I do not think there is an expert in California who can tell it with certainty. This is one of the weak points in guarding against the disease; the other is a fact that many nurserymen are also dealers, and do not raise all the stock that is needed for filling their orders. They buy and in so doing may unwittingly become the agent for the spread of diseases and pests. If this practice on the part of the nurserymen continues the time may come when the law will prevent all intercountry business in nursery products. This would be a long step in the direction of securing clean stock.

Clean nursery stock would practically guarantee immunity from spreading pests, and the security thus obtained would be of the greatest economical value to the viticultural and horticultural interests of California. (Applause.)

MR. ANDERSON. I would like to ask Mr. Hecke if he has found any Anaheim disease in Yolo County.

MR. HECKE. No, I have not found any in Yolo County.

MR. ANDERSON. In what county nearest Yolo?

MR. HECKE. I explained in my paper that it was rather uncertain whether the disease is in any of the northern counties, for this reason. The disease may be there and yet the conditions and circumstances may not be such as to make it dangerous. Some years ago, in the Vina vineyard, in Tehama County, the disease was very destructive, and we also know that the disease is suspected to be in Marysville, and yet at the same time it did not prove as destructive as it did in Santa Clara and southern California. It is pretty likely that the disease is all over California, but it may take a combination of circumstances, a dry year, overbearing, or something of that kind to make it destructive. I thought that I had found the earmarks of it near Woodland; the peculiar discoloration was there, and for awhile I was actually afraid that I would have a dead vineyard in two or three years' time. But it recovered. I lost about six or seven vines out of 9,000, and the symptoms passed away. I have always thought it was an attack of Anaheim.

MR. ANDERSON. In my inspection northeast of Woodland I saw something like the Anaheim disease, but I was not sure; I was not well posted.

PRESIDENT JEFFREY. Nobody in the world is well posted on the Anaheim disease. Mr. Hecke has taken the best position possible. It may be a condition altogether, not a disease. It may be it is not infectious, but that it is a condition, like the sour sap of the peach tree. In southern California where in 1884 the vines all died absolutely for whole sections of the country there, to-day there are the finest vineyards in the south, growing on the identical land where these vines were all killed. You will remember, in connection with this kind of disease, a few years ago the orange gum disease, as they called it, was supposed to be infectious. Now, all the scientists of the university tell us—and they have gone into this thoroughly—that they are unable to find any bacterial culture from what was known as gummosis, and now they tell the farmers down there not to pay any attention to a sick tree as far as infection is concerned; it is simply a condition that has come over that tree, the same as sour sap on a peach tree, which will cause it to absolutely fail to put out any leaves until August, and finally in two years that tree will be as well as it ever was in the world. I have seen thousands of acres of peach trees in the south affected with what they call the sour sap that up to the first day of August were apparently dead. Eighteen months or two years from that time that orchard would be as well as it was before it was affected in that way. So I don't wonder Mr. Hecke can't find the Anaheim disease.

MR. WHEELER. I would state that about 1888 Professor Gustav Eisen and myself were requested to investigate the Anaheim disease in the county of Fresno, and we were there about four or five months. While there we were taught how to detect the Anaheim disease. Pick up a leaf and hold it to the sun and see if the cells have a little yellow spot. Some years ago when the disease was affecting Santa Clara County I came to the conclusion that it was something similar to the Anaheim disease, from the appearance of the leaves.

MR. HECKE. I believe in Santa Clara County, Mr. Wheeler, it was the phylloxera in conjunction with this Anaheim disease.

MR. WHEELER. I saw a vineyard die at Orange. Professor Pierce, Professor Eisen, and myself went through that vineyard the early part of June, and we found no trace of this Anaheim disease. We figured upon 2,000 tons of good raisins, calculating it would dry 2½ to 1. I think about the first or middle of July we saw the first indications. By the middle of August that vineyard was dry and yellow, like a wheat field, and they only got about one carload of grapes.

MR. WILLIAMS. Mr. Chairman, I was reminded at one point that on the first day of the session I brought up the question of those French vines; that I contended that they ought to be kept out of the country entirely. Of course, that might hurt some commercial project, but it is good for the growers. You can't be certain, even from the most rigid inspection, that you are not bringing in the disease. The horticultural commissioners, some of them, pass them. It seems to me it ought to be definitely decided whether they should be brought in or not.

MR. BREMNER. I saw about a million French vines come in last year, and I know about what those French vines have passed through before they come into the United States. They are not first-class vines from a nurseryman's standpoint, but they are first-class as far as disease is concerned. The French Government and its colonies have the strongest quarantine of any nation on the face of the globe. You can't get a flower into Algiers; a lady can't even wear a carnation into Algiers as a bouquet, and every vine that comes out of France has to come with a certificate signed by the Minister of Agriculture. They are pretty strict. I would not condemn these vines without being pretty sure that they were affected.

MR. HECKE. The main objection to the importation of French vines is this. You order maybe 10,000 vines from France. When you receive your vines you have no assurance that you have what you have ordered. As Mr. Bremner said, the condition of the cuttings can not possibly be as good as those that you buy from some good California nurseries that have the reputation of furnishing you the proper varieties.

PRESIDENT JEFFREY. Mr. Hecke, will you tell the growers what they are going to do about the sprouting of resistant stock?

MR. HECKE. I am not in favor at all of field grafting. A few years ago it was recommended to set out your resistant stock in the fall and field graft in the following year. My observations over practically the whole viticultural districts of California have convinced me that that is wrong. Purchase from a reliable nurseryman the young vines that you want. If you want field graft, however, with such varieties as already mentioned, you are liable to have trouble with suckers all during the life of the vineyard.

PRESIDENT JEFFREY. I know of one vineyard of 160 acres where the sprouts were cut and windrowed up like hay. It was almost filling the road.

PRESIDENT JEFFREY. Mr. Hecke, would it be a good thing for you to advise the grape-growers here to-day to put in a good deal more time to the resistant stock?

MR. HECKE. I should certainly do so. Of course, you might read a paper here on the grafting, and yet at the same time it is a delicate operation and can not very well be performed by an actual grower. He has to break in his men, and if you set them out in a nursery part of them do not grow. I believe that the bench grafting is work for experts, and I should certainly advise the grower to get in communication with a good reliable nursery and get his stock from there with a guarantee, or, if he possibly can, order his vines a year ahead of time. Now, there is another point that I would like to speak about. You have all noticed how quickly the phylloxera has spread through the coast counties; you know how it has acted in Napa and Sonoma. Sometimes they have planted two or three times with the same results. In the Sacramento Valley the phylloxera is not spreading nearly so rapidly. The phylloxera does not live in water, and therefore our vineyards are partly resistant, you might call it.

MR. NEWCOMB. I also think that one reason the phylloxera does not spread any more than it does in the Sacramento Valley is because the phylloxera travels through the winged form, and for some reason the winged form is developed very little in this locality. I think the different counties are perfectly right in establishing quarantine laws.

MR. HECKE. I have never heard of a winged form in California but once, and I think Mr. Bremner was reported to have found it in Sonoma.

MR. WHEELER. The Japanese at Fountain Grove, Kanai Nagasawi.

MR. BREMNER. I have found the winged form in Sonoma County in very many sections. When a vine is nearly dead, the small roots deep down being killed, the phylloxera comes to the surface. It does that anyway in the fall, but when the vine is nearly dead in certain sections, especially in sandy soil where there is much moisture, small roots are put out near the surface and on those the winged phylloxera form appears. It will only be found where those rootlets form. You will find it around the Fountain Grove vineyard and up through that section.

PRESIDENT JEFFREY. I think Mr. Newcomb is right, that every county ought to quarantine against every other county. Sutter County, for example, has no phylloxera, and they are trying to keep it out. I believe that one district in the same county ought to have quarantine against another district. What little trouble it makes to the nurserymen won't amount to much. They don't make much on the grapevines, anyhow. Mr. Roeding and I have fought this out over and over. He is always opposed to the quarantine regulations on the grapevine, and yet he goes right along and does all he can to support those regulations and obeys them; but it is a fact that quarantine ought to be stricter than it is. If the nurseryman tells any commissioner in this room or in this State that we will keep on until we have everything quarantined you tell him no, that the phylloxera is about the only insect pest we have that the best inspector in the world might overlook; and you can tell the nurserymen who are objecting to our grape quarantine that so far as you know there will never be any effort made to quarantine peach trees and apple trees and orange trees.

PRESIDENT JEFFREY. I will name the following as the committee on the Form of Dried Fruit Contracts: A. R. Sprague, chairman; E. F. Adams, and Arthur R. Briggs. I would like to say I just have a letter from Mr. Smith of the Whittier Pathological Station, expressing his regret at not being able to be here. Our Celery Growers' Association of Southern California have just reported at their last annual meeting that the work of the Pathological Station at Whittier has saved their celery crop. They shipped 2,000 carloads of celery—a little section there not much bigger than you can see from the top of the State House here, and two years ago they thought they were going to lose their entire crop; the blight got in there very badly, but the problem has been solved and they are no longer afraid of the disease. This is some of the work that your scientific men are doing.

Mr. Williams then produced a new style of crate, filled with grapes, and explained to the Convention the experiments he had been making in that line.

PRESIDENT JEFFREY. Judge Norton is now here, and I take pleasure in introducing him to this Convention.

MARKETING OF TABLE GRAPES.

By C. W. NORTON.

The marketing of table grapes is made up of two factors, which may be tersely expressed in two words, "quality" and "quantity."

I have mentioned quality first, because of the two, quality is perhaps the more vitally essential to the remunerative disposal of this fruit. But "quantity"—the number of tons of marketable table grapes produced in the State, is a close second in importance. Quality is a condition directly within the control of the individual grower, but quantity, in the general sense in which I use the term, is a matter entirely beyond the control of any individual or set of individuals, every man being entirely free to plant as much land to any product as he pleases, and to dispose of his crop in such way as to him shall seem best.

Under these two heads of quality and quantity the entire subject of the marketing of table grapes can be appropriately discussed. While the two subjects are distinct, there is yet such an interdependence between them that it is most convenient and logical to discuss the two together.

The paramount importance of producing a first-class grape for table use can hardly be overestimated. Many of you are no doubt familiar with this saying of one of the leading handlers of table grapes in New York City: "There are just three things necessary to the successful disposal of table grapes in New York, and those three things are quality, *quality*, QUALITY." Within the last few days one of the leading shippers of table grapes in California said to me that quantity had nothing to do with the price of grapes in the East. That quality is the sole thing. But while these statements are in a great measure true, they are not entirely true. They only serve to show, and were probably meant by their authors only to serve to show, the extreme importance of "quality" in the disposal of California fruits in the East.

If proof were needed to show that quantity also cuts a figure in the price of fruit in the East, it should be found in the fact that during the present fall, when the New York market was overburdened, from 25 to 30 carloads of Tokays selling per day, strictly first-class Tokays were materially lower than when the quantity of this grape upon the market dropped down to 10 and 12 cars per day.

Yet there is no doubt that the successful marketing of table grapes rests fundamentally on the quality of the grapes produced. Human nature is much alike the world over, and every one of us knows that if we pass a fruit-stand upon which are displayed fine, fresh, splendid looking fruit, no matter what the variety may be, the temptation to purchase is strong, while if on the same stand there had been displayed small, inferior looking, upripe, or overripe fruit, we could not be induced to purchase at any price.

There is no way of arriving with any degree of accuracy at the increased amount of fruit which might be successfully marketed in the East, if strictly first-class fruit only were sent forward; but the writer ventures the assertion that the quantity might be increased at least several fold. If this be true, this one thing would go far to relieve the present unsatisfactory condition of the table grape industry.

Therefore, the first great object of our growers must be to produce strictly choice fruit. Not only to grow it, but to see that nothing but a strictly choice article is packed and shipped to the consumer.

There are many elements which enter into the production of a choice Tokay, or other table grape, among which may be mentioned soil, cultivation, proper pruning, fertilization, sufficient moisture, and many other things. But when all this is successfully accomplished, there still remains the delicate and absolutely essential task of properly picking, packing, and forwarding the product, so as to put it in the best possible condition into the hands of the consumer.

All this requires great and constant care on the part of the successful vineyardist, combined with a constant search for further knowledge of the history and nature of the vine, its wants and habits, as well as the nature and habits of the numerous enemies with which it must contend. It has been said, and truthfully, that the successful growing of table grapes is a profession and a difficult profession. But nothing pays like work, and the man who bends the best energies of his hands and brain to the task before him will achieve the highest degree of success in this line, as in any other. But it is not the purpose of the writer to discuss in this paper the best method of successfully growing a choice grape nor to enter in any degree into the details of picking, packing, and loading the fruit. It is his purpose to take the grape after it has been grown and matured, properly treated, packed, and crated, ready for its journey in the refrigerator to its final destination. To do this the writer intends to review briefly the history of the table grape business from its infancy down to the present time, basing his statements and conclusions both on his own experience as a grower and shipper, and on statistics showing the growth of the business.

The question of the proper style of package, and the present system of packing, have provoked much discussion during the present season.

The United States Government has this year conducted a systematic series of experiments, designed to demonstrate the best method of preparing this fruit for shipment, and these experiments have shown some surprising results. This question, however, is to be treated at this Convention by a representative of the Government thoroughly qualified to present this subject. The writer will, therefore, do no more than to remark in passing that the grape-growers of California owe a debt of gratitude to the National Government and its able corps of agents for the campaign of intelligent investigation which they are waging for the benefit of this very important industry.

For the purpose of showing the bearing which the quantity of table grapes shipped has upon the market let us now for a short time review the history of the table grape business in California.

The writer's experience in the growing of this fruit dates back to about the year 1893, and has been confined to San Joaquin County, and applies, of course, to conditions there, though it is believed that analogous conditions have existed all over the State. At that time the business was in its infancy, and its condition was far from satisfactory. In San Joaquin County there was then no medium by which the grower could ship his product into the great auction markets of the East. Indeed, at that time, I think, outside of New York, Chicago, and possibly Boston, there were no open auctions. The growers were forced to depend on the local buyers, who loaded an occasional car for the East. Most of these buyers were irresponsible, and whether or not the grower got his money depended on whether or not the buyer had a successful season. At that time, too, the price of a crate of table grapes f. o. b. was much less than it is at present. At that time fancy Tokays in the East brought possibly as much, but certainly not more, than they do now. In fact, strictly fancy Tokays bring as much money in the market to-day as they have ever done in the history of the business. In those early days second or third grade Tokays did not command any better prices than they do now. There was a period, however, a few years later, when there were better facilities for shipping, and new markets had been opened up, that second grade Tokays could be sold at fairly remunerative prices. This was the period which induced the great rush to plant Tokays which has taken place in the last few years.

In the year 1894 the Earl Fruit Company first took a hand in the grape business in San Joaquin County, establishing headquarters at Lodi. It was followed rapidly by other strong companies, and from that time on the reign of wildcat shippers was ended, and there has been no further trouble about the collection of amounts due for fruit.

Let us now examine the increasing output of table grapes in the past. In the year 1895 there were 1,010 cars of table grapes shipped out of California. This amount was not again equaled until 1902, except in one year, 1897, when the shipment reached 1,100 carloads.

In 1903 the total shipments reached 1,786 carloads, dropped back a little in 1904 and 1905, reached 2,052 carloads in 1906, 3,460 carloads in 1907, and up to November 15th were 3,790 carloads in 1908.

If we reckon the total shipments for this year at 4,000 carloads, which they will approximate, we will see that the shipments of table grapes in the last thirteen years have practically quadrupled.

But as we are examining the past and present of this industry so that we may prepare for the future, we must remember the immense plantings of the past few years, which will be rapidly coming into bearing as the years go by.

I have been unable to obtain accurate statistics as to the acreage of table grapes in counties outside of my own, but if San Joaquin affords any criterion we can draw comparatively correct conclusions.

The figures I am about to quote are accurate, and are furnished me by the best authority in San Joaquin County on the grape question.

In that county there are 14,773 acres planted to Tokays. Of this 7,792 acres, or a trifle over one half, have been planted subsequent to 1905, and are therefore not in bearing at all. Of the other one half by far the larger portion has been planted within the three or four years prior to 1906, and are therefore not in full bearing. On this basis we believe it safe to estimate that within the next ten years our output of Tokays, without any more planting, will be again quadrupled, and that within that time, instead of being called upon to market 4,000 carloads, we shall have 16,000 carloads to find a market for.

These figures are truly startling. Not so much the growth which has been made in the last thirteen years, but the prospect for the increase in the next ten. Certainly not a very encouraging outlook for prospective planters. Indeed, the man who would plant Tokays in the face of this showing would, to use a popular expression, "have to have his nerve with him." Now, how are we to handle and successfully market this vast quantity of perishable fruit? The answer is, *by improving the methods of marketing the fruit.* First, reduce the quantity to be shipped by eliminating everything from Eastern shipments except strictly first-class grapes. We must educate our growers to raise the highest possible percentage of choice stuff, and to the fact that one half of their product, properly culled and packed, will bring them more money than all of it put up in any old way. Let them bear in mind that there is more clear profit in one crate of $2 than there is in eight crates at $1. Secondly, we must widen the markets and reach more people with our fruit. Thirdly, extend the period of marketing by improved methods of packing.

Along the line of reducing the output by relentless culling too much can hardly be said. I have said that we must educate our people along this line, and so we must; but it is probable that experience, that stern but impartial teacher, is doing more to teach this important point to our growers than any amount of friendly counsel can do. It seems as if our growers must learn this hard lesson by having their grapes sold a few times at a price at which they not only give their grapes away, but pay something for the privilege.

Now, as to the second point—the widening of our markets so as to reach more people with our fruit. And this brings me up to the very meat of the question indicated by my subject.

A casual inspection of the fruit shipping business will show that there are but three methods of distribution and sale in practical use, viz.: The open auction, the f. o. b. sale, and consignments upon commissions other than to open auction. As to the last method, it has never proven, and, it is safe to say, never will prove satisfactory. The reasons are many and cogent, and I say this with the kindest of feelings towards any and all commission men. One single reason is sufficient to mention, and that is that this method puts the prices which we shall receive for our grapes entirely in the hands of the other man. Why should we do this with this valuable product, when it is not necessary for us to do so?

With this commission business eliminated, there remains but two methods of marketing our grapes, to wit: Sales in open auction, and f. o. b., which includes private sale at this end, subject to confirmation on inspection at the other end. As to the first, it is the fairest and best method, in the opinion of the writer, which can be devised. But unfortunately only a portion of our grapes can be marketed in that way. Only the very largest cities in the country—those capable of consuming at least several carloads per day—can be served with the fruit by the auction plan.

There are hundreds of cities varying in population from a few thousands into the hundreds of thousands, with their contiguous territory, which, in the aggregate, could consume hundreds of carloads of our grapes per day which never see a California grape, simply for the reason that our system of distribution has not yet been developed to a point where our product has been brought to them. This portion of our people the auction market never has and never will reach. Yet it is among this portion of the population of the East that we must look for the market that will consume the immense quantities we will produce in future years. This population must be supplied by the f. o. b. method of distribution. It is the only method, in the opinion of the writer, that can reach this portion of our people, and at the same time bring any returns at all to the grower.

And yet this very method of disposing of the product of our vineyards is in danger of meeting a violent and untimely death at the hands of the very people whose salvation it would be if it were given a fair opportunity. Unfortunately a considerable portion of our growers will, if opportunity offers, put up for f. o. b. sale a pack which should never go anywhere except to the winery or the hogpen. If ever the old adage of "Honesty is the best policy" held good, it is in the preparation for market of table grapes. While working off on the shipper, and perhaps his customer, of a lot of inferior trash may seem to these shortsighted growers to afford them a temporary profit, it is, as surely as the sun shines, driving nails into the coffin of the table-grape business. If persisted in the result will soon be that practically there will be left to the grape-growers the open auction only. There only the strictly fancy article will find a sale at profitable prices, and the grower will not be able to get cost for anything else.

The result of this practice is to demoralize the f. o. b. method of sale. Some of our chief shippers have sought to remedy the difficulty by requiring the grower to divide his pack, buying one half at a stated price and forwarding the remainder on consignment, the grower not knowing in advance what was to be sold outright, and what was to be consigned. But the fact remains that every season a great amount of fruit is worked into the market that ought to be relegated to the cull box. The result is that the f. o. b. shipper is afraid to guarantee the contents of his car. Carloads are continually being rejected, and the shipper 2,000 or 3,000 miles from his customer, knowing the uncertainty of the pack which he has been forced to send for lack of something better, is unable to determine whether his car has been turned down honestly on account of inherent defects in the cargo, whether it has been turned down by reason of a falling market, or because a sharp dealer thinks there is a chance to work him for a reduction.

As a consequence of these abuses our shippers are becoming discouraged, and are gradually quitting the f. o. b. field. The responsibility for this state of affairs rests, as I have attempted to show, with the growers themselves. If this practice of putting up inferior fruit for market would be abandoned, the difficulty of marketing our grapes would be almost overcome.

I have not thus discussed the difficulties and abuses of shipping our grapes for the sake of finding fault, but in the sincere hope that some means may be found of overcoming the difficulties and correcting the abuses. However, I have no remedy to offer which I conceive to be a panacea for all the ills we suffer. The best I can do is to offer a few suggestions, which may be of some value in the premises, and may not.

After much thought upon the subject it is my opinion that we will never be able to exploit the markets of the East so as to make them absorb the immense crops of the future without coöperation of some kind. But how to effect coöperation, or how to make coöperation effective, is a problem which will require the best thought of the best minds in the business. The California Fruit-Growers' Exchange, which manages the marketing of the citrus fruits of southern California, affords us a valuable object lesson. But our problem is a more difficult one than theirs. We have a much more perishable product, rendering the handlings of it more much exacting in every way. Besides, the nature of our product is such that it can not be graded in any such simple and effective way as oranges and lemons can be.

It has been suggested that the growers submit their packs to the inspection of competent and impartial persons, selected for the purpose, who should determine what should be shipped and what should be rejected. This plan is open to many objections, not the least of which is the difficulty of properly examining a pack after it has once been finished for shipping. This system could only be put into operation by the free coöperation and consent of the growers, and I incline to the opinion that if an angel were appointed inspector he would last only one day.

Another suggestion which seems to me to have more merit than the one just spoken of is that the shippers might coöperate in a plan to improve the quality of the pack. There are only ten or a dozen shippers who do any purchasing of fruit. It would seem that they might be brought into an agreement by which they would require all fruit purchased by them to be prepared, if not in their own shed, at least by packers employed and directed by them, working under their supervision, with the absolute right of culling and rejection in their hands. Of course, this would require coöperation on the part of the growers also, at least to the extent of agreeing to the plan. To make this plan effective it would have to be carried to the extent of controlling the output of the State, except such as went to the auction market. In other words, everything would be either auction or f. o. b., with all the latter under the direction of one central organization. If this were done and the shipper was thus able to guarantee the excellence of his pack without fear, we would soon have the dealers of the East coming to our very doors to buy grapes for cash.

Let us now turn for a moment to the third and last means that may be of assistance in the disposal of our grapes, viz.: extending the marketing period. Along this line the experiments made by our Government experts this season, to which reference has already been made, offer surprising possibilities. They have shown the possibility of keeping perfect grapes for long periods without ice.

The way in which the Almeria grapes imported from Spain are kept affords another object lesson. These grapes come in small barrels packed in cork dust. It is said that large quantities are placed in cold storage and marketed in the Eastern cities long after the beginning of the new year. If our Spanish neighbors can do these things successfully and profitably, why can not we?

It requires no argument to show that if we can by some means preserve a portion of our grape crop, either here, before shipment, which would be preferable, or in the East, near the place where they are to find a market, that this would be equivalent to opening a new market for the amount of our fruit thus held back. I respectfully offer this suggestion as one well worthy the earnest consideration of our growers.

There is one other point in connection of the importation of Almeria grapes which I desire to mention, and through which it seems to me that our growers might find material relief. Almeria grapes now come into this country in immense quantities, and subject only to a very light duty amounting to less than one cent per pound. They are imported just in time to sell alongside of our Tokays. I will not say to compete with our Tokays, for I will not admit that any grape that grows can fairly be called a competitor of our Tokay. But the placing of several hundred thousand barrels of these grapes on the market certainly helps to glut it with fruit, and lessens the demand for our grapes. Why should not the protecting arm of the tariff be extended to us as American producers to relieve us from unprofitable competition with Spain? If we seek to cross the Canadian border with our fruit, we are met at once with a duty of about fifty cents per crate, which almost prohibits the introduction of our grapes into that country. It would seem that tariff legislation ought to be enacted which would secure to us at least our home markets. The American market for the American producer first is supposed to be the principle of tariff legislation.

This question of the duty upon Almeria grapes, and upon bananas, an imported fruit which also helps to glut the market of the East at the same time that our grapes are being sold there, has been taken in hand by the efficient General Committee on Tariff Revision, whose very comprehensive and instructive report has been presented to this Convention and its recommendations approved. I take this opportunity to urge all who are directly or indirectly interested in this business to use their utmost endeavors with our Congressmen and Senators to secure relief in this direction.

Much interest has also been aroused over the question of a mutual trade agreement with Canada, looking to the removal or reduction of the Canadian tariff on our grapes in return for the removal or reduction of our tariff on lumber. This question presents very interesting possibilities. But the writer is not sufficiently conversant with the production of grapes in Canada nor with the lumber interests of this country to discuss it intelligently at this time. It can do no harm, however, to say that every trade agreement which can be made which will serve to reduce the foreign tariff on our grapes will serve to enlarge the market for them, which is the grand objective point to which all our efforts should be bent. I would therefore urge all to exert their influence to secure trade arrangements with Canada, as favorable as possible to the admission of our grapes.

And now, in closing, I summarize the facts and conditions which I have endeavored to set forth in the foregoing paper, into these conclusions: That the present production of table grapes under existing conditions is already in excess of market requirements except for fancy grapes. That the present output of Tokays will be multiplied several fold in the next ten years.

That the remedies which must be applied to overcome the difficulties are:

1. Improvement of the quality of grapes produced by better cultivation and care.
2. Improvement of the quality of grapes shipped, by better selection, severer culling and improved methods of packing.
3. Extending and widening our markets so as to reach all the people.
4. Coöperation of growers and shippers for the improvement of the quality of the pack put up, to the end that we may make our fruit so excellent that instead of its being a drug on the market it may be eagerly sought after in all quarters of the country.

PRESIDENT JEFFREY. I now have the pleasure of introducing Mr. R. D. Stephens.

MR. STEPHENS. Mr. Chairman, ladies and gentlemen: It is evident that Judge Norton has given great consideration to this subject and to the arguments and facts presented by him. His paper is a very important one, probably one of the most valuable ever presented to a fruit-growers' convention, but I differ with Judge Norton in regard to some things. Some of the suggestions he has made are very good, but they are wholly impracticable, simply because you can not organize the producers to bring about such a condition. The Judge prognosticates that in a few years we will have 16,000 cars of Tokays. What is to become of those shipments unless some relief comes to the producer? You can all understand that if you are following a certain course, doing certain things which in the judgment of others are not right and nobody says anything, you are not the wiser, and therefore you will continue to do those things. But if your attention is called to any errors you may remedy them yourself, and therefore publicity is the greatest remedy for any evil that exists. In other words, if you have a bad law and you think it is a pernicious law, and that it is wrong, the only way to succeed in getting that law off the statute books is by enforcing it. I wish to state that, taken as a whole, in the table grape shipments from this State there is a loss to the producer; that this year's shipments have not been disposed of at a profit to the producer. While a few producers have received splendid returns, splendid profits from their shipments, it is because of the fact suggested by Judge Norton, that their pack has been superior to other packs. But you must understand that if all packs were equal, if there were no difference in all the packs, one as good as another, then there would be no opportunity for one grower or one shipper to receive better prices for his products than the other. A very important admission and statement was made by Judge Norton that during the glutted condition of the Eastern markets the superior packs were materially impaired in price to what they were when fewer shipments were going forward. Some of the packs that sold for $2.00 and $2.25 were brought down to $1.40, and while $1.40 is a good price and will bring to the grower a reasonable profit, yet you will see there was a dollar less for that pack than when the market was not flooded. Distribution, of course, cuts a very important figure. Just how that is to be brought about I do not know, and I wish to ask now, Mr. Chairman, whether the California distributors have made a report or not?

PRESIDENT JEFFREY. Not here.

MR. STEPHENS. And you don't know the number of cars shipped, so far as any report of theirs?

MR. WALKER. Close on to 13,000 cars this year, all varieties.

MR. STEPHENS. You see there have been about 5,000 added in one year to the deciduous fruit shipments to the East. New York alone has sold as many as fifty odd cars per day of California fruit, Chicago thirty-eight to forty, Boston fifteen, and so on down, which concentrates our business in a few cities. I believe there are about 150 cities now, Mr. Walker, that receive carload lots?

MR. WALKER. About that many.

MR. STEPHENS. A few years ago there were about 120. If this distribution can be broadened, of course, great good will come to the producer; but, as a matter of fact, some relief must come to the producer if he is to continue to exist as a producer. Let that come in any manner, shape, or form that it may, it will be a good thing and the only thing that can perpetuate the interest. It seems to me that this section of the State, the Sacramento and San Joaquin valleys, is somewhat handicapped. I am only throwing these out as suggestions that good may come from them, possibly. From the south there is a freight tariff of 1 1-15 cent on oranges and 1 on lemons to any place in the United States. It may be just, it may be right, to handicap this section of the State with an additional freight tariff, but while there may be a reason, I can't understand it, and it seems to me that ought to be a question to be investigated by the fruit-growers of the State. If we have to pay $1.45 freight rate to New York, which is 30 cents a hundred more than they pay on oranges and 45 cents more than they pay on lemons, but a five-hundred mile farther haul, I can't say whether that is just or not, because I have not given it the consideration that it ought to have. You can not say whether it is just or not, because you have not had the opportunity and do not possess the facilities and facts bearing upon this question for you to properly and intelligently pass upon it, but it does seem to me that this is an injustice to this section of the State. It certainly must cost something to haul a carload of oranges and lemons 500 or 600 miles. Anyway, the transportation companies assume that it costs something. If you want to ship a carload from here to Los Angeles or Redlands you have got to pay for it, and a considerable little sum, too. I believe that if this question was taken up and properly presented to the transportation companies good might come from it. While I was not here personally yesterday, I was here in spirit, because I had the opportunity, and I improved it, of going to the Southern Pacific officials and presenting this question to them. I asked them if they had ever given it serious consideration, and they admitted they had not. I asked them if there were any good reasons why such a condition should exist. I asked if there were any reasons why we in the Sacramento and San Joaquin valleys should be handicapped in that manner. The citrus fruit interests in southern California have prospered and grown rapidly because of the advantages. They have three roads there; they get better service and lower rates. Now the time is coming that we will get better service. And I wish here now to thank the Southern Pacific Company for the improved service given us this year. We have had better service, better time, and better care has been given to the icing of our fruit shipments. I think that was brought about to a great degree by interviews that I had with the officials last fall. It is possible they might entertain erroneous ideas in regard to the necessary care and attention, in regard to time as well and icing, as the days grew shorter and the nights longer and the temperature lower; that they might assume that it was not necessary to give the same time and give the same attention to the icing that it would be in June and July. I called their attention to the fact that it was necessary to give more careful attention to the late shipments than the early shipments, for the reason that the fruit was on the turn, it was on the down grade, it was at its full maturity, and therefore that it took more care and attention to keep it in good condition than it did before it reached that point of maturity. They admitted that it was a new idea, and they would give it consideration. They evidently have, and we have had better service from the railroad companies this year than we ever had; we have had better time, more regular time. One of the most essential and important things to make California fruit-growing a success is to have a regular schedule time for the fruit trains. The f. o. b. buyer or the shipper must have this protection in order to act intelligent. To illustrate. A car is shipped here to-day by Judge Norton, another one to-morrow and another the next day. He consigns these three cars to a certain place. He knows that if it arrives there at the proper time it can be disposed of within the twenty-four hours, but it is a day late, so he has two cars there. Maybe they are both a day late, so he has three cars for the same market. As a matter of course that market is going to be glutted, and he can not dispose of his shipments at a profit. If he attempts to divert he is going to divert to some market and glut that. If he does not divert he is going to lose, and if he does he is going to lose, because he is going to oversupply the market he diverts to. Therefore, the transportation and the handling of the shipments by the transportation companies is one of the most vital and important questions to be passed upon. I simply asked those gentlemen if the Fruit-Growers' Convention would present the matter to them in a proper way, do it in an intelligent way, not go to them with a club but go to them with arguments and reasoning, give them an opportunity to investigate to see whether relief could be given to the producers and to the shippers along these lines, whether they would take it into consideration or not, and they said that they would do so with pleasure, that they would be willing to discuss this question with the fruit-growers of the State. At that time they admitted that they were not prepared to pass upon it, because they knew nothing about it. What we want is regular schedule time, so that when you ship a car to a certain locality you know, barring accidents of any kind, that that car will arrive upon a certain day and it will be sold upon a certain day, not waiting for another car and putting twice or three times the quantity of fruit into that market that it will take.

As I stated, you take as a whole the table grape shipments from this State and they will foot up a loss to the growers. I have some statements here that I can produce. A car that brings $600 brings a heavy loss to the grower. A car that brings $700 is still a loss, and $800 is another; $900 will bring him no remuneration, and it will take over a thousand dollars a car for him to make both ends meet, including cost of production, purchase of land, the interest upon the capital invested and the taxes. Those are matters that have been figured out, and you can not get away from them. I have presented them for years, and nobody has attempted to deny their correctness. Lodi, Judge Norton's district, has suffered heavily this year. I presume Judge Norton will be ready to admit that. While some growers have prospered and made money, many of them have met with heavy losses. I believe that Judge Norton is right. You should be careful with your pack, very careful.

Now, before I forget it, I want to show you another condition the grower is up against, different from what it has been in the last few years. Last season the culls or the grapes rejected and those left upon the vines —Tokay grapes, I am speaking of—were sold to the wineries at the rate of $10 a ton. There was an incentive for a man to reject, and very heavy rejections were made. This year they first offered $4 a ton, delivered, which meant nothing. Then they came to $5, and I believe that was about the maximum. In some instances, however, they agreed to pay the freight rate, f. o. b. $5. There is nothing in that. You had better do the proper kind of culling and haul those culls out on your vineyard and use them as a fertilizer than to sell at that price. You take the profit you may make in marketing a ton of Tokay grapes at $5 and it will not bring you as much profit and benefit as it will to dump it in your vineyard, return the properties to the soil which have been taken out; and when you come to pay $30 or $40 a ton for fertilizer you will find it will take about twenty tons of grapes to buy one ton of fertilizer; therefore, it is much better to dump your culls on the ground than it is to sell them for that small price. There is a condition that the grower is against this season and likely to be against for some years to come, different from what he has experienced in the past.

Here is a suggestion I am going to make. I will make it as a motion and not endeavor to discuss these questions any further. I believe it would be wise for this Convention to appoint a committee to wait on the different railroads and transportation companies and present these matters to them. Do it in a friendly, intelligent way. Don't go to them with a club, but go to them and discuss in an intelligent way these questions and see if some relief can not be gained for the producer. One of the important ones is a regular schedule time; another is the careful icing of the cars. If this can be secured from a transportation company they can then with safety ship a car to Galesburg, Burlington, or any market outside of the auction market and feel sure that two or three of their cars will not arrive there on the same day on a market that can not take such a quantity. I move that a committee of five be appointed by the Chair to take this matter up with the transportation companies and see what,if any, relief can be brought to the growers.

The motion was duly seconded and carried.

PRESIDENT JEFFREY. I will announce that committee this afternoon.

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION.

The Convention was called to order by President Jeffrey at 1:30 o'clock P. M.

PRESIDENT JEFFREY. The discussion of the humus question was postponed the other day until this afternoon; if there is no objection, we will have that discussion now, and then turn the meeting over to the grape-growers.

MR. GERALDSON. Somebody thought I said the other day that stable manure was not good or desirable. I did not mean to let that impression go out at all. I meant to say that we can not get enough stable manure to accomplish anything in the face of extensive, clean cultivation of the soil; that the humus we put on in that case would be almost nothing. If we up there could get all the manure from one town and could afford to bring it there, it would be enough for one piece of ground, but there is not enough there to go around.

(Mr. Geraldson then, for the benefit of those who were not present Thursday morning, repeated practically what he then said, describing the manner in which he cultivates his orchard.)

MR. DARGITZ. I would like to ask Mr. Geraldson if he thinks his plan would work on comparatively level ground and without irrigation, where we ordinarily grow crops of fruit without irrigation, but by intensive cultivation.

MR. GERALDSON. Unless I have got an entirely wrong view of the matter, when we cultivate land in California without irrigating it and get crops off of it, we are running on our capital; that is, the humus in that soil. The moment we commence to cultivate the ground annually we stop making any more humus. Nature makes humus out of twigs and dry grass. When we cultivate there is no last year's dried grass. Every year we cultivate the ground we use up a little humus. We wear it out by cultivating; we stop the new supply, therefore the old supply must disappear; and we are going to come to a point absolutely in cultivating without irrigating, as in other ways, where we will be put out of business. Our soil will cease to have humus enough in it to produce crops. Therefore, a person is, in my mind, forced to choose between the plan I propose or some similar remedy, and face the ultimate fact of going out of business when the humus is out of his soil. I think it is absolutely imperative that that system be adopted.

MR. CRAIG. I think it very unfortunate that Mr. Mills and Professor Shaw are not here, because they could very easily answer all those questions, and Mr. Geraldson has the rest of us rather at a disadvantage. I think Professor Shaw could tell him how the humus could be gotten in the soil. Mr. Mills told us in talking the other day, out there before the door, that he used both winter and summer crops in his own orange orchards, and in that way he furnished, probably, a great deal more humus than Mr. Geraldson can get by his method. Mr. Geraldson has just told us that he has a large crop of burr clover. I think that is very likely the cause of all the benefits he thinks he gets from his system. Mother Nature does not, like some mothers, overlook every fault of the offspring and treat it just the same as if it were good all the time. Rather. she is like a pretty hard stepmother, infinitely capable and infinitely heartless. She rewards liberally those who are intelligent and industrious. but to those who are lazy or ignorant she is cruel as the grave.

About the time I was born there was a book written called "Two Years Before the Mast." I think Richard Dana was the author. He was ordered to take a long sea voyage for his health, and, being poor, went before the mast, and came to California around the Horn. The book is very interesting. giving a vivid description of all the horrors of a trip around the Horn in those days. They came to trade in California. They came to the bay of San Francisco. but there was no city there then. although he predicted there one day would be. What did they find to trade? A few hides. that was all. This country had been in the occupation of white men for two or three generations. They had done the best they could with it. They had not the courage of Anglo-Saxon white men to cope with nature. but they had done their best, and that was all California produced. a few hides. Mother Nature only produced a little grass to keep a few animals alive. We have got not only to follow nature. but to feed her. We must do it energetically.

It seems to me that when we watch the course of an orchard that has been neglected we see to what end Mr. Geraldson's system would come if it were allowed to pursue its own course. Just north of my place. in Fair Oaks. are one or two small orange orchards whose owners have been discouraged and they abandoned them some years ago. Of course, Mother Nature takes care of it. The trees died. You find, however, a dozen olive trees where there were hundreds. Even the growth of grass is a very scanty affair. It might be said that the difference is a matter of irrigation. but I can tell you that in my orchard the first seven years I could not get water. some years none at all, in any year very little indeed. but we cultivated carefully: we did the best we could without water. We conserved the water in the soil to the best of our ability. and the result is you could not find one dozen dead trees out of a thousand. What is the difference between that orchard and those to the north? Simply that mine was cultivated. We have got to fight Mother Nature and work against her to some extent. If we allow her to have her own way we will succumb. but if by intelligent methods we do what science points out as the thing necessary to produce the best results in fruit. then we will be liberally rewarded.

MR. CUTTER. Mr. Dargitz asked the question of Mr. Geraldson, Would it do on level ground? I think Mr. Geraldson's land subirrigates. He runs his ditches diagonally across the orchard and all the trees get some irrigation across the rows. where it is possible they would not on flat ground.

MR. SPRAGUE. Water is a necessity to your plan. is it?

MR. GERALDSON. No. no—water from some source—rain water. You have got to keep humus in by irrigation if there is no rain water. I can see no difference whether it is dry cultivation or irrigated cultivation. You must have moisture to retain the humus in the soil.

MR. SPRAGUE. We all will grant that humus may be had, but I think many of us will take issue with the statement that humus can be had on such land as Mr. Dargitz refers to without water. Your middles not cultivated would soon dry out so that you would not get the amount of humus gathered during the summer that you would under the circumstances which you mention, and consequently that would not be as good a means as some other.

MR. GERALDSON. There are more ways of getting wrong conceptions of this plan than there are of pronouncing some words. The grass we get our humus out of grows through the winter and spring and is dry in the latter part of the summer. It is last winter and spring's grass. It grows up to maturity. You can not plow it under in the usual time in the spring, because then it has not matured, has not gone to seed and does not make one-tenth as much humus as after it has matured; and the only way to get the matured grass and leaves and twigs is to let it stay through the summer and plow under next year. It reseeds itself that way. The seed is of value first, to propagate itself, and second, for the chemical properties it contains. That system applies absolutely just the same, whether you irrigate or whether you do not irrigate.

MR. SPRAGUE. I am sure I speak for all when I say that Mr. Geraldson has performed an exceedingly interesting experiment, has made a very valuable demonstration for a hill country with water, but I show no disrespect to Mr. Geraldson when I say that in the problem presented by Mr. Dargitz, Mr. Geraldson's opinion is worth no more than yours or mine, because he has made no experiments there and he can only guess what the result would be. For myself, I feel very sure indeed that the crop you would get from an orchard treated in that way every year, plowing each alternate land in the summer, would be a very poor crop indeed, and that your orchard would run down instead of going up, being just the reverse of the results which Mr. Geraldson gets in his experiments.

MR. GERALDSON. This soil where Mr. Dargitz is, doesn't that grow native grasses of some kind during the year?

MR. DARGITZ. Yes. We plow that under every spring. I want to take issue with Mr. Geraldson just at this point. While it is all right if you plow that growth of grasses under, making thereby a green manure, we hold the moisture; our soil is from five to twelve feet deep; we hold the moisture and get crops, but if we let that grass grow and mature it is too dry to plow and it takes the moisture out of the ground and our trees would all be wilted. In orchards getting to be eighteen or twenty years old, we find it necessary to irrigate. Irrigation is rather expensive with us; we have to pump our water. It does not rise closer than thirty feet, and to pump water to irrigate a crop of weeds does not appeal to us very much. But I believe we have got a plan developed there by which we can afford to irrigate and still accomplish all that has been stated in the different lines; that is, to put alfalfa in our orchards among our trees. I do not believe that the alfalfa injures the trees or the crops, provided we put water enough on to give us the hay crops. If we let it dry out then it suffers, but by watering the alfalfa sufficiently to get our crops of hay we keep the trees green and growing, and I am satisfied that the alfalfa gathers fertilizers from the atmosphere and carries them into the ground. My attention was called to this from getting reports of the Washington State Convention some two years ago. A gentleman spoke about having an apple orchard; said that he planted an orchard of six acres, I think in the Yakima Valley. It was sagebrush, sandy land, and he said for four years he did not do much but go around with a hoe and shovel and scrape the sand back around his trees that the wind had blown out. Finally he said he was going to sow clover in there to stop the sand drifting, and when the clover got to growing he was horrified to find that half of it was alfalfa. His neighbors said, "Cut it out; it will ruin your orchard," but he said he was going to try it, and it grew there for seven years—it is nine years now—and he says that he took no hay off; he irrigates sufficiently to keep it growing, and each year he went through and mowed the grass and let it lay right on the ground; and from that six acres in 1906 he marketed 4,300 boxes of fancy export apples, and he said as long as it did as well as that he would let the alfalfa grow. I am inclined to think that a large part of our orchard will be seeded to alfalfa in the future; that we will plant it and cut it once a year and let it lie on the ground.

PRESIDENT JEFFREY. I would like to ask Mr. Geraldson if he has taken into consideration in his plan the physiological principle that a perfectly healthy working orchard must have every section of its root system acting and operating uniformly to produce the best results, and if the plowing of one half the root system one year, leaving the other half go without plowing, will not interfere with the perfect action of the entre root system of that tree?

MR. GERALDSON. After thirty years of diligent cultivation of our hillsides up there we worked out all the humus. We prevented nature putting any more back in except the little bit she put in from green grass, ten per cent of what she put in by dry grass. We got the ground like Portland cement. That is simply rock ground up very fine. You put a little water on it and it bakes. Things were going from bad to worse, and we had to do something. We simply considered the objection of Mr. Jeffrey and decided that we would choose between the two horns of the dilemma; we were between the devil and the deep sea, and we took the deep sea and trusted that by giving a little more water to the trees they would get through. It was rather a severe strain on them, but they got along better than I expected they would do. We increased our water perhaps twenty per cent, not more than that. That year, on account of the ground being in such bad condition, there was only a little grass, but the next year when we plowed that ground it looked different. There is some effect produced on soil from standing still a year. I don't know what that is and no professor in California can tell you. The very best authorities on green manuring are only beginners, as you will see in ten or fifteen years. I am, too. You turn soil over and it looks like new soil. You let it stay a year and then turn it over and it looks a little more like new soil. After six or seven years it looks almost identically like new soil, and it produces in every way identically like new soil. In ten years I think you will have it back to the ideal condition it was in the beginning. Mr. Dargitz says that after eighteen or twenty years of dry cultivation they were forced to irrigate. Wasn't that what I told you awhile ago? That is only a temporary expedient, and after another eighteen or twenty years irrigation won't do it; then you will have to abandon it. That is why it is abandoned back East, why they are growing hay and grain on rich fertile land in California and turning sheep on it; sheep which should be confined to twenty acres they turn on two or three acres, and call that resting the land! What Mr. Dargitz said about planting alfalfa is only a variation of the system. Alfalfa plants nitrogen in the ground and is valuable. I think every native grass has its mission and its place. If a ground needs a certain chemical a certain grass will grow on the ground. I can not prove it, but I believe it. If the ground needs some other chemical you will find another grass. I believe there are chemical reactions in the soil that that soil needs and that nature goes on interminably putting things in.

A MEMBER. The canners up our way have a peculiar standard. When we send down our fruit maybe they accept it and maybe they don't. I would like to ask Mr. Geraldson if he has any of this byplay with the canners and if they take it or send it back.

MR. GERALDSON. Of course, the bulk of our fruit goes over the mountains East. Seven years ago, with plenty of water and liberal doses of fertilizers and stable manure, we had trouble in making our fruit clean or reaching any size. This past year, after abandoning fertilizers, we had the heaviest crop in our orchard, and the canners took their share of it without any question; and the dealers in Newcastle will say that our fruit stood as well as any near Newcastle.

A MEMBER. I think the gentleman has an advantage in being on the hillside, but how about adobe land?

MR. GERALDSON. Adobe is like Johnson grass; it is rather a difficult problem, and I don't envy a man the working out of that problem; but adobe is largely humus now, and it is so rich that you don't have to bother much about it. It is fertility condensed, almost, but I do believe that if you keep on cultivating it it becomes more and more stiff, more and more clayey, and that if you can get it aërated and light it will be better. Our soil will bake and crack like brick, but after three or four years of grass being plowed into it it got better.

MR SPRAGUE. Mr. Chairman, I want to call attention to one thing in criticism of certain things Mr. Geraldson has said. I think we did not exaggerate the other day the importance of soil humus. Professor Shaw confessed that nobody knew what humus was, but it was a peculiar compound manufactured by nature somehow in the soil, and that it was of inestimable value. Mr. Geraldson has certainly given the impression that unless you get your green stuff dry and allow it to remain one season dry you do not get very much benefit from the humus in it. In that I think he is wrong. I think he is exceedingly right in the manner of cultivation which he has adopted in such situation as he is in, but we must not go wrong on main principles. There is nothing better established in the agricultural world than that rotation of crops will maintain the fertility of the soil. That would be impossible were it not that you obtain very large benefits from the plowing under of the material at the surface of the ground and the roots, of course. I recognize that there is undoubtedly something in Mr. Geraldson's claim that the chemistry of nature is facilitated by allowing this vegetation to remain undisturbed for a season at the surface of the ground, because we all of us know that that peculiar mold in which the humus very considerably consists is promoted by that sort of treatment, and hence it is fortunate for us that we have conditions such that we can use the method which Mr. Geraldson proposes, but in the absence of that I think no one would hesitate to use the method suggested by Mr. Dargitz, that is, put alfalfa in every other middle, plowing alternately, and in that way secure an increase of humus that will give you the fertility of the soil and the other values without running the great risks you would run in using the system as Mr. Geraldson uses it at Newcastle. It is very clear that your orchard must have sufficient water to enable it to perform the fruit function. Then the next thing is to protect the surface of the ground as much as you possibly can, for the protection of the humus during the hot summer months. It is a well established fact that the burning heat of the sun actually burns out the humus in the first three or four inches of the soil, and that is a very serious situation. and the more your soil packs and bakes the worse that result is. If you have humus enough to enable you to keep your soil mellow and friable you do not lose humus so fast; but once let it burn down, and you lose as much in two weeks as you would in two years, perhaps, under a more favorable treatment of the soil.

MR. GERALDSON. I have been plowing under green grass all my life, and I am nearly 40 years old, and the soil kept going down hill. Whenever we get in a quandary we turn to nature in one way or another. Sometimes we go down on our knees and do all sorts of things, but we go to nature anyhow. We have tried this out. We have gone right to the brink of destruction and we turned back to nature, and we found that nature never made humus out of green grass. Now, that is all there is to it.

MR. CHASE. Mr. Chairman, I have got a new idea. In explaining the method of destroying Johnson grass, a gentleman said, "This is what I would do to introduce humus into sandy desert soil. I would plant it with Johnson grass and cultivate it two years, and then I would turn my sheep on and let them eat it up, and then I would have my sand pile full of humus."

At this point several members of the Convention expressed their desire to resume the discussion on grapes.

PRESIDENT JEFFREY. We left off without having concluded the grape discussion. The marketing of your fruit is the coming question for the deciduous fruit districts of California. It is no use to produce the fruit unless you can market it, and I predict that unless your marketing agencies are remodeled and improved it won't be more than a year or two until that will be the great cry of the State. Now, you are here to try to throw out some ideas that will lead to a deeper investigation of the difficulties such as the grape men have met this year, such as the Bartlett pear men have met this year, and all other men that are in the deciduous fruit districts of the State, excepting where you have special advantages in some way. Bartlett pears have gone to rot in this valley—the grandest fruit in the world. It seems almost a crime that Bartlett pears should rot and be fed to the hogs, and we have got to find a way to put this fruit where it belongs. I made a statement to the Commission the other day that a whole train load of fruit-growers went to Kansas City the other day to discuss one single problem, the distribution of fruit. They said: "If you spread out the fruit, if New York wants 25 carloads of oranges to-day and you only give them 20 you are going to have a better price for oranges than if you give them 25.'' That is the keynote of one great marketing organization. If you will get that to be the keynote of your marketing organizations in this valley and the San Joaquin Valley, I think the overproduction of Tokay grapes and other fruits may be set away off in the future; if you do not do it I believe it is right before you know. Now we will continue the discussion in the line of Judge Norton's paper.

MR. CHASE. Judge Norton said there were three conditions which affected the marketing of all grapes—quality, quality, quality. If you turn a flock of sheep into your vineyard the quantity and quality will both deteriorate. If your sheep get into your neighbor's orchard you will have to pay the damages. Now, for the past three months I have found a flock of sheep in almost every vineyard, in the shape of noxious weeds. They are eating the humus out of the soil; they are destroying the quality and quantity of your grapes. My idea is to increase the quantity of humus in the soil and have every man to take care of his own sheep and corral them where they can not feed and destroy his crops. Here is a man who gets the highest price, the largest quantity, superior quality, and he has the cleanest vineyard I have ever seen; he does not even keep a cosset lamb there. The remedy is this. All of our noxious weeds can be reduced 90 per cent of their present injury if our Legislature will appropriate one half as much fund to the State Horticultural Commission as it does to horse racing, and this Commission will do the work, and you will have the best grapes to market. (Applause.)

MR. DARGITZ. Mr. Chairman, I think the question of economics in connection with commercial fruit-growing enters largely into the problem at this time. If we eliminate the commercial feature, money making, from our deciduous fruit-growing in California, the project is doomed. It resolves itself, then, into a question after all, how can we produce fruit so as to make the most money out of it? I am in very hearty accord with the paper Judge Norton presented. I am in very hearty accord with what Mr. Stephens said. I am heartily in accord with pretty nearly everything that has been said, but I believe we want to go a little bit further. No matter what system of marketing we have, if we have not got quality we need not expect to make any money. It is equally true that we have got to have a certain quantity before we can make very much money. The only opportunity to make money commercially out of our fruits going East is to grow them in such way that we can load our cars. By grouping together, small growers can do this. When I came here and took up the fruit business a few years ago it appealed to me wonderfully to think that a man who was growing a dozen or fifteen acres of grapes could put them in a car and have them go East and be sold without any bother on his part and get the benefit of railroad rates and transportation. Now that is coöperation. Coöperation has brought it about and made it possible, and without coöperation the man with a small amount of fruit might just as well go out of business, as far as money-making is concerned. After you get a certain quantity then we reach another stage, where an increased quantity beyond that presents another problem. Too much is just about as bad as not enough. And here arises another question. From what

I can gather from the records of the matter in this State, a few years ago the fruit-growers were getting red ink and getting it pretty liberally, and they were very much discouraged; then the idea of coöperation to change this condition came up in a fruit-growers' convention. If I am correctly informed, in the convention of 1900 a committee was appointed to take this in hand, and Theodore Kearney was the first chairman of that committee, and the work of that committee resulted in the organization of the California Fruit Exchange in May, 1901. The California Fruit Exchange, through some vicissitudes, did a great deal of experimental work along this line. It was found necessary to change it from a strictly coöperative to a stock basis, still retaining coöperative features, and while reference has been made to the fact that that organization had died, it was reorganized for the purpose of bettering it, putting it on a safer basis, a sounder basis, a money-making basis, and that is what we are all in the business for. You may find some of the professors in the Berkeley institute or at the Davis farm who are in it because of the love of the professional part of it, but we fruit-growers as a mass are in it for the money that is in it, and if there is no money in it we might just as well get out of it. The matter of coöperation in the handling of this fruit is of tremendous importance. Admitting all that has been said about quality and cultivation and preparing our soils, now comes the marketing. I said the other evening that we were lobsters, because we were going at the marketing of our fruit products backwards, and that is the way a lobster travels. Instead of allowing the fruit-buyers to fix the price on fruit, it should remain in the hands of the fruit-grower to say what his product should bring. The orange-growers are organized in the southern part of the State so they do that very thing. They fix the price at which they will sell their oranges, and if the people in New York or Chicago or Boston or Baltimore do not want to pay that price they will make the shipment there a little bit smaller until they do pay it. I have been surprised to see in the past six weeks reference and comment in several publications in the State to the effect that the deciduous fruit interests in northern California must get together on somewhat the same plan the citrus interests in the southern part of the State are, and I have been somewhat amused because the people did not seem to understand that there was that very kind of an organization already in existence. That organization is the outcome of a committee appointed in one of these conventions to start that very thing at work.

In regard to the developing of new markets. There are wonderful possibilities before us in that way. Last summer there was a retail dealer from the Dakotas in our packing shed and we were bringing the dried prunes in. He looked at them and said, "What do you get for such prunes?" I said, "This year we are getting 4 cents a pound." He said, "We have to pay the wholesalers in Dakota 10 cents a pound for prunes very far inferior to that." Now, look at it. We have to grow the prune and cure the prune and finally get 4 cents for it. The man who buys it at an expense of $\frac{5}{8}$ of a cent a pound pays one cent a pound to ship it back there and then he gets 10 cents or more. Somewhere there is a great leak between the producer and the consumer. It is consuming three fourths of the profit of the business and it ought not to be. I believe it is possible for deciduous growers of grapes, of prunes, of peaches, of pears, and even of dried fruits, to get together in small associations where, in the matter of green fruit, you can together conveniently load cars. Or, in the matter of dried fruits, you can load cars, make up carload lots. Let the association have its own brand and pack its fruit under that brand, and if there is no general marketing agency to help you out, enough get together that you can afford to put a commercial salesman on the road in those states where they consume dried fruit and sell to the retail dealers, and you can double your clear money in all dried fruits. In the matter of the green fruits you may have to handle it a little differently, because you have to handle it quickly. If associations can be gathered together for the purpose of loading cars of green fruit and then turn them over to some central organization for the marketing of the same, that is well and good. You will all agree with me that if you could have the distribution, the placing of all deciduous fruit from this State, under the control of one single organization or head, you could avoid the glutting of any single market at one time. Some one will say, "There are two or three such organizations in the field now." Two or three won't answer; it must be one, and that one, no matter what its name may be, no matter what the detail of organization may be, must be under the absolute control of the bona fide fruit-grower. He is the man, after all, that must set the prices and control the whole matter eventually. It won't do for commercial packers and shippers to get in and control that matter; it must be the bona fide grower. He can work through employees, but it must be so that eventually when any question arises it comes back to the bona fide fruit-grower for settlement.

Let me illustrate why this is necessary. Early last summer we started out shipping fruit East. We began by getting very good prices. We were selling at something like a dollar a crate, f. o. b. California. All at once, without any warning whatever, within twenty-four hours, shippers in California began to quote in these same markets fruit at half that price, which meant a loss to the grower. Everything was panicky all at once, and the grower was placed in the position where he had to foot the bills. Now, you might suggest that the men who are responsible for the cutting of that price were not the men who were buying in the East at all, but were gambling on some one else's fruit. They had some purpose to accomplish, and the fruit-grower had to stand the loss. I do not want the fruit handled in such a way that somebody can take my fruit and cut out somebody's prunes that he does not like. I want it handled so that if the man who handles it does not handle it right he has got to answer to me for it. It sifts back to where the grower must have the final word in the matter.

Now, just one word of experience. The little colony which I represent have some large prunes to ship. Previous to three years ago about 18 or 19 cents on the tree was the greatest price that could be had for this fruit. I took hold of the matter and began to pack myself, took my own brand, and the prices began to increase, and in three years we pushed that price up until it netted us 55 cents a crate on the tree instead of 19; and whereas the people before did not want to buy the fruit and said there was not much demand for it, it got to the point where they would send their representatives a mile out of town, watching for our teams, trying to buy it from us. Oh, no. I placed my fruit to be handled by the men who were in my employ as a grower—coöperation. It is the way to do it—it is the only way to do it.

MR. STEPHENS. I would like to ask the gentleman what colony he represents?

MR. DARGITZ. It is the Christian Colony, near Acampo.

MR. STEPHENS. I would like to ask if you have sold your prunes this year?

MR. DARGITZ. Yes, sir.

MR. STEPHENS. Have any trouble in delivery?

MR. DARGITZ. No trouble at all.

MR. STEPHENS. If it is a fair question, how much did you get?

MR. DARGITZ. I sold very early. I sold on a 2½ basis this year. I could have had 3½ if I had waited later.

MR. WALKER. Mr. Chairman, the matter of marketing table grapes, I believe, is the matter under discussion, and as it covers such a very broad field and yet only a portion of the field which this Convention represents, I believe some of the study that we have been forced to undertake as a growers' organization might be helpful, as far as the marketing of the grapes is concerned. We have had, you might say, two branches to the marketing of the fruit; first, the gathering of the fruit, and secondly, the distribution of it. Judge Norton raised the question this morning as regards getting uniform packs, and I might say that we solved that, to a very large extent, in Fresno, in marketing our Malaga grapes, the Emperors and some Muscats, by establishing small loading stations for packing houses, costing $400 to $600—some, $300—merely shelters so the employees could be protected from the sun, and the grapes are brought there in lug baskets and there they are packed. Since that time we have had very little trouble with decay. Certain brands have become quite famous, and the buyers insist upon certain brands. Another thing that we have tried to develop among our growers is the use of two brands. In the citrus industry there are two grades. The citrus-grower tries to market all his fruit under one name, with the result that if he gets a lot of bad fruit and does not clear it that will give him a black eye in the market, whereas if he had two brands and kept the first one absolutely up to standard we would not have the trouble in the f. o. b. markets.

As to Tokay grapes, I really believe the market is practically unexplored beyond the large markets. We distributed our fruit this year into 81 markets, the grapes into some 19 different districts and they were split up into smaller amounts, all the way from Corpus Christi to British Columbia and Toronto. The market is very large, but the great trouble we had this year was the matter of decay, and especially from the Lodi district, where a good deal of the discussion seems to have developed to-day. We had the same difficulty last year, and I would like to illustrate how the decay in your grapes is interfering to a large extent with the distribution of the grapes. We sold a car in a small city in Iowa and the buyer received the car and accepted it, and after he got into the car found a good deal of decay. By the time he got through he lost $200 or $300. The result was we could not sell him any more Tokays this fall. He did buy Malagas and Emperors. I won't say that it was necessarily poorly put up, but I will say there is a very large problem there that will have to be solved, and I am very glad the Federal Government is undertaking that question.

Another point that interferes with their distribution is the matter of assorting crates. As you know, a small city can scarcely handle a straight carload of grapes, whereas if we could have some other varieties coming along about that time so we could put in 700 crates of Tokays and fill the balance up with other varieties they could be handled. We overcame that to some extent with the Tokays from Lodi by having different varieties of grapes put in, although I must confess that the greatest acreage in Lodi is running to Tokays, and some day I think that is going to make trouble, because the orders come in from small cities that they want so many Tokays and so many of other varieties.

In connection with the glut at auction markets. It was said that a schedule would completely correct that. A schedule will assist very materially, but when you understand there is no sale in an auction market on Saturday, and should a car arrive in any auction market on Friday it has to remain there all day Friday, Saturday and Sunday and is not sold until Monday, you have three days' arrivals on Monday. That is one of the great objections to the auction system.

In regard to the improved service by the railroad companies, I must confess that the improvement this year has been most wonderful, as far as we are concerned. The railroads were willing to listen to us, and when we had any kicks coming they would send some one there instead of our having to hunt all over town to get some one to listen to our story.

We are closely allied with the Fruit-Growers' Association of Southern California by contract. We are endeavoring to follow these, not only as industrial organizations, but as owners, feeling that each one of us was interested in his own product.

As to railroad claims, especially on Lodi cars. Last year the refrigeration was not always good. A number of times we had to ship the cars out dry. We were able to collect a great many claims as the result of that, and we in turn distributed that among the shippers. We collected some $3,000 or $4,000 in 1907, and we were able to collect nearly $12,000 this year.

There is another point in connection with the distribution since 1901. In 1901 about 51 per cent of the total shipments were distributed into three markets, namely, New York, Boston and Chicago; the next year 49 per cent; the next 49 per cent; the next 49 per cent; the next 48 per cent; the next 52 per cent. I do not call that very good distribution, with an increasing crop, and that is a feature that we as growers will have to get down and study, and if the type of organization that the Exchange has is not the proper kind, let us have a committee get busy and find out what is proper, because it is really a serious question and one that in three or four years, as far as the grape industry is concerned, will be overwhelming if we do not anticipate it.

The matter of freight rates. It was said that we possibly had been asleep up north there. I might say that that has been an ever-present topic with us. We received on the same day as the orange people the same reduction in fruit rates that they did. Their reduction was from $1.25 to $1.15 and ours from $1.25 to $1.15 as far east as Chicago, but on deciduous fruit the rates have always increased from Chicago eastward and there was not the same proportion of reduction east of Chicago, so when the committee goes to visit the railroads in San Francisco it would be well to state the matter east of Chicago and endeavor to get a blanket rate, because if we had a blanket rate we would cut out a good deal of trouble in the Michigan markets and Ohio markets and develop a much larger market.

PRESIDENT JEFFREY. If you can ship to Portland, Maine, as cheap as to Kansas City, would not the postage stamp rate be a greater advantage to the deciduous fruit men than to the citrus fruit men?

MR. WALKER. Yes, sir. That would help us very materially, but we have not got it.

MR. SPRAGUE. I just wish to make a correction in the interest of history. Mr. Dargitz was not quite correctly informed with regard to the history of the California Fruit Exchange. The organization known by that name first was the one of which E. F. Adams spoke yesterday and which never did any business. When the California Exchange, which is now known, as Mr. Dargitz says, as the stock company, but formerly purely coöperative, was organized, we were allowed by the Secretary of State to take the name which had formerly been taken by Mr. Adams' organization. The California Fruit Exchange of which Mr. Walker is the able manager now never went out of business and never lost any ground.

PRESIDENT JEFFREY. I will at this time appoint as the committee to interview the railroads, R. D. Stephens, chairman; C. M. Hartley and W. M. Angier.

In 1902 all of the commission men, orange brokers, orange speculators and orange buyers were as anxious to all get together in the one body as any set of men you ever saw. They formed an organization which included 100 per cent of the orange growers of California and did business that year under the name of the Fruit Agency. I want to ask Mr. Stephens if it is not just as necessary for the fruit shippers, the well established fruit firms of California, to have some organization?

MR. STEPHENS. They have it.

PRESIDENT JEFFREY. A coöperative organization?

MR. STEPHENS. Yes, sir.

PRESIDENT JEFFREY. The shippers?

MR. STEPHENS. Yes, sir.

PRESIDENT JEFFREY. Coöperative for themselves?

MR. STEPHENS. Yes, sir. Now, Mr. Walker, I want to put you on the stand as a witness. I would like to have an explanation from you why such large quantities were put in auction markets this season, particularly in New York, Chicago, and Boston.

MR. WALKER. Through lack of proper organization.

MR. STEPHENS. But the responsibility must rest somewhere. Does it rest with you or somewhere else? I am speaking of deciduous fruits, grapes particularly.

MR. WALKER. Certain varieties can be marketed in New York or any market east of Chicago and certain varieties can not be successfully marketed east of there. For instance, cherries can be marketed in almost any section of the United States; apricots can be marketed in almost any. When it comes to peaches, it is almost unsafe to go east of Chicago. Having that in view, we only put 43 boxes in New York, but we did put a very large percentage in Omaha—

MR. STEPHENS. I am not speaking about your organization.

MR. WALKER. Why the others put fruit in New York I don't know. There was no market there for early fruit.

MR. STEPHENS. Was there any good reason why it should be done?

MR. WALKER. Well, one can't fathom another man's mind.

MR. STEPHENS. What I am trying to get at is, there has been a great deal said about coöperation. I think it is the only solution of the difficulty, a grower receiving a fair proportion of his profits. I do not wish to assume to be knocking anybody. I have been accused of that for a long time. I made a pretty strenuous fight on the car line, and I think that was one of the most important fights, because it was utterly impossible for anybody outside of the owners of the car line to do anything except by and with the consent of the car line. Mr. Armour was absolutely master of the situation. It seems to me the great obstacle in the way of forming great coöperative communities and then having a central one has been removed. It seems to me utterly impossible for you, Mr. Walker, or myself or anybody else to completely divorce this from selfish interests. I can not understand how a commission man can accept consignments and at the same time be an f. o. b. buyer and do justice to the consignors. It seems to me that if I buy 500 boxes of fruit and I receive 500 boxes of fruit on commission, if there is anybody to suffer it will be the ones from whom I receive on commission.

MR. WALKER. That point has been one of our most vital issues. We do not buy at all.

MR. STEPHENS. Inasmuch as the way has been paved for coöperative organizations, so the individual grower can combine with his neighbors; I think there is an opportunity of building up such organizations that will greatly advance and promote the interests of the fruit-growers of the State, particularly the deciduous fruit-growers. We will go back to a little ancient history. Mr. Earl, when he first started in in the f. o. b. business, would go to Mr. Walker and buy 25 crates of plums. After those plums had been marketed and returns came back he would send to Mr. Walker a statement showing expense of marketing and freight and loading and extra icing charges, and you could see that Mr. Earl was losing 25 or 30 per cent on every box he bought, and still Mr. Earl kept buying and retired a millionaire. Take the Porter Brothers and those connected with them, and they are millionaires also, while the fruit-growers, most of them, I fear, are mortgaged. Now, if you will form those coöperative organizations, not as a menace to the commission men, but to act in harmony with them and to hold them, in a sense, kind of level, they will have to recognize your power and you will get a great deal better treatment from them. I wanted to find out from you, Mr. Walker, why those auction markets were so glutted this year. Here are 150 or 160 markets, cities and towns, that will consume carloads. I ask you again if you have got any solution of the question, if you can answer why there were 40 or 50 cars a day sold in New York and 28 or 30 in Chicago and 15 in Boston and considerable in Philadelphia and Pittsburg, why there was not better distribution.

MR. WALKER. Ask the organization that had the majority of the fruit to handle. Mr. Stephens said there was an organization in northern California based upon the same plan as the California Fruit Agency. This organization was organized in 1903. The theory is splendid, but the practice is not worked out quite as well. I am not saying this with any idea of criticism. Instead of selecting one agent of each market they have three or four, and that is the fault of the system. The individual firms deal with their broker and work upon his information, and your experience must have told you that the average broker makes his market look pretty good. If there was one agent for each market and the distribution was from one office, the glutting would not have been so marked. The solution of the problem is to have an organization in the saddle to distribute the fruit. This was a very peculiar year. It was a bad financial year, there was an immensely large crop in the East, there were many adverse conditions; but I have always been a profound believer in the private sale market as against the auction system, because we can increase the distribution of our fruits.

MR. STEPHENS. The auction market is the only protection the grower has. Up to their establishment the grower was wholly at the mercy of the commission man. I realize that in a small place you can not do that, because combinations would be very easy to prevent a satisfactory price. The point I was trying to make through you is this, that the f. o. b. buyer does not sell his fruit, even in an auction market, unless he has a bidder to buy it in.

MR. WALKER. In Illinois it is against the law to buy at auction.

MR. STEPHENS. There are a great many things against the law, and it is very hard to establish that those things are violations of the law.

MR. WALKER. The competition there alone between the buyers would keep the market about where it belongs.

MR. STEPHENS. The purchases f. o. b. here do not go to the auction market.

MR. WALKER. They put most of their purchases on at private market.

MR. STEPHENS. If they can not find private purchasers then they put them in the auction market, don't they?

MR. WALKER. I suppose that would be the natural consequence.

MR. STEPHENS. Then the result is that the prices go down and your frame of mind is altogether different from what it is when I first offered you an amount. You are ready to sell for any price. Now, what we want is an organization formed along the lines similar to your organization, to distribute the fruit, to put it into these outside markets, markets that are not known to California growers. You send to Chicago as a distributing point, which it is, but it is much better to ship a car direct to Galesburg, saving the local freight, than it is to ship it to Chicago, take it out of the car and send 25 or 50 packages back to Galesburg, because of the local expressage, with the longer time added. There are a thousand towns in the United States that might be reached in that way through an organization such as has been suggested here. The only question is, can you organize the growers.

MR. WALKER. I think I am safe in saying that we are working in the right direction, and we are getting the points organized as fast as it is safe. We have grown this year about a hundred per cent. We are gradually organizing the growers in different localities, and I think in time, after the growers in northern California grasp the situation as have the growers in southern California, you will have such an organization. We have been working for about six years, and we are now beginning to reap the reward. One of the oldest organizations in the State is the one down here at Florin. There is an association at Newcastle and at Loomis and Penryn, at Winters, on the Sacramento River, and in Fresno, and these local associations are purely coöperative. At other points you put out agents so as to educate the growers in those localities to organize. I think in time we will get it, but it will be slow progress.

MR. STEPHENS. One great difficulty to overcome is that so many growers are impecunious and they have to borrow money. There has been no such thing as a fruit-grower going to a bank and borrowing money. The security was not regarded as good. The only relief would be from some of the large shipping organizations, of course, on the condition that the grower had to ship to the organization. I think, however, I must admit that those conditions have materially changed since the elimination of the private car line, and there seems to be a disposition on the part of the shipper to treat the grower better than in the past. Take Placer County. There was a penalty attached to any f. o. b. buyer who would exceed a certain price. Now I think that is done away with. Instead of making enemies I want to make friends of all interests. I am not here to criticise; I am here to draw out facts to show what may be accomplished if proper action is taken by the fruit-growers themselves.

MR. MILLER. Mr. Stephens, I was at the other end of the fruit line six years ago, and I knew a little more of the market in that way. Speaking of Galesburg, Burlington, Springfield and Rockford, if they put in fruit at that time they would have to have an agent at each place. It would be risky at that sized market to put in a car without having it personally conducted. I know, with the coöperative proposition with the New York growers of Concord grapes, they used to ship them in seven and eight pound handle baskets. Before the growers organized we bought them for from 7 to 9 cents a basket, which meant a loss to them. After they organized we bought nothing less than 14 cents a basket. Another thing Judge Norton spoke of this morning, the Almeria grapes from Spain. They were packed in kegs of 40 to 46 pounds. I don't remember ever buying them at less than $4.50 a barrel and as high as $9 a barrel. They were kept until the first of April. They are no better grapes, and if we could get them out of the way and then improve the pack and the keeping, it would make a great difference in the California grapes.

PRESIDENT JEFFREY. The California Fruit Growers' Exchange, which is the citrus exchange, has no more fear of the box trust of California than they have of their home groceryman. You have been up against that box trust or will be. That concern is not a trust with them; it is on an equality. Instead of trying to put its price on, it says "What can you afford to pay this year? Can you stand a raise of six cents?" The directors say: "We had better get up a box factory of our own." So they levy a tax of 5 cents a box and sent their agent up to Siskiyou and Oregon to get options on mill sites and timber, and when he came back to Los Angeles the box trust was there ready to ask them if they would give one cent more for the next five years. So the orange growers met and said: "That is about as good as we could do with our own box factories." So they make a contract for another five years at 15 cents a box. Mr. Stephens has come nearer to me on this matter than he ever has since I have been in the State. I think it will be found just as necessary to have coöperation here as it is in the south; 20 or 25 per cent of the fruit in southern California is handled by speculators and buyers and commission men. They would rather see anything in the world happen than see the California Fruit Growers' Exchange disband. They would have the nightmare. Why? Because those speculators and commission men find it easier and more profitable for them to handle 20 per cent of the oranges now than a larger per cent under the old conditions. Overproduction will not stare you in the face if you organize. You will protect your own men. There are men here who have bought your fruit for many years; they must be protected.

MR. DARGITZ. Mr. Stephens suggested the situation was sometimes critical because the grower needed to borrow money. I borrowed the money out of a bank, about 25 per cent, on the stock that I took in this California Fruit Exchange. The Exchange carried me on the other 75 per cent until the crop paid me out, and now the bank I first borrowed from says my stock in the California Fruit Exchange is gilt edge collateral for its full face value at any time I want to borrow.

JUDGE NORTON. I have refrained from saying anything up to the present time because in the first place I had my say in the paper that provoked the discussion, and then I desired to hear from the different gentlemen in order that I might be informed as to their ideas. I confess that I am very much pleased and have been very much interested in the discussion that has taken place here. I have been surprised at one thing, and that is the practical unanimity among us all as to what the necessities are. The only difference I can see is the means by which we can accomplish the thing we want. The only difference I can detect is a little difference in the detail of how we will go about to coöperate. Perhaps the most feasible way to coöperate would be through the shippers; that they organize in such a way that they can act for us. I say that because they are fewer in number. There are only 10 or 12 parties that buy grapes that would be interested in marketing these grapes, while the growers number thousands. I realize that there are very serious difficulties in organizing the growers at all. We are going to have trouble and it is going to take a long time. That is only my suggestion; I am not wedded to anything. If we can form little groups and then unite the groups into one large organization, I say that is all right. I do not take kindly to the proposition that the fruit distributors and the growers are going to fight each other. I think that we are all united to accomplish the same thing. Now just look at it. It has been said that these men are in it for what there is in it for them. And so we all are. The more the grapes sell for in the East the more the man that handles them for you gets out of it. So far as I know, all these houses do business on commission. The more they get the more they have. Whether we begin at the bottom and organize the growers into groups and then organize a large central organization, or whether we can get the shippers to form the organization, it does not make any difference. Possibly the shippers, only being 10 or 12 in number, might agree that they would make no grape shipments to the East except those which they saw packed. If we could get enough growers to agree to that plan that could be done and no grapes would go out except in that way. I know that these companies are very jealous of each other. One company will tell you the other company is not responsible and they wont keep their agreement.

Now, there is one thing suggested by the gentleman from Florin. He objects seriously to any arrangement by which he would have to haul his grapes to some central place to have them packed, and I can see that that would be very objectionable to him because he has always done his own work. He has saved labor, and I have no doubt he gets a better pack than people who have more grapes to put up. But here is an answer to that. Undoubtedly, doing the work himself, having a fine quality of grapes, he puts up a pack of grapes which he would not be afraid to put in the auction market. He does not need to come in and it does not make any difference.

PRESIDENT JEFFREY. Suppose he puts up the very pack that you describe and goes into New York with 24 other cars of exactly the same quality and New York that day only wants 20 cars, what will he get for his fruit?

JUDGE NORTON. He won't get so good a price as he ought.

MR. FRENCH. I wish to speak, not as an individual grower and shipper, but as representing quite a class; that there are very many in my position and consequently it was not an individual thing. I represent a large number in Florin.

JUDGE NORTON. I was simply speaking of you as a type. It does seem to me that we might get 75 or 80 or 90 per cent who would agree to some plan.

A MEMBER. May I answer one portion of Judge Norton's remarks? He spoke of the fact that we are all in the business for the profit that is in it, and he seems to indicate that the California Fruit Exchange is in the business in the same way that the Earl Fruit Company is. Perhaps he is ignorant of the fact that the California Fruit Exchange divided among its growers last year 24 per cent of its earnings. The California Fruit Growers' Exchange is a growers' organization, and any earnings over and above the actual running expenses are divided out among the growers again. There is your ideal proposition. We accumulate the fruit at the shipping points. They handle that business locally by a small group of shippers getting together and shipping fruit. Then they are turned over to the central exchange here. If the exchange controlled 50 per cent of the fruit the distribution would be better than it is now.

JUDGE NORTON. That arrangement would suit me if we could get 90 per cent into it. I don't want the gentleman to understand that I made any reflection upon the Exchange or any organization. I think the interests of the shippers and growers are identical. I can't see that there would be any object for any of them to want to beat down the price of fruit.

MR. STEPHENS. You say it is to the interest of the commission men to get large prices instead of low prices. That may be the condition existing now, but it was not the condition before the elimination of the private car lines.

JUDGE NORTON. If the motion will be entertained, I desire to say that I have in my hands an invitation from the Chamber of Commerce of the city of Lodi, inviting the next Fruit-Growers' Convention to be held there.

I take pleasure in moving that such place be selected as the next assembly place.

The motion was duly seconded.

MR. STEPHENS. I wish to say this, that while it is a proper thing and I have no objections to Lodi, yet it is a matter that rests entirely with the Horticultural Commissioner. It would not be improper to have an expression in favor of Lodi, but it should be understood that the authority and power rests with the Commissioner to put it where he desires.

JUDGE NORTON. I understood that was the case.

PRESIDENT JEFFREY. Six months ago Watsonville came to Riverside with the request to have the Convention there. After having told the Watsonville people two or three months later that we would hold it there, I wrote to Mr. Judd and Mr. Rogers and asked them if they would release us from this promise. They consulted, and released the Commissioner from the arrangement he had made to go there. Then immediately several towns tried to get it. Now, Watsonville has the first call on the Convention for next year. If Watsonville does not want it, Lodi will be second in line. Watsonville will probably not want the Convention. Mr. Rogers said to-day that he did not think the town was large enough to accommodate us. In case the Watsonville people do not want the Convention we will consider Lodi, and meet there one year from to-day.

MR. STEPHENS. I move that a vote of thanks be tendered the officers of this Convention for the impartial manner in which they have discharged their duties.

The motion was duly seconded, put by Mr. Stephens, and unanimously carried.

On motion, duly seconded, the Convention adjourned *sine die.*

THE TARIFF QUESTION.

By A. G. KENDALL.

I am asked to present some views on the question of the tariff as affecting California interests.

I assume that the promised revision of the present Dingley tariff law, so-called, by two of the great political parties prompted the request, and that I am expected to treat of those subjects of peculiar interest to California.

Deciduous fruits, generally speaking, are grown commercially in over forty states and territories in this country, and will be represented in Congress by over 360 members of Congress, while citrus fruit, the production of which under the present law has received a great impetus, may be said to be confined to but six Congressional districts, three of which are in California, and which produce more than 75 per cent of all citrus fruit grown in this country.

If the tariff is a local issue, as some would have us believe, it will take the superhuman efforts of our representatives in Congress and the individual effort of every citizen and person interested in California to retain for us the proud position we now occupy as growers of fruit.

This effort of our citizens can be best directed by supporting those who have these matters in charge at home and by individual efforts with Congressmen, Senators, and prominent people from other states, with whom they are acquainted or who may be reached through mutual acquaintance, by soliciting their efforts for the maintenance of such tariff duties as will permit us to lay our California fruits down in Eastern markets in fair competition with the imports of other semitropical countries, who have half-paid and half-clothed labor, and cheap ocean freights. Make the organization at home efficient and then let every person consider himself a committee of one on the state of the country as applied to the necessities of the Pacific coast.

It would seem to me that there was but one side to the question of tariff from a California point of view, and that little could be gained by discussing among ourselves a one-sided question—but of this last I am not sure—if discussion leads to action.

Tariffs are laid for revenue and for protection, and the two great political parties, who have promised a revision of the present law, may be said to fairly represent a tariff for revenue and a tariff for protection.

California has spoken; her voice could not have been otherwise so long as it costs $393 to lay a carload of oranges from California down in New York and only $93 to lay the same sized car from Italy down in New York; the orange grower will ask for a tariff that will equalize the cost of labor and transportation between the two countries.

The same principle should apply to every other product that can be produced in this country.

The writer of this article was reared in New England, where fifty years ago it was the custom to grow and produce as nearly as possible every necessity of life in each family. I distinctly remember that we raised the sheep that grew the wool that made the cloth that made the clothes we wore; I have peeled the bark that tanned the leather that made the boots we wore; we bought nothing from abroad which we could produce at home. From the treasure chests of New England has the great West been builded, and the spirit of the New Englander has imbued her sons that have helped to build it.

Tariffs seldom raise the price paid by consumers for products of the soil; they do preserve the home market for the home producer, and the output not being restricted, competition by producers regulates the price.

As a matter of fact, the prices during the past year (which is acknowledged to have been a remarkably successful one for the California grower) have been lower to the consumer than were ever known under the lower tariffs on citrus fruit. The reason is apparent. Oranges grown in this country or imported at the time of lower tariffs sought only the larger markets. The commission men and the railroads, by local freights, did the distributing, the quantity was limited, and prices were fixed accordingly.

Home production has been so increased by the Dingley bill that now growers, through coöperative exchange organizations, are compelled to place our oranges in every city in the United States in carload lots, where they go direct to the consumer, and the commissions and long local freight hauls necessary to distribute from the larger markets are avoided. The consumers have been increased many fold and have been benefited in price. Retail dealers in Maryland, Minnesota, New York, Nebraska, Oklahoma, Iowa, and many other states have, during the past season, advertised for sale fancy California navel oranges at from 10 cents to 30 cents per dozen, and lemons from 8 cents to 15 cents per dozen—not on single occasions, but successively through the season, from February to September—prices never before known in the history of the industry in this country.

Perishable products are amenable to the length of time they can be preserved and presented to market. All imported, and over 40 per cent of American-grown citrus fruits, are sold under the hammer at public auction for what they will bring.

Before a California jury an advocate of high protective tariff on fruits would win his case without the necessity of their leaving the jury box—why?

They say you can't talk on the tariff question because it's a dry subject. Let me tell you—without a protective tariff on California fruits, the subject would prove a hungry one for the attempting grower—again—why?

Let me speak to the last question, then you will see there is no occasion for doubting the confidence expressed as to winning the jury case.

In the first place, California is a semiarid State, to grow semitropical fruits you must produce semitropical conditions; we have the temperature, but we lack the moisture. With moisture supplied to the ground only by irrigation, we produce a fruit with our warm days and cool nights with texture, quality, general appearance, keeping and carrying qualities that can not be duplicated outside of like conditions in the known world.

Millions and millions of dollars have gone into irrigation problems in California for developing, conserving, and pumping water from deep levels, nine tenths of which has been in the name of the California orange and lemon.

These millions of money have converted a portion of the great American Desert to what is now acknowledged to be the finest garden spot under the sun. They have invited other millions to investment within the radius of the orange perfume, that have been spent in the employment of labor in developing enterprises, undreamed of a single generation ago, so that, in fact, the golden fruit has become a lively incident in the great growth, wealth, and prosperity of our Golden State.

If California oranges were grown in a Cuban or Jamaica climate they could not be shipped across the continent without great loss, much less be exported to England, Germany, and Russia, where our oranges are now going in safety.

We pay higher wages in the California orchard and about our packing houses than is paid elsewhere in the world for similar service—it requires intelligence, and we pay for it.

The prices paid for American labor in the citrus industry have had a stimulating effect upon labor prices elsewhere, and it is needless to say good prices could not be so paid, except for the protection afforded by the tariff on citrus products.

California grown fruits must go to market over mountains and across deserts, by steam railroad for a distance of from 2,000 to 3,300 miles, and from March to September each year under refrigeration.

It costs 84 cents for lemons and 83 cents for oranges in freight to lay the box down in the Eastern market without ice, and 20 cents a box additional when refrigerated; in 1907, 58 per cent of the citrus crop of California was shiped under ice.

These are some of the conditions under which has been built up a great industry—what are the results?

When the Dingley law went into effect in 1897 we were producing 7,350 carloads of citrus fruit in California, which brought us a revenue of $3,839,000. Eleven years after—1908—we produced 32,500 carloads that brought a revenue of $21,210,000, f. o. b., California. We now have 120,000 acres in bearing citrus trees, owned by between 9,000 and 10,000 growers. During the time of the present tariff law we have produced in California 100,000,000 boxes of citrus fruit; during this time we have paid for transportation on citrus fruit alone $97,500,000, besides $42,000,000 packing and selling charges. We are to-day supplying every demand of consumption for oranges in this country and exporting our surplus. In the eleven years mentioned the imports of oranges have decreased 400 per cent and the exports of American oranges have increased 400 per cent.

Not so with the lemon.

The history of lemon production is interesting, but not so favorable as to results; California produces practically all the lemons grown in America; their growing, handling and marketing may be said to be past the experimental stage.

In 1900 we produced 1,447 carloads, or 18 per cent of consumption, and imported 6,618 carloads, or 82 per cent of consumption.

In 1908 we produced 5,000 carloads, or 41 per cent of consumption, and imported 7,119 carloads, or 59 per cent of consumption.

In the nine years mentioned the consumption of lemons in this country increased 154 per cent and the California production increased 345 per cent.

Will we overtake the importer of Italy? We think not, under present conditions. In California we make lemon-growing a commercial proposition; the vast sums invested in necessary irrigation problems, the distance from our markets, the cost of labor, transportation and refrigeration require large capital and great care.

Lemons in Italy are principally grown in gardens and terraces with family labor and little expense; when orchard labor is needed, 30 cents per day is a fair wage.

The Italian lemon is shipped green, cured in transit and laid down in New York at a cost of 24 cents per box, freight. The finer grades go to England and Germany under cheaper freight rates, and America, the great consuming nation, is made the dumping ground for what is left.

Those who have made a study of the problem believe that with a duty of 1½ cents per pound on lemons we would produce in California within the next ten years every lemon demanded for consumption and drive the foreign lemon from our market, as we have the foreign orange.

Who are our competitors and what are their advantages?

As has already been said, Italy is yet able, under present import duty, to furnish 59 per cent of the lemons consumed in this country.

You have a right to infer that having once gained our orange market we ought to be able to hold it against all comers, and this might be a correct inference if conditions were not changed.

The Spanish war and Cuban occupation by the United States have made it possible to do business in Cuba, and such has been the inrush of American and Canadian capital to that island that confidence is sustained, and the promoters in Cuba are declaring "the Americans will never leave the island. Large corporations financed by the Americans from Dakota, Michigan and other states have secured large tracts of citrus lands in Cuba, subdividing them into small tracts and are selling them to thrifty Americans, who are now planting out orange groves.

Other corporations financed by Canadian capital are taking advantage of the peaceful condition of the island and have secured thousands of acres of suitable citrus fruit land and are selling it in small tracts to thrifty Canadian farmers, under a prospectus of future wealth and happiness that would make a California "boomer" blush.

The same is true as to Mexico—American capital, and in some instances California capital, is now exploiting the citrus belt of Mexico. Hundreds of acres have been planted to oranges in the last few years; labor and lands are cheap, and labor dependable. In both instances, 30 cents to 50 cents per day; with no irrigation in Cuba and free water in Mexico.

We wrested the market from the Cuban, the West Indian and the Mexican because of their methods, or rather lack of method. Can we keep it when the American becomes the controlling influence in citrus fruit culture in Cuba and Mexico, surrounded and supported by conditions as to cost of land and labor that can never obtain in this country? The British West Indies have been visibly improved by the conditions in Cuba. Jamaica oranges are laid down in New York City for 25 cents a box; the Cuban orange for 30 cents, and the Mexican orange for 35 cents per box, freight.

We have a right to expect, and do expect, that within the next few years the struggle for supremacy to retain our own market will be sharp —a protective tariff only can make it decisive for us.

What is said herein as to citrus fruits applies equally to the walnut, the almond, the raisin and the prune and olive. I have not gone into that feature of the tariff as applied to them for I have not the information at hand to permit me to do so, but I think enough has been said in these few words to give me the verdict in the jury case, for it must be evident to every person present that whatever his political opinion or wishes may be, as to the supremacy of either of the two great political parties in this nation, California with its well-paid labor and long distance from market must always be a protective tariff State. If any one hearing this opinion is inclined to raise objections to that theory of the case by reason of a fear of increased cost to the consumer, or for other cause, let him not fret or worry over the moral issue; it were better to grow more fruit or nuts and insure a competition among ourselves, if he is not satisfied with what he now has, remembering always there can be no restriction of soil products in this country so long as there is a profit in their production sufficient to sustain the labor necessary to produce them.

There may be production without a profit, for the soil producer's capital is largely labor; and the hope that springs eternal to the hearts of men for better future conditions will keep labor employed in the support of human life, while the man of means will easily change his vocation.

SOME HIGHER IDEALS OF HORTICULTURE.

By FRANK FEMMONS.

From the earliest dawn of the world's history, our people have been pioneers, with their eyes and footsteps towards the unknown West. Often have I gone back in imagination over their ever onward pathway and stood beside our great ancestor as he beheld for the first time the going down of the sun. The first day of earthly existence had charmed his soul with the beauty of his surroundings. He had wandered among the sunshine and shades of his garden home; the flowers had bloomed about his footsteps; and the songs of birds and rippling brooks had filled the day with music; but the sun was slowly sinking down behind the western hills. What strange sensations must have swept through his mind as he watched its fading light as it seemed to rest for a while among the tree and hill tops of his earthly home! His eye long lingers where he had seen its departing rays, as they painted in purple and gold on the clouds of the evening sky the reflected beauties of, to him, some western world. Darkness is stealing over the scenes that had so charmed his first day, and while he bows in wonder and adoration, weary and alone, he sinks to rest, and the angel of Sleep wraps her mantle around his weary form. The grandeur and beauty of that sunset scene, and the solemnity of the oncoming darkness still filled his heart, and his thoughts and imagination awoke in his dreams. "The evening and the morning were the first day," and the night, like a new creation, had its "evening and its morning stars."

Awaking from that first night of earthly dreams, the "Star of Empire," like the emblem of a prophetic vision, has ever beckoned onward to the west. At times it has seemed to halt and its cheering rays dwindle amidst the darkness of doubt, but with returning faith and new hope the ages of life and light are again marching on with a courage that meets and surmounts every obstacle, developing new strength with every effort, finding or creating new powers to conquer, and new inspirations for the struggle to come.

Some of us who from our boyhood can remember our frontier, as it then reached almost beyond the confines of civilization along the banks of the Mississippi, stand here to-day, amazed, on the shores of the Pacific. We look back over the rushing tide of development where,

> Like waves upon an ocean shore,
> Each coming wave drives on the wave before,

and in the light of the past that comes to us in shimmering brightness across the crests of the rolling tide of the ages, try to solve the problem of future. Shall we turn away from that great solution because it seems beyond our individual powers and few short years of life?

The mind of man is ever striving for advancement. We look back over the ages and compare its first noble efforts with the grand achievements of the present, and as we sweep aside the curtain from the future, and see something of its vastness that reaches in sublime beauty beyond, we may feel sure that the past, the present, and the future is but an unbroken chain, binding all time into *one eternal now.* The mind of man is ever ready to attempt the most rugged steeps. Throw the light of hope on its pathway and wake up its enthusiasm, and no matter how difficult and rough its footsteps may prove, his cheering watchword is ever *onward.*

"The Star of Empire"—the dream of an ever new western world—has nearly completed its cycle. We look out through our Golden Gate across the peaceful waves of the Pacific, and waving the Starry Banner—the emblem of the accumulated triumphs of the ages—shout our returning cheers to the garden home of our infant race.

Meeting you here to-day, the fruit-growers of our great State, and in the spirit of brotherly friendship looking into your faces, one need not mistake the soul developing influences at work in your high vocation. From the rich soil of the Earth and the bright sunshine of Heaven, and like the developing beauty of our ripening fruits, the high and noble qualities of the heart are stamped upon the brow. Your lives and labors so close to the soul of created things, must stamp their influence upon the development of every activity of the commonwealth; not only in producing the highest types of orchard fruits, but the last, the best, the highest ideal of God-created man.

"Ye are workers together with God." I am not here to preach the gospel. You have that in your churches (some of them), but I wish to suggest some of the laws, principles, and their source, upon which has, and must always, depend the development of humanity in all ages. Of this one thing we may be assured, that if our individual ideals and efforts are in harmony with the great design of created nature, the collective power of that influence will lead onward, and, like the "pathway of the righteous, grow brighter and brighter to the perfect day," but if through our careless doubts and fears, and losing sight of those higher ideals, we drift off into channels that lead out and away from

"that divine event,
Toward which all creation moves,"

again, as in the past, will our civilization be wrapped in the clouds of "dark ages," through which, with faltering footsteps, we must regain the onward way.

Among all the vast and almost bewildering developments in all lines of human activity in every part of the world, I know of none that better illustrates the rapidly moving progress of our age than the growth we have seen here in California, and that means, in a large measure, the orchard interests of our State. We can not think of California without her oranges and lemons, her grapes, peaches, and pears, and a hundred other fruits of her valleys and hills that have been a new wonder and revelation to the markets of the world. At times we hear some feeble voice of warning about overproduction, but soon a little adjustment of methods, a little more care in selection and packing, or better facilities for reaching the distant markets, and we find the demand still growing greater than our orchards can supply; and to-day more new ones are being planted than ever before, and new railroads are building in every direction.

With her almost boundless natural resources and her vast bodies of still unoccupied land, extending for eight hundred miles along the shores of the Pacific, and from the sea to her mountain heights, embracing all the soils and climates that have enriched the world; with the thousands of new homeseekers who are yearly coming with their high hopes of a new home surrounded with their orchard trees and perpetual garden flowers, we wonder what can be the great destiny of our productive State. We stand upon some high Sierra peak, and, looking out over her valleys and plains, her flowing rivers and the restless waves on her shore, her cities, towns, churches, schools, colleges, and universities, her prosperous homes, and bending orchards, all suffused with the golden sunshine of a genial clime, and exclaim,

All hail to our State! We greet thee anew
With all that is loyal, from hearts that are true;
Thy sons and thy daughters, and sisters afar,
Are watching the rays of the brightening star.
That rests on the shore of this New Western World,
Where the flag of her greatness was proudly unfurled.

When we remember that all these high hopes and accomplishments have come to us within our own memories of fifty or sixty years, we stand amazed with wonder as we see in it all the prophetic morning sunlight of a grander development to come.

Nearly all our horticultural literature has been directed toward the practical and commercial growth of our distinctive industry. Nowhere and at no time in the world's history has there been such an advance in horticultural knowledge and its application. Many of our California investigators, authors, and practical orchard men stand at the head in their high calling. To their farsighted wisdom and successful labors we all owe a debt of love and gratitude. We are proud of them to-day, and to future generations we bequeath their honored names. While we have no right to think the less of our vast productive resources, nor their far-reaching commercial value and influences that must ever go hand in hand with all our varied industries, they bring with them equally vast responsibilities.

We think of our Christian civilization as that divine system that must eventually bind together, under the Fatherhood of God, all the nations of the world. What other agency could carry the educating influences the world so much needs as our vast productive and commercial activities that are building railroads in every land and filling oceans with steamship lines? And what commodity, of all the rich productions of the world, could carry with it a higher refining influence and arouse a brighter hope for better living than our own California fruits when grown at their best? But we are sometimes in danger of losing sight of the higher ideals and responsibilities that our opportunities place before us, and to think of the commercial value of our orchards as their highest end and consummation. Their influence upon ourselves, our homes, our children, and the present and future welfare of our State and the world gives them a still higher value; and the wealth of that influence in making life and its conditions more beautiful; in building up heart and soul, the *character* of ourselves and our people, should be the greater high object of all our thought and labor, and *it all rests with our individual selves,* working together in that spirit of coöperation and neighborly helpfulness that is ever ready to share, and, if need be, "bear each other's burdens."

With these higher ideals before us, we can never be content with anything short of the best we and the ever ready hand of Nature can produce. In all lines of our horticultural efforts the production of the most beautiful and best should always be our highest aim; not because they have a greater present money value, but because from them we gain the greater satisfaction. They help make our homes more beautiful; they fulfill our hopes and add the greater blessing to the world. It is ours to work in harmony with that great design that looks onward through the ages, that age by age should grow better and brighter. We dare not lose sight of those higher ends of creative wisdom. If we are true to our highest ideals, continually striving to make our lives and our homes reflect the beauty of our higher hopes, and stamping the spirit of our faith in God and ourselves upon every package of fruit we send to the world, we need fear no end to our onward development. The better days will come as the sunlight of the morning, and with them that hour of brighter hope for which we were taught to pray, "Thy Kingdom Come."

But few of our fathers, the horticultural pioneers of our western world, are with us to-day. Soon the sunset rays of their day of life will rest upon their last but honored resting place. To you, the younger men of to-day, their high ideals and heroic struggles have left a noble heritage. As yet it is rough and unfinished. The foundation, under the directing hand of the great Architect of Time, has been wisely and truly laid. It is for you to go on building the grand structure, which, in your hands and of the generations to come, must rise here on this eastern shore of the Pacific until its beauties and grandeurs in archways and architraves, its domes and spires reflecting the sunlight of our highest Christian civilization, cast their cheering influence of life, hope, and happiness, with new inspirations, to the peoples of the world.

OFFICIAL REPORT

OF THE

THIRTY-THIRD FRUIT-GROWERS' CONVENTION

OF THE

STATE OF CALIFORNIA.

HELD UNDER THE AUSPICES OF THE STATE COMMISSION OF HORTICULTURE AT MARYSVILLE, COMMENCING TUESDAY, DECEMBER 3, AND ENDING FRIDAY, DECEMBER 6, 1907.

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CALIFORNIA STATE COMMISSION OF HORTICULTURE.

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SYNOPSIS OF THE PROCEEDINGS

OF THE

THIRTY-THIRD CALIFORNIA FRUIT-GROWERS' CONVENTION

HELD UNDER THE AUSPICES OF THE

STATE COMMISSION OF HORTICULTURE, AT MARYSVILLE, DECEMBER 3, 4, 5, AND 6, 1907.

TUESDAY, December 3, 1907.

Pursuant to call, the Convention met in the Presbyterian Church, Marysville, Cal., at 9:30 o'clock A. M.

The Convention was called to order by President J. W. JEFFREY, State Commissioner of Horticulture.

MR. JOHN ISAAC acted as Secretary.

REV. W. S. WILSON, of Marysville, opened the proceedings with prayer.

ADDRESS OF WELCOME.

BY G. W. HALL, MAYOR OF MARYSVILLE.

Mr. President, Members of the California Fruit-Growers' Convention, Ladies and Gentlemen: That passage of Scripture which reads, "By their fruits ye shall know them," to my mind is applicable to this occasion. I take it that many of the delegates and friends of horticulture at this meeting are visiting our city for the first time, but you are not unknown to us; you are not strangers in a strange place, for by your fruits we have known you.

We welcome you to this city—you, the representatives of the greatest industry in the State of California. You have developed, during the last quarter of a century, not only the greatest fruit-growing State in the Union, but the greatest fruit-producing area of the entire world. On behalf of the city of Marysville and of Sutter and Yuba counties, I extend to you a very cordial welcome to our city, the hub of the Sacramento Valley. We appreciate the fact that your Convention is so representative, so strong, as to attract to our city His Excellency, the Governor of the State of California, and to him I extend a most cordial greeting in behalf of the city which I have the honor to represent.

During your stay, while visiting our city, you will notice the whitewashed stumps of what were once beautiful orange trees, and you will, no doubt, appreciate the sacrifice which the property-holders of this city made for the fruit interests of this State. Yuba County has a live, wide-awake Horticultural Commission, and one of its keen-eyed commissioners discovered the white fly and warned the people of the city that the pest was a menace to the fruit industry of the State. The people backed up the commission, and it resulted in cutting down and defoliating in the vicinity of eight hundred trees, at an expense of $4,500 to the people of this city.

We appreciate very much the compliment this Convention has paid our city, and I trust the results of your labors will benefit your organization, and also that you will enjoy every moment of your visit to our city. I thank you. (Applause.)

THE CHAIRMAN. I am sure we appreciate the Mayor's remarks, and Governor Gillett will now further that appreciation in an address to us. (Applause.)

ADDRESS BY GOVERNOR J. N. GILLETT.

Fellow Citizens: It is a pleasure for me to be with you opening this Convention. I have been expecting to make a trip into this section of the country for some time, but have been rather busy, and this is the first opportunity I have had, and this only for a short time. I came, not only to be present with you for a short time to-day, but also to take a trip down the river to see what improvements might be made by the State to save this city and the surrounding country from the dangers that almost annually threaten it by reason of flood waters.

As was said by the Mayor, the fruit industry of this State is one of the great industries—in fact, the greatest—and as time rolls on and our population increases it will continue to grow greater until it will be one of the great interests of the world. It is a business that requires a great deal of study and a great deal of thought and a great deal of protection, and it is just such conventions as this that will bring about the results which are necessary to keep this great industry fully alive and to have it accomplish that which we all hope for it.

I noticed the stumps as I came into Marysville. That was the very first thing I looked for. I remember when the word first came to me that the white fly had been discovered in Marysville, and appreciated how dangerous it would be if that fly should spread, and I was pleased to know the willingness with which the people of Marysville took down their ornamental trees and destroyed their grounds—and it was almost like a man destroying his household idols, and that for the purpose of protecting one of the big industries of this State—and I want to thank the people of this city for the work which they did. They showed the right spirit, and the people of the State will appreciate what was done in Marysville and the energetic manner in which the war was carried on against this pest, which, if it spreads, will do injury to the whole State to an extent that we can not contemplate.

As I said, there are a great many things for the people to give thought to and study out. You have got to be wide awake all the time, and I know you are. The Horticultural Commissions of the State and of the different counties must pull together in harmony, for you are all working for one common end. This State of ours, with its climate and its soil, is peculiarly adapted to fruit growing, and there is no reason why we can not supply the entire country with its fruits, green and dried, and we are going to do it and are doing it to-day. But there are several things which we have got to take hold of and which are of vast importance to us in bringing about the desired results.

One of the great problems to-day confronting California is the transportation question. If you are going to make your fruit industry a success you must have the best, the cheapest, and the quickest transportation. You must be able to get your fruit to the markets of the East in the best and quickest way possible, and that is something that is going to take a good deal of time. But I am satisfied that, if you stand together, if you make a united effort, this thing will finally be settled and we can get our fruit to these markets a great deal faster and a great deal cheaper than we are getting it now. I believe the building of the Panama canal will be one of the great factors in settling this question. Of course, one road can not very well carry the great amount of fruit that is produced in our orchards, but we will have three—the Western Pacific, the Santa Fé, and the Southern Pacific. With proper car equipment and with fast trains, these railroads ought to be able to handle the fruit of this State and handle it quickly, and get it to the East quickly, and that is what we want—to get it there as soon as possible and at a rate that is reasonable and fair and just; and as soon as the canal is completed, which I think will be in ten years, possibly a little longer, there will then be another means of transportation by which we can get our fruits to Europe and along the Atlantic coast cheap, and that will tend to bring down rates to this coast. So the question of transportation is one on which the people must be continually at work to see that rates are reasonable and that cars are supplied, so that when we grow our fruit it does not rot on our hands or on some side track, but that it reaches the great cities of the country in splendid condition and where it can be sold for a fair price.

There is another thing in which it seems to me our State ought to take an interest, and that is the advancement of horticulture and agriculture through our colleges, our University, and Agricultural farms. Our boys ought to be educated along those lines, because if horticulture and viticulture, for instance, are going to be great industries of our State—and they are great industries to-day—it is important that our boys should be educated along those lines. It is an immense question and we ought to take hold of it in our universities with a great deal of vigor. We have a farm at Davisville, we also have a large property at Fresno—the Kearney estate—and I hope the State will be generous in its appropriations to make those farms a success, and do everything it can to develop the horticultural and viticultural interests of our State, because I know of nothing else we can teach our youth which will be of greater advantage to them in the future than education along these lines.

I said I was pleased to be with you to-day. I did not expect to make much of an address when I came here—only to state to you that I feel an interest, as I pass through our State, in the large fruit orchards that I see on every hand. I realize the great importance of your industry. I know that it is the wealth of our State. It means the bringing here in the future of a great many people. What we want in California is intensified farming. The time is coming when these great ranches must be broken up and we must look more to irrigation and to small farming, the raising of fruits and vegetables, and that is what is going to make our State a great State. Provide a water supply that is inexhaustible. It seems to me that if man had devised a plan for making a great valley which could be irrigated nicely, he could not have improved on the Sacramento and San Joaquin valleys. There is everything that you need—a good soil, an abundance of water, and splendid sunshine—everything that is necessary to grow fruit to perfection. All these things we have in the Sacramento and San Joaquin valleys, and I know as time rolls on and our population increases and these great questions of reclamation and irrigation are solved and people come among us to make their homes here, we will find in this valley and around Marysville and above and around Chico—in fact, all up and down where fruit can be grown—a large population consisting of happy people and fine cities. Marysville may be, as the Mayor says, the hub of the Sacramento Valley, but we will find that around this hub there will be settlements; and it is for you people whose business it is to see that the fruit industry grows, to hold your conventions and to take up these questions and to solve them right, and I know that you will.

I am glad to be with you here to-day, and I want to assure you that as long as I am Governor of the State of California I will do all I can, through our State Commissioner and through your County

Commissioners, to promote and care for the fruit interests of our State and make appropriations to develop our farms and help carry on investigations along the line of horticulture and viticulture. (Great applause.)

SECRETARY ISAAC. The next number on the program is an address by our State Commissioner of Horticulture, Mr. Jeffrey. Mr. Jeffrey has had wide experience in horticulture in the State and has been at many of our conventions, but to-day he addresses you for the first time as State Commissioner of Horticulture. Ladies and gentlemen, I have pleasure in introducing Mr. Jeffrey. (Applause.)

PRESIDENT JEFFREY'S ADDRESS.

Ladies and Gentlemen: For the first time in almost a generation a State Commissioner of Horticulture other than the Hon. Ellwood Cooper has been chosen to administer this office and to preside at a meeting of the fruit-growers of the State in convention assembled. I appear before you to-day with some hesitation, a stranger to many of you, and yet acquainted in some measure with the work to be done in this office, and earnestly ask your forbearance of the many deficiencies that may be shown in my administration of this great trust. To the older members of the Convention this change of officials appeals with peculiar interest and some misgiving, because of the fine personal qualities of Mr. Cooper, his attainments in horticulture, his services to the State, and his long association with them as their president and friend. The younger members of the fruit-growing fraternity, who equally respect and love the retiring Commissioner, also regret the loss of their leader. This admiration of a good man is not confined to this organization, or to any section, but the people of the whole State join in tribute to his admirable qualities and in appreciation of Mr. Cooper's public services of the last thirty years. I wish to be foremost in the expression of these sentiments and to hope that this Convention may indorse, and forward to this great advocate of horticulture, a testimony of esteem that gives voice to these feelings in an official and cordial testimonial.

One need but refer to the records of thirty-two conventions to discover the wide range of their activities, and to understand that they have been fruit-growers' conventions in fact, and made the forum in which the fruit-growers could have sole voice in the consideration of their own interests, free from interference and undisturbed. Not only have subjects been given place here pertaining directly to the fruit industries and all other enterprises of farm life, but many great questions have been wrought out whose value is but little remote from the main issues. The abuses of the private car lines have been catalogued and condemned before these meetings oftener than before all other unofficial bodies combined; freight rates upon orchard products have been analyzed and reductions demanded by the members of these conventions; better time and facilities in the transportation services of the State's perishable products have been discussed and declared imperative; the coöperative marketing of fruit has been given the right of way in many warm discussions, and advancement made in many cultural lines and publicity given to many practical and scientific discoveries of value to the fruit-grower. Some progress has been made also in bringing to a better basis the farm labor supply; the parcels post has been indorsed, good roads advocated, and encouragement given to every good movement throughout the State and with special preference to those pertaining to the moral and material advancement of the farmers and fruit-growers of California. One need but refer to these annual reports to realize the wholesome and helpful tone of these conventions, held for a generation under the direction of the gentleman who now retires with the respect and love of the people of this great commonwealth, full of the best wishes of his fellow citizens everywhere. Less than a full recognition of Mr. Cooper's character and achievements would not do justice to this remarkable occasion, which closes an association perhaps the longest of its kind in the history of horticulture. In recognition of the faithfulness and sincerity that have ever distinguished the attitude of Ellwood Cooper toward the welfare of the fruit-growers, I wish to express the hope that the new administration may be as sincere in its purpose to do good. I wish to pledge you that any changes of methods or policies made by your new Commissioner will be attempted with reasons thought to be obvious and acceptable to the people of the State. No one worthy of your confidence, and competent to hold this great office, would promise to follow the policies and plans of his predecessors; but I know that a safe example has been set for me in the work of this conscientious man, and I shall try to keep faith with its spirit to the end of my term.

But we must turn from this inspiring subject to the duties and conditions that now confront us. In the year just closing California has experienced the most prosperous season of fruit-growing since the days when the pioneers discovered that all the gold of the State was not to be mined from the soil, that the pick was not greater than the plow, and that sluicing was not more profitable than the use of water upon the fruit farm. This prosperity has extended from the northern limits of the State to the international line, and it has brought affluence to all the land. Judging from the achievements of the passing year the outlook for the future of fruit-growing is most reassuring, and justifies a very optimistic view of its security, and of the high value of good land throughout the State. So great have been the revenues of the last fruit crop in the orange districts that the net cash received by the citrus growers would pay for the construction of the Owens River conduit, which President Roosevelt says is the most remarkable undertaking of its kind in modern times. The deciduous fresh fruit business of this year perhaps passes all records for steady, lucrative prices; prunes in this valley and elsewhere have brought riches to hundreds of growers; grapes have touched the highest mark in many localities; walnuts have sold twenty per cent above the averages of past years, and all through the lists from small fruits to melons we hear the same story of satisfactory fruit returns. It is time the voice of the croaker was heard no more in this State of plenitude, and that the counsel of the hopeful and helpful be given the ear of the orchardist.

While the fruit-growers are deeply concerned with the causes that have led to the successes of the banner year of 1907, they must also consider the adverse influences that may greatly affect this prosperity in the future. It is certain that the obstacles to profitable horticulture are increasing. Our soils are becoming more difficult to handle, insect pests lay heavier tribute upon our orchard crops, fungous and bacterial diseases are becoming more frequent and virulent, and altogether the practical and scientific exactions of our orchards, farms, and vegetable fields are becoming more strenuous every year. Should we lose courage in facing these growing adversities? On the contrary, we find in them great encouragement, for in them is the compelling call to a higher order of horticulture, advanced as is our State in this, her greatest industry. Just as the difficulties of doing legitimate and profitable business in this country have been exposed by the financial and investigational events of the last year, to be corrected for good by the genius of the American people, so are the vicissitudes of fruit-growing to be better understood and mitigated by scientific investigation and specific, practical detail in the growing and handling of California fruits. These intellectual exactions of the orchard, and the bothersome requirements of detail will help to eliminate competition by the reduction of unfit fruit, and will be followed by the greater elevation of our horticultural industries and their final emplacement above most other avocations where skill and business capacity are required for permanent success.

The United States Government is busy all over this State with helping us in our present difficulties and providing against those of the future. Powell is in Southern California for his third year, investigating with his assistants the faults of packing and shipping citrus fruits; Marlatt is there also with his helpers studying the use of cyanide in the fumigation of trees; Husmann is established in the Sacramento Valley working out the problems of vine stocks, varieties, and vineyard conditions; Waite is with us both in person and with a corps of assistants lending a hand toward the control of the most virulent disease known to pomology; Mackie is engaged in mapping the soils of this section; Pinchot is patrolling the mountains of the State and planting the forests anew for the protection of our water supplies, and many individuals upon the payroll of Uncle Sam are pursuing lesser avenues of investigation throughout the State. The head of one of the above departments invited me the other night to attend a chance meeting of his young associates at the Capital City. When these young men began to unfold the secrets of the vegetable world one might think, "How fortunate that the Government had turned them out into a valley broad enough and long enough to hold all this learning." Before the evening was over I was ready to vouch for every one of them as a practical man, without fads or visionary pursuits, and thoroughly equipped for the work assigned him. These are the advance guard of better horticulture, the young men whose success and standing are bringing back to the farm the boys of the country, the men the Government has sent among us to help in making fruit culture in California more stable and profitable in all future years.

But what are we of the State doing for ourselves? A great work whose familiarity to our people should not lessen their appreciation. California has two great departments charged with the promotion of horticulture and kindred interests; namely, the University at Berkeley with its various auxiliary stations, and the State Horticultural Commission with its many correlative county organizations. The former is delegated with the investigation of scientific problems touching the interests of field and orchard farming; the latter with the practical care and protection of the horticultural industries of the State. With the exception of a very few unimportant but exasperating cases in these two departments, they are in harmony and coöperation, and must be brought into closer relationship to meet the demands of the people who pay for their support. Unfortunately, the enactments under which these coördinate institutions operate do not clearly define the scope and duties of this dual responsibility, and it is therefore not strange that pedantic criticism on the one hand and ignorant egotism on the other have bubbled up occasionally, to the amusement or disgust of the State. I am sure that both of these institutions will stand for the removal of these frothy utterances in the future, for the betterment of the great work before them. And the people will say, "Amen."

The University of California is forwarding the agricultural interests of the commonwealth in a manner excelled by similar institutions in but few states, and not surpassed by any state if we take into consideration the diversity of conditions and the magnitude of the difficulties of cultivation in the insimilitude of our soils and situations. And yet no field is so white for the harvest of investigation, no territory so urgent with the demands for scientific examination and practical conclusion. To fulfill its field and educational mission the University must have masterful guidance, faithful service, and constant coöperation. The latter is hereby pledged, as far as the State Horticultural Commission is concerned, for I have subscribed for years to its every act and policy. To give spice to my sincere indorsement of this great institution, I wish to note one exception. I do not approve of the late attempt to exterminate the white fly with printer's ink, for the process is as tedious and tasteless as ineffective. Otherwise I continue to favor the policies and applaud the successes of the University in the large work it is doing for the farmers of California.

No less important is the work of the office which I hope to represent with some approval for the next four years. The office of State Commissioner of Horticulture is largely executive and is charged with duties and endowed with powers neither possessed nor needed by any other department. It is a clearing house of horticultural information, not a bureau of scientific investigation other than is necessary in making effective its quarantine department, and its control of insect pests and plant diseases; it is the horticultural patrolman of the State, its badge of authority the quarantine code; it is not the detective of soil salts, the discoverer of varietal adaptations, the sleuth of pathologic troubles in plant life, or the officer to bring to book the thousand secrets of nature that perplex or impoverish the farmer. The office of State Commissioner of Horticulture is not the State schoolmaster of horticulture charged with the duty of bringing back to the soil the escaping young men, or of educating the rural people in the technical departments of horticulture. These matters properly belong to the University. Rather is the Commissioner's office the statistician, the secretary of correspondence with horticultural societies, colleges, and schools upon applied knowledge, and, above all, the medium through which protection is afforded to the orchards of the State, and pursuant of which this great office is empowered to bring into businesslike coöperation the County Horticultural Commissions in the enforcement of the laws designed for the exclusion of insect pests and disease, their extermination or control, and in meeting any emergency that may threaten the fruit-growing enterprises of the State. To secure this coöperation the law has made your State Commissioner member ex officio of every County Board of Horticulture, and I shall try to fulfill this duty to the best of my ability.

Upon the policy of protecting from insect pests there is an idea extant that the new administration will be at variance with the old, especially in the search for and use of beneficial insects. Statements have been made that, if true, should disqualify me from holding my present position, and as far as I know the belief in these statements is the only bar to my acceptability as your Commissioner. I would not refer to this personal matter if it did not touch so closely the work of this office. And then you have the right to know my attitude upon a question so paramount to the success of fruit-growing. A circular was sent all over the State last summer in which, with other remarkable matter, the statement was made that my candidacy was a direct challenge to Mr. Cooper's policy of using parasitic insects in the control of orchard pests. The charge needed no denial in the south, and it is useless to deny anything in the warmth of a contest of this kind. I think it is proper now, however, to suggest that the authors of this circular depended entirely upon their imagination for their facts, for my faith in the efficacy of parasitic and predaceous insects is now, and always has been, as firmly grounded as that of any other individual's in the State. The gentlemen who have erred in this matter are known for their honorable membership of this Convention, and for their loyalty to the fruit interests of the coast, and I know it will be a pleasure for them to discover their mistake, and to continue to support the office with which their work has been so long and faithfully identified. I believe, however, that some of us have lost the sense of proportions between the so-called natural and the artificial methods of fighting insect pests, and I hold that these proportions may be equalized in the public mind without abating in any degree the search for new insect friends or relaxing in the nurture and distribution of our native beneficial species. I know by experience how easy it is to exaggerate the achievements of parasitic insects. Four years ago, when the *Scutellista* seemed to have the black scale at its mercy in the south, the Los Angeles office led the procession in boasting of the triumphs of the little fly; and I was in the front rank of the boasters. Many of our people joined in the noise we made over the work of the fly, some doubted, and one friend felt it his duty to remonstrate with us for making such extravagant claims. He said our office reminded him of Lincoln's Mississippi steamboat. Lincoln said he went up-river one time on a boat which had a whistle so much bigger than its boiler that they had to stop and tie up to a stump every time the pilot wanted to blow for the next landing. I hope to carry this lesson through the four years of my administration. Within the next three months we hope to have the Insectary built. Time will prove this institution one of great value. Its successful operation will be in line with my predecessor's most cherished policy, and I propose, when the Insectary is finished, to have placed in its entablature this inscription, "Founded by Ellwood

Cooper,'' and then a line indicating the years of his services to the fruit-growers of the Golden State.

If the optimism of the present time is to be permanent and become brighter in the future, the fruit-growers of the State must take advantage of their opportunities to the fullest extent. Of what avail is the work of the United States Government, of the University and of the State Commission if the growers do not respond? What is to be gained by investigation and demonstration if the growers continue to plant unsuitable kinds and varieties, or do not match their crops to their soils, or buy cheap and impotent stock for their orchards? What advantage to know all about soil chemistry and forget selection and pedigree at planting time? Can your Horticultural Commission assist in lessening the troubles that beset the business of fruit-growing? In some degree, yes. It can be made the means of your broader and more forcible expression. You can enact laws that will tend to eliminate or to make responsible unfit nurserymen, and see that your officers enforce them. Require your Commissioner to take notice officially of quacks, and frauds, and misrepresentations, and dishonest dealings in all that may degrade your fruits and discourage superior productions. You can see that his office be made the source of publicity for all the good things and the bad that affect fruit-growing. The Commissioner's office is the only rallying point where all horticultural interests can unite for common good in the practical solution of their protective and working policies. But this can only be made possible by widening the field, and making room for their effective consideration in this office which was created for the safeguarding and promotion of commercial fruit-growing.

It is a shame that this great office under whose auspices you are assembled to-day has to plead for a bare existence when it should be equipped to give back to the State ten thousand times its cost every year. It would not drink from the finger bowl, nor swallow the knife, nor eat the bouquet, if given a seat with the more scientific institutions that are so richly sustained with means of doing the work they have so well in hand. The scope of the office which I represent is broad enough. It should have officers with executive ability and should be backed with the funds to make its work felt throughout the length and breadth of the State. To this end the laws concerning the appointment and support of our County Boards of Horticulture should be wiped off the statute books and reënacted in a new and effective spirit; the county quarantine ordinances should be destroyed and a uniform system adopted that would be more stringent and effective, without driving our nurserymen to distraction, as they are driven under the present lack of system. I believe this feasible, if every fruit-growing county were compelled to maintain an efficient Horticultural Commission, appointed solely on merit and supported by an able corps of inspectors. These appointments should be divorced from politics and governed entirely by fitness for the work required. I shall carry this idea into the administration of the State Commissioner's office, for merit will govern every appointment, and no one in the State will expect any other policy to prevail. Time will not permit further reference to the work that this office should do, nor to many other topics that demand attention.

At the risk of your impatience I must pay tribute to the chief of the forces that stand for betterment of fruit-growing in California—the men and women of the country homes, the artisans who have built the grandest horticultural structure in the world, and have established here the highest degree of rural civilization upon the face of the earth. Twenty-seven numbers on this Convention's program are represented by these people. And who shall say their achievements are not far beyond those of all other forces combined? These are the architects of the State's real grandeur. These are the people to whom the elimination of an unfit fruit is greater than the creation of a hundred varieties, the delineation of suitable soils for the cultivation of their crops of more value to them than an encyclopedia of horticulture, the possession of an honest nurseryman of more worth than another farm. They are here to speak for themselves. They pay for all, and all should listen. All honor to the fruit-growers of the State. May their prosperity never grow less nor their influence in these conventions be abated.

THE CHAIRMAN. Ladies and Gentlemen: The next on the program is an article from Edward Berwick, one of our oldest and most honored members. Mr. Berwick will now read a paper on "The Fruit-Grower and the Parcels Post."

THE FRUIT-GROWER AND THE PARCELS POST.

By EDWARD BERWICK, of Pacific Grove.

With prunes and raisins at five cents per pound and canning peaches at from forty dollars to ninety dollars a ton, it may be hard to persuade the fruit-grower that he wants anything more this side of Paradise. Of course, we must except the extermination of the white fly and the control of the pear blight. He may feel a little exercised as to the labor question; but, as sales f. o. b. are easy, he can afford to let the other fellow worry over the old vexatious transportation troubles. In Los Angeles four years ago the fruit-growers were telling quite a different story. We were then as unanimous as Jonah in the belly of the whale that our transportation troubles would be lessened, and our cash in hand materially increased, if Congress would authorize the Postmaster-General to institute an up-to-date parcels post, such as is enjoyed by other civilized countries.

To agitate for this end, the Postal Progress League of California was organized. No doubt many of you have since then read or heard various arguments, favorable or unfavorable, concerning the matter. But lest many of you are not familiar with the parcels-post idea, let me briefly inform you of a few of the facts.

Almost all the civilized world regards it as the function of the postoffice to carry not only letters but also packages, varying in weight from ounces to hundredweights. Switzerland, for instance, permits the mailing of anything that will pass through the door of a railroad car. Rates are various, but extremely low. Thus Germany, for 6 cents, within a 46-mile radius, sends 11 pounds, and for 12 cents all through, not only her own domain, but also through Austria-Hungary—a possible 1,500 miles. Great Britain sends 3 pounds to farthest India for 24 cents, or 11 pounds for 72 cents. While we, as you know, pay 64 cents for 4 pounds from Marysville to Chico. By a curious and ridiculous anomaly this same 4-pound parcel can be sent all the way to London, England, for 48 cents—12 cents less than it costs to Chico; so a suit of clothes can be mailed to Marysville from Dublin, in Ireland, for less than from San Francisco.

At the same time, for the *British* public, the American express companies carry all parcels up to 11 pounds from New York to any point in the United States for 24 cents; when an *American* citizen, living in his own country, wants to send an 11-pound parcel from Pacific Grove to New York, the same express companies charge him $2.35 for the same parcel. You need not suppose that the 24-cent rate is given to the Britisher "because they love him so"; simply there are dollars in the job for the express companies, even at 24 cents. It helps to swell the $30,000,000 surpluses of the Wells-Fargo Express Co. and to make possible the 200 per cent stock dividends of the Adams Express Co.

What these express companies do for the foreigner your postoffice could do for you. But do you want it done? Do you believe that cheap transportation increases trade? I don't know how Marysville feels to-day; but I do know that over three years ago I made a call on Mr. A. A. Watkins, President of the San Francisco Board of Trade. I wanted to enlist him and his board in an enlarged commerce, made possible by cheaper transportation of packages by mail. He said to me, "No, sir. We had a man at Washington last session of Congress purposely to oppose the passage of any parcels-post bill, and we'll do so again! Why, in Marysville the retail hardware dealers of northern

California just held a convention, and called upon us to take this action, and we'll do it."

Well, it seems to me irresistibly comical that retail dealers should oppose a cheaper method of getting goods delivered at their doors. From that time on inspired editorials have appeared continually in the press, telling the storekeeper that with a parcels post in vogue he would be ruined. Who inspired such editorials it would be easy to guess. The stuff was even published in San Francisco as telegraphed from New York. And under the guise of opposing the Eastern mail-order houses, it gave them a splendid free advertisement. It was alleged that a parcels post would throw all business into the hands of the mail-order houses, who could, would, and did easily undersell the local trader. On this account merchants, as individuals and in their various associations, were vehemently urged to oppose its institution tooth and nail. Certain jobbers in San Francisco even formed an Anti-Parcels Post League. Their organ was the *Pacific Coast Merchant*. They feared that the retailer would avail himself of the parcels post to buy his goods direct from the various factories, and so benefit himself and his customers. One such jobber with whom I conversed, after trying the mail-order house talk, frankly admitted that the parcels post would prove a permanent benefit to the local merchant; but, he claimed, would injure the jobber.

As to why the local dealer should be hurt by a parcels post no one has yet found out. That the persistent calamity-howling of the express companies is already becoming ridiculous and ineffective, the recent indorsement of parcels post by the Society of Retail Merchants of New England loudly attests.

On the face of it, the contention as to injury being worked to the local dealer bore its own refutation.

The parcels rate asked of the postoffice was 25 cents for 11 pounds. Now, it is safe to say, that five sixths of the population of the United States live within such distance of some large mail-order house as to get their goods delivered by freight at a rate much less than this 2 cents per pound. It is also well known that department stores, even in California, already deliver goods from their bargain counters free of all charge for transportation. In spite of this, I am sure you will all acknowledge that in Stockton, Oakland, Berkeley, Sacramento, and even in Marysville, there were never better stores with finer stocks of goods than there are to-day. This absolutely free delivery has had no such ruinous effects as have been predicted. Moreover, were the mail-order business so exceedingly profitable, it would be easily within the bounds of imagination to conceive of branches of these large mail-order houses established at San Francisco, Los Angeles, or Sacramento sending their goods by freight at much lower rates than the advocates of a parcels post have suggested.

And, by the by, has it ever occurred to the Marysville merchants that they were giving these same mail-order houses the biggest kind of a boost by getting the press all over the country to proclaim that goods could be bought cheaper of those houses than of the local dealer? Is not this a free advertisement for those houses of the utmost value? Is it not a direct invitation to any wide-awake buyer to purchase of these houses?

I am glad to be here to-day, not only to tell them that if this is really their argument it is "bad business," but also that their whole opposition to the parcels post is, as they are now slowly discovering, also bad business.

In the first place, the parcels post has proved in other countries a most powerful stimulus to trade. The retail merchants would in those countries be the first to object to its impairment or abolition.

In the second place, the lack of a parcels post has been, and is likely to be, the cause of more orders going to mail-order houses than otherwise would be the case. Postal rates and express rates on purchases being largely prohibitive, buyers naturally turn to freight rates. To secure these, a minimum freight of 100 pounds must be paid for. So if Jones wants only 25 pounds of goods, he suggests to neighbors Smith, Brown, and Robinson that they should pool issues and each send for 25 pounds, dividing the freight charge among them. Jones lends them his mail-order catalogue and each selects the goods he needs, and the local dealer thus loses the sale of 100 pounds of goods instead of 25 pounds. Or, Jones himself further scans the catalogue and sends for 75 pounds more goods than he would otherwise have ordered had it been possible to send for his 25 pounds by parcels post. This is no far-fetched, fanciful instance; it is what is now being done, and the best way to check it is to institute an up-to-date parcels post. This is the true method of giving the small local merchant a chance to compete with the big houses. It widens his stock and practically multiplies his capital. As to local buyers, there is no doubt they prefer buying things of local dealers where those dealers understand their business. The average buyer hates to write a letter, or even to fill in an order blank. He wants to see the articles he is to pay for before he parts with his coin. He wants his goods *now*, and not five or six weeks hence. I am glad, therefore, to learn that those retail merchants who oppose parcels post have reconsidered the matter, and decline any longer to be dupes of the express companies.

Concerning the stale fabrication as to the demand for a parcels post being raised by the Eastern mail-order houses, as President of the California Postal Progress League I can vouch for the fact that not a dollar has reached our treasurer from any one of those houses; and not even a single word of encouragement. Of course, if there are individual retailers who choose to cherish the notion that paying exorbitant rates to swell the extravagant dividends of express companies really benefits them and their customers, that is their privilege as citizens of this free republic. If the experience of the past does not convince them that all improvement of transportation facilities increases commerce, I can not hope that any argument of mine will avail. If there be such an one still in California, at least let him cease from advertising the Eastern mail-order houses by getting his local editor to tell the farmers that they can buy cheaper in Chicago than they can of him. He had better spend his time hustling to buy his own goods cheaper by buying direct from the factory and getting things delivered by cheap parcels post, where there will be no rebates and no special rates of any kind. The world moves, and the retail merchant must keep step or lose his place in the procession. He must accept the means at hand to hold his own, and in this struggle with the Eastern mail-order houses the parcels post is the very weapon he wants to aid him in his warfare. By its aid he can stand, if he will only cease telling all the world that they can buy cheaper in Chicago than they can of him. The fact of this having been the one stock argument put forward to discredit the parcels post, certainly demonstrates that the express companies and not the merchants are the real opponents. It is surely incredible that any body of intelligent California merchants would be so insane as to spread a report up and down the length and breadth of the land that consumers can profitably send to Chicago for their goods instead of buying at home. I trust our merchants have such abundant good sense as shall lead them to denounce their being any longer made cat's paws to rake out hot chestnuts for the express companies' ravenous maws.

My time runs short. But permit me one word to tell you how British farmers and fruit-growers are subserved by the parcels post. By the adoption of packages of size and weight in accord with postal regulations the British farmer can have his produce taken from his gate by postal motor or wagon, shipped in the cars, and thence delivered at the house of the addressee in such quantities as suit his convenience. Similarly, goods can be shipped to him from any part of the kingdom and delivered at his gate. It does not matter one whit whether it is cream, butter, eggs, fruit, fish, or fowls—anything goes, goes on time, and gets there on time. One firm shipped 70,000 parcels in two days.

Just how useful such an institution would be to us, each one can readily picture for himself. The endless waste of time, and the constant annoyance daily experienced for lack of such service, we all too keenly realize. The comfort of such an institution, the saving of cash and energy, of time and temper, also appeal to us all. Whether we are to enjoy this inestimable boon to all classes depends upon ourselves. We are too prone to relegate our responsibilities on that impersonal thing we call our Government. We forget that *we* are the government, and that unless we, the people, issue *our* mandate no reforms are possible. All reforms come from outside pressure, not from spontaneous internal action. It is for you to instruct your Congressman in such forcible and unmistakable terms as shall leave him no option but to vote for an up-to-date parcels post or make way for one who will.

A MEMBER. Has the postal service in England, Germany, Switzerland, and France wiped out the local dealer?

MR. BERWICK. I caused inquiry to be made regarding that. I received word that, if there were any talk of impairing the parcels post, the retail dealer would be the first to object. It subserves his convenience very fully. I also did more than that. I wrote to London to inquire what the effect of parcels post had been on the express companies. They have no express companies under that name in Great Britain, but they do have what they call parcels delivery companies. I have a letter, I believe, from the manager of the London and Westminster Bank, one of the largest banks in London, saying that there were no shares of that company on the market; they were all held by families who were extremely wealthy; so even the express companies can live and compete with parcels post at those low rates. They can not pile up, I presume, in a few years, $30,000,000 surplus or declare great dividends. (Applause.)

In the absence of Prof. W. T. Clarke, Secretary Isaac read his paper entitled ''Extension Work of the College of Agriculture of the University of California.''

EXTENSION WORK OF THE COLLEGE OF AGRICULTURE OF THE UNIVERSITY OF CALIFORNIA.

By PROF. WARREN T. CLARKE, of Berkeley.

The history of the Colleges of Agriculture and Experiment Stations in the United States can be readily traced through four lines of general activity. In the first place, the endeavor has been to build up a science of agriculture. This endeavor demanded the gathering together of a vast mass of facts through the mediumship of experimental work, and we find that this has been and is being done by the institutions in question. How well the work has been prosecuted, and how great may be the value of the results obtained, it is not our purpose to discuss at this time. It will suffice to say that each succeeding year finds these institutions receiving renewed support and their methods of work being adopted and becoming the common farm practice.

Of course, the facts that might be established through this experimental endeavor would be useless and inert did they not become the common property of others besides the college and station workers; hence, we find the function of *teaching* taken up by the members of the station staff of experimenters as a very necessary part of their activities.

By the college courses in agriculture the results of the experimental work became a part of the working equipment of the students in these courses, and through them to a certain extent the property of the interested farmers. The number of those benefiting in this way was of necessity limited, and to reach a larger audience publication of methods of work and results obtained, in bulletins, is and has been, since the beginning, the third form of activity of the Experiment Stations. These bulletins give in concise form the necessary data upon which procedure should be based to obtain certain results, and undoubtedly have been and are of great value to the agricultural and horticultural interests of the country.

Satisfactory as far as they go, the lines of activity heretofore described were found in experience to be not broad enough to adequately cover the ground, and a fourth line of endeavor has been the result. This is included under the broad title of University Extension in Agriculture. Various activities are carried on under this heading, all tending toward making available to the farmer information necessary to him in the successful prosecution of his work. Under this heading, probably Farmers' Institutes have in the past received more attention than any other one item. The Farmers' Institute is, in its make-up, a meeting of those engaged in agricultural pursuits addressed by men who, in Experiment Station and College of Agriculture work, have studied over and experimented on the very problems confronting those who make up their audiences. By this means, the experience and thought of the worker along scientific lines are carried directly to the man who should profit thereby. Not alone, however, does the man from the college make himself heard in these meetings, but the practical worker, the farmer, the horticulturist, who is in the business and has made a success of it, is led to tell of his work and methods. Thus, all sides of the particular question receive attention and the farmer receives the benefit. That no point may be missed, no item of value fail to get due attention, is the prime object sought, and therefore we find in the Farmers' Institute the asking of questions encouraged and indeed insisted upon. In fact, it is recognized that only in the asking of questions and in the free discussion of pertinent matter can the full value of these meetings be realized. As one of the forms of work in University Extension in Agriculture, the Farmers' Institute undoubtedly fills a very important field; yet it has been recognized that the business of farming demanded, in some of its phases, more detailed and intensive instruction than could be expected from the Institute.

We find, therefore, reading courses for farmers offered as a further amplification of the Extension work, and the Department of University Extension in Agriculture of the University of California has the rather unique distinction of being in the lead of such departments connected with the Experiment Stations and Colleges of Agriculture, in the matter of these reading courses for home study. At the present time the department in question offers two such courses, one in economic entomology and one in irrigation practice and institutions. Any one desiring to read up on these subjects, in a systematic way, may enroll in the courses, and literature will be furnished him, free of all cost save the expense of transportation of the books from and to Berkeley. These books and publications are chosen as being representative of the best thought and study and experience on the questions at issue, while the students using them have the privilege of referring questions that may arise to those members of the staff of the College of Agriculture, Berkeley, who are specialists in the subject being studied. The courses may be considered as bringing University Extension teaching to the students' homes.

Other forms of work are undertaken by the department in question, but enough has been said to indicate the policy under which it works. How well the purpose and spirit of the institute movement are being carried out can be perhaps best shown by a review of the work done in the past year. This review must to some extent deal with figures, but is instructive none the less.

During the past year Farmers' Institutes were held in 30 counties of the State. The total number of institutes held during the year was 84. Of these, 33 were one-day meetings; 48 continued through two days; while 3 were of three days' duration. The total number of sessions was 296, while the total attendance at these meetings was 20,470; making an average attendance of 69 at each session.

It required the services of 23 State lecturers and 195 local speakers to carry on the work of these institutes. Of these State lecturers, 13 were employed at various times to give instruction in special topics, while 10 lecturers and demonstrators from the faculty of the College of Agriculture devoted a total of one hundred days to the work.

In addition to those already noted, three general institutes were held. Two of these were in conjunction with the State Teachers' Institutes at Fresno and Chico, and one with the Sonoma County Grange. The total number of sessions at these meetings was 8, and the total attendance 2,500, or an average attendance per session of 312.

The work done at these institutes covered, from both the practical and the theoretical side, many of the problems confronting the agriculturists and horticulturists of the State, and can be considered, judging by the interest indicated through the figures just given, to be of actual value to the farmers of California.

We believe that this educational movement along the lines of a better and more scientific agriculture is of great significance, and points in the end to a better and more stable, more dependable citizenship for our State.

There remaining a few minutes before time for recess, Mr. Berwick called the attention of the Convention to the so-called "Tin-Can Club," the object of which is to interest the children of the public schools in the planting of trees in tin cans, and then finding some man with a large tract of land that is not being utilized and getting him to plant trees on his land. Mr. H. A. Green, of Monterey, will send to any one interested a booklet entitled "Practical Forestry Simplified."

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION—FIRST DAY.

TUESDAY, December 3, 1907.

The meeting was called to order by the Chairman.

MR. JUDD. I move that a committee of three be appointed on the Chairman's address, the committee to be named by the Secretary, and that the President also appoint a committee of three on the Governor's address.

The motion was duly seconded and carried.

The Secretary appointed as the committee on the Chairman's address Messrs. A. N. Judd, S. A. Pease, and E. Booth.

The President appointed as the committee on the Governor's address, Messrs. Edward Berwick, F. W. Crandall, and R. P. Cundiff.

MR. BERWICK moved that the Chair appoint a committee of three on resolutions. The motion was duly seconded and carried, and the Chair appointed as such committee, Messrs. John Markley, James Mills, and H. P. Stabler.

THE CHAIRMAN. Ladies and Gentlemen, we have Mr. Lownsdale, representing the Willamette Valley, who will give us a paper on "Apple Growing in the Willamette Valley."

MR. LOWNSDALE. Mr. President, Ladies and Gentlemen: For many years I have stored up for myself the pleasure of attending some of your annual meetings. I have for all those years read the reports of your annual meetings so faithfully that I have become well acquainted with all the growers of California, exceedingly well acquainted with them by name, and I am glad indeed to be able to be here to-day, where I may possibly take some of these growers by the hand and look into their faces, here in this city of Marysville. Just think of it! In Marysville and Yuba City, names hallowed in the romance of days! When I was reading these reports of your annual meetings, I had never hoped to be asked to address any of your meetings. I thought, "If I could only be there at some time," but it never occurred to me to be asked to address you, because that was beyond me, an Oregonian in the backwoods; but I am happy to have been asked and happy to be standing before you to-day, even if I compel you to listen to a very elementary essay on horticulture. You know, in Oregon, at our State meeting, each one comes along with a little primer of horticulture and recites his A B C of horticulture, and recites it with great seriousness and sometimes with sobriety, and I will have to do the same—that is, as to the seriousness. We have not got out of the rut. We know our A B C's, but the E F G's are beyond us; so it will be a very elementary paper on the every-day happenings in an Oregon apple orchard to which you will have to listen. I would like to say further, that I do not wish to be understood as attempting to speak with any semblance of authority, any semblance of scientific authority, upon any subject, any abstruse question of horticulture, for I am only a layman, and I wish to leave all those deeper problems to deeper thinkers.

APPLE-GROWING IN THE WILLAMETTE VALLEY.

By M. O. LOWNSDALE, of Lafayette, Oregon.

The growing of apples in the Willamette Valley was one of the first industries undertaken by the Oregon pioneers. To these adventurous souls, these crusaders to a holy land, the great valley with its fertile soils, abundant moisture, and delightful temperature seemed the natural home of fruits that were the joys of their childhood days. The planting of apples resulted—at first in a tentative way by the trial of seedlings. The remarkable productiveness of these seedlings was everywhere noted and soon led to the introduction of grafted trees. In the fall of 1847 the first grafted apple trees were planted in the Willamette Valley and were the first grafted trees to be planted on the Pacific Coast. You know we had several years' advantage of you in the matter of immigration from Eastward and our tree plantings antedated yours somewhat. These trees thrived. The beauty, the lusciousness, the perfection of form, color and size of their fruit gave to Oregon a wondrous fame, making its name a household word throughout the Western and Middle States as "the land of big red apples." We, the sons of those sturdy pioneers, glory in that title to-day. Other sections may appropriate, other sections may imitate, but the Willamette Valley will always be the true, the original "land of big red apples."

In these early days fabulous sums were obtained for the output of our orchards. Twenty, thirty, forty, sixty dollars per box were not uncommon. The product of a single tree was sold for $260, and a single box containing 75 apples was sold by Mr. Lewelling of our valley for $75.

San Francisco and the gold mines of California were our principal customers. But the marvelous development of the fruit industry in California, and the lack of transportation to more distant centers, robbed the valley of its markets. The varied interests of farmers in the fertile valley, where so many lines of industry thrived, caused the orchards of those early days to be neglected, forgotten, and they soon passed into a ghostly semblance of their primal glory. The majority of them remain now, time-worn and rusty, hoary with moss and bending to their mother earth as if to lay them down in a long rest. Yet these old friends, in whose arms many of us have lain in our childhood days, these old friends burdened with the infirmities of age and the ills which their guardians have allowed to creep in, are each year trying to do their best, pitifully trying to show us fruits of the quality of those early days, faithfully trying to give returns for the little attention they have received during a lifetime.

But we of a younger generation, believing somewhat in a reincarnation of souls, propose to give a new life and vigor to these old orchards, by cutting them back to the ground, allowing them to grow a year and top-grafting into Yellow Newtowns. Then by stringent legislation, to compel owners to keep these rejuvenated trees free from pests. With the encouragement, the care they will receive hereafter, these old hard-working friends will again carry the fame of the Willamette Valley to the farther coast, and beyond. This matter is already well in hand and some trees planted in '52 are to-day bearing fine crops of newly grafted fruit. There is practically an unlimited market in England for Yellow Newtowns to which we propose to cater. This variety is a very slow grower in our valley and needs just the virile root-system of these old orchards to give it thrift and vigor.

However, it is not upon these pioneer orchards that the Willamette Valley depends for the maintenance of her fame as the "land of the big red apple." Large commercial orchards have been planted in various sections of the valley and are annually producing great quantities of fruit that, in each succeeding year, bring higher and higher prices in Eastern markets. The work of growing apples for these sensitive and hypercritical markets has become a specialty with many Oregon orchardists. The extreme care necessary to produce Spitzenbergs, for instance, running 72 and larger to the Oregon box, all of high color and without blemish, fruit that brings from $2 to $5 per box, makes orcharding an operation of delicate exactness and of constant watchfulness. The cheaper grades of apples, like Baldwins, Ben Davis, Rome Beauties, etc., do not require such close attention and do not need to command such extreme prices to be profitable. Yet the best orchardist is he who tries to approach as nearly as possible the standard in everything he grows, and so there is great rivalry in the specialty work of apple-growing in Oregon.

We of the Willamette Valley claim to produce the highest type of Spitzenbergs grown on the Coast (which means in the world). The true Esopus Spitzenberg is an elongated apple, brilliant in color, musky in flavor, and rich in the spicy oils and juices that taught our youthful palates an ecstasy to be remembered until we pass to our graves. Such is the Spitzenberg of the Willamette Valley.

But this exquisite fruit is as shy as many a dainty maid, and must be sought by a persistent wooer if he would win her in all her voluptuousness. The kiss of a lover upon the lips of a bloom often leaves an unsightly blotch of scab upon her cheek. Her perfumes are so seductive, her color so brilliant, that codling-moths, ever haunting where beauty lies, hover in hordes about her to fondle—but ah, with stings of death. Loyally must we serve if we would protect her from the devoirs of these lovers who bring disease in their train and scars in their every touch.

To bring the radiant Spitzenberg to her greatest perfection, a moist atmosphere is desirable, an abundance of moisture in the soil imperative, and a valiant sweep of a temperate sun to soften the asperity of autumnal frosts necessary. Dry climates or soils that lose their moisture rapidly are not to be trusted with the bringing up of a Spitzenberg family. Trees of this variety are hard drinkers, and also lose more moisture by transpiration than almost any of the standard varieties of apples. They require double the cultivation that would suffice for Baldwins, and varieties should be so interplanted as to allow of this extra cultivation of the thirstier trees.

I would think there are many situations in California along the coast or water levels, along the bays and rivers, or on foothills, where there is plenty of moisture in the air, that could produce these fancy grades of apples, if close attention be given to the constitutional demands of these varieties. But the hot, dry valleys of the interior would never do for Spitzenbergs, and probably other varieties could never succeed quite so well in those sections as in our moister climate.

The worst enemy of the apple-grower in the Willamette Valley is apple-scab, as the very condition that produces the high flavor and lusciousness of our fruits—an abundance of moisture in the air—furnishes the best medium for development of the scab fungus. As yet we have not thoroughly mastered this obstinate fellow, though we have a strangle hold upon him and keep him in fair subjection.

In handling these fungoid diseases we find that local conditions, atmospheric or otherwise, are often unique, often peculiar to themselves, and are always so variant in different localities that it is impossible to formulate a universal rule for the treatment of such troubles. We have to learn the best methods, the best materials, the best times for application by the old, hard knocks of experience. We must abandon many of the scientific formulas, and, following the doctrine of selection, adapt them to our local needs. For instance, winter treatment of the scab fungus seems to be of no value in our valley and we are compelled to dodge the rainstorms of late spring and, in a moment as it were, dose our trees with preparations of Bordeaux or similar fungicides. As soon as the blossoms drop, we are out combining with Bordeaux one of the arsenicals for the many beetles and measuring worms that inevitably make their homes in an apple orchard. No effort is made to fill the calyx with poison for codling-moth, as in other apple-growing districts. Moths do not appear in the Willamette Valley before June 25th, and it is useless to attempt to hold the poison in the calyx cup until that time. The poison is so taken up or lost in the process of fruit elaboration, or is dissipated by dews, fogs, and rains, that it disappears in about three weeks after an application, which would be considerably before the appearance of the moth in our valley.

The labor of thinning begins as soon as the little apple-children begin to show the blessed precocity of youth. In the best practice we thin to about eight inches, and, for better protection against moths and blemishes of fungi, we cut away all foliage that touches the fruit or obstructs the rays of the coloring sun. It is this infinite solicitude, this tender care for the nursling, that gives the immediate vigor, the energy to push fruit along to the special high grade our finicky market demands. Size, form, type, the ability to color well under the proper impulses, are all given when the little fruits are in swaddling clothes as it were. Neglect at this time will cause a slow development, an inability to throw off fungoid diseases, and will leave many footholds for the attacks of apple worms and beetles. Weak pollinators, so-called self-sterile trees, like Spitzenbergs and Gravensteins, will often carry unfertilized fruit to a fair maturity, if given such an extra impulse just as the pome begins to increase in size.

This problem of pollination and the inter-related corollaries of sterility and cross-pollination have received much attention of late, and their theoretic solutions, at least, have been before us for many years. But the more we investigate, the more we study its various phases, the more clearly do we recognize the intricacies of the problem and feel that its solution is farther and farther removed. There are at work so many influences with which we do not seem to get in touch, influences at work in the season previous to blooming, influences perhaps of soil, of atmosphere, of moisture, of temperature, of cultivation, and, perhaps, hidden influences that affect the potency of pollen—all these imperfectly understood agents, that may possibly be controlling factors, confuse us in our attempts to work out practical methods of directing the fruitfulness of our trees. In despair we can only sit down and formulate theories.

We of the Willamette Valley, abandoning somewhat the highways constructed by scientists, seem to get good results with impotent pollen-producers like Spitzenbergs by applying a combined fertilizer of nitrate of soda and muriate of potash in the spring just before bloom buds are formed. [Since this paper was read a distinguished authority has suggested that a superphosphate might give even better results than the first mentioned fertilizer.—Ed.] This treatment seems to give trees a vigor that will carry buds through the hot summer months without a loss of fertility, and at blooming time the next spring we have flowers whose pollen seems not greatly lacking in potency. This evidence is not at all conclusive and we are not prepared to announce positive results, but we believe that we can at least affect the potency of pollen to a great degree by this method. It is not so much that these varieties of shy setting fruits are always shy in the bearing of pollen as that their pollen seems impotent, and it is the problem of the grower to correct that tendency if possible. With the bare theory of self-sterility of these trees (a theory founded on experiments conducted under false and unnatural conditions) we have little patience.

True, as before remarked, this theoretic solution of this problem is ever before us. Practical men among close observers see that there are more important factors working through as yet unknown channels to be reckoned with. These observers find that the factors that control the receptivity of pistils, the potency of pollen, the virtue of the secretions that bear such important relations to the setting of fruit, are as elusive as gossamer on the summer-wind. There are no wizards of Santa Rosa among the plain apple-growers of to-day. For this special knowledge we are groping through an undiscovered realm. As in our dreams, are shadowy forms before us, a moment shown and then withdrawn. But as we catch these trembling glimpses of a truth beyond our ken, we feel that perhaps we may be groping in the right direction and hope the solution may not long be delayed.

For how disappointing, as practical assistants, are trees set for purposes of cross-pollination in orchards. Your pollinators will not bloom in the years your sterile trees need them, or some untoward or unforeseen condition will hasten or retard their normal blooming period and your sterile trees will bloom alone. Perhaps in one year in five you may notice the influence of pollinators in the form and vigor of fruit. But these specimens are generally more important as curiosities than otherwise. So that any method that promises to reveal the controlling factors in the setting of fruit will be welcomed by planters of self-sterile or weak pollen-producing trees, and will mark a very distinct advance in fruit culture.

The paraphernalia of a large apple orchard, and the elaborate processes of handling fruit, are as spectacular in their operation as in any of the great orange groves and packing-houses of the south. Of late years trees have been groomed as faithfully as are thoroughbred horses in great racing establishments. It is by this attention to detail that fruit is brought to that perfection which enables us to get the highest prices paid in the world to-day for apples. As you have all learned years ago, the haphazard leads to the brush heap, and every detail of our specialty work is the result of much study and experience. Study with pruning knife and microscope, study of the physical characteristics of a tree with the same minute attention which the physician or surgeon gives to the human system, study of the needs of this market and that, of new and attractive methods of packing, study of even more abstruse subjects than these—all of which require expert attention and demand that the large orchardist shall seldom ''go fishing.'' Exactness in the matter of spraying, heedful both of time and of thoroughness, as, for instance, spraying from both elevated platform and the ground at the same time, exactness in the matter of cultivation, of thinning and watching the summer development of the fruit, exactness in allowing no foliage to touch a fruit or two apples to touch each other, such care in picking as is known in no other apple-growing section, the thorough washing and careful sizing, with specially constructed machinery, of fruit before it is stored in warehouses, the storing on ventilated trays, the control of drafts among stored fruit—these are some of the requisites that go to make the growing of high-grade apples a specialty proposition to-day, and are methods in use by the best growers in the Willamette Valley.

Apple-growers generally believe this to be the most remarkable year for their business known in a generation. So many abnormal physical conditions are found, so many of the old rots and a few new ones, rots like the brown speck in the flesh of the apple, the core rot, the new, dry, spongy rot that shrivels a thin layer of flesh under the skin surrounding the calyx, and many others of the same general family, all these are rampant this year where the layman would naturally expect high quality. The crop is the shortest in the history of the United States, and it is often said, ''Well, it will be of an extra good quality then." That is a mistake. Give me a tree comfortably filled, or well filled, and normal conditions and I will always pick from it the fanciest apples. Because of the shortness of the crop, prices have been high for extra fancy fruit. It was thought last year that the maximum had been reached when 72's, or larger, in Spitzenbergs sold for $3.10 and $3.15 per box. But this year they have gone even higher, these grades bringing in the Willamette Valley $4 and $5 per box. But we do not imagine that these high prices will continue, and are gradually working toward the English market by top-grafting into Yellow Newtowns.

There has always been a chance for discussion as to the causes of the coloring of apples, and Professor Van Deman has lately gone on record as saying it is a matter of soil and the availability of its constituent foods. I think the great professor would revise his opinion if he were long a resident of Oregon. Soils, situation, elevation, moisture, and many other considerations may affect, but the inconstance of coloring year after year on the same trees would not bear out the theory. In our valley, if we have early September rains quickly followed by frosts, as is our usual experience, we don't bother much about the coloring of our apples, in any situation. If we miss either of these conditions we are standing a-tiptoe until late in October before we can commence picking, for we pick our apples when they are ready, be it October 1st or November 21st.

It would hardly be fair to the Willamette Valley, with its sweep of over a hundred miles of rolling hill and prairie, its wealth of woodland witcheries, this garden of the Hesperides, along whose slopes might have been borne the golden apples that won Atlanta—it would hardly be fair to that beautiful valley to ignore its wonderful adaptability to the growing of other fruits than high-grade apples. This valley is a natural haven for tender cherries, those delicate varieties natived in the south of France. Then, too, in the Willamette Valley have been originated the greatest cherries of the world to-day, with the single possible exception of the Napoleon Bigarreau. The Bing, the Lambert, and the Hoskins are an unbeatable trio, as many of you know. Unbeatable for their beauty, their high flavor, and their enormous size. I remember when Mr. Hoskins sent some early specimens of his seedling cherry to the Department of Agriculture at Washington, he received an acknowledgment about as follows: "The plums you sent me must have been very fine and large, though they were delayed so long I could not test them as I would have liked." Plums will not stand long delays.

The Lambert, the Bing, the Hoskins, and the Royal Ann, as grown in our valley, are certainly revelations to the connoisseur of fine fruits.

And then our Bartlett pears! The juiciest, the most meltingly delicious Bartletts in the universe, as many of you know who have eaten them in their habitat.

MR. BERWICK. Regarding fertilizing, what quantity do you use per acre?

MR. LOWNSDALE. 130 to 160 of the two.

MR. BERWICK. Drilled in or broadcast?

MR. LOWNSDALE. Broadcast.

MR. MILLS. Would it not be better not to wash the apples?

MR. LOWNSDALE. No; apples should always be washed before going into storage. It is a mistaken idea that an apple will deteriorate if washed. The better you clean an apple the longer it will keep in storage. It is absolutely necessary to remove that dirt, or the luster is gone. Then as soon as the luster is gone, the keeping quality of the apple is gone. The luster depends upon the oils that are secreted. If that moisture is taken care of by proper handling, it will form an oil on the surface of the apples which will keep them a long time. It will be impossible to form that oil if the apple is dirty.

MR. CRANDALL. I wish to ask if this question of washing for the long keeping of apples is not almost contradictory to the general law which we have been observing, that in any way removing the natural bloom from fruit will cause its early deterioration?

MR. LOWNSDALE. I am not prepared to answer that exactly. As I have hinted in something I said, this is the result of long experience, of many experiments both ways, and I can not say what influence the retention of the bloom on the apples would have in reference to their keeping qualities. I am sure, however, that I am absolutely correct in the statement that apples in our valley will not keep as long if they are not washed as they will if they are washed and put away. That is as far as I care to go.

MR. MILLS. How long must you handle them to eliminate any decay in the fruit?

MR. LOWNSDALE. After they go on to the trays they are never touched until they are packed.

MR. MILLS. How about the percentage of loss?

MR. LOWNSDALE. If we pack them about the first of January I would say about five per cent; if they are left until March, about ten to fifteen per cent. Not all will decay, but they will not be marketable apples. We may have to dry a portion of that fifteen per cent, but by the middle of March there would be ten or fifteen per cent.

MR. MILLS. Is that for the ideal handling which you have described, or is it the general result from the average farm?

MR. LOWNSDALE. That is the general result.

THE CHAIRMAN. There is a request from the audience that Mr. Frank Femmons read a short poem which he has on the apple.

THE APPLE.

By FRANK FEMMONS, of Home Orchard.

That maxim old, so often told,
"We live by what we eat,"
Is true to-day, in every way,
So true "'tis hard to beat."

'Twas old I know, long years ago,
We only need remind,
Lest we forget to follow yet,
A rule that's ever kind.

To keep in health, with little wealth,
Through days as they come 'round,
'Tis simply this, Ah, what a bliss!
I'll tell it as I've found.

Some apples eat, both tart and sweet;
If small, then two or more;
First peel the skin, quite neat and thin,
But do not eat the core.

Of changing stripe, when fully ripe,
A golden, green or red,
A good one choose (or you may lose,
By beauty's cheek misled).

Whatever hue that pleases you;
One juicy, rich and fine—
With flavor rare—without compare,
A lover knows the sign.

At morning's meal, when you may feel
The need of some rare wine,
The apple fair is far more rare
Than vintage from the Rhine.

To gods who feast, from west to east,
Or 'neath the tropic sun,
Our apples bright, by Nature's right,
Are first with every one.

Their juicy flesh, so crisp and fresh,
Is flavored from the dew;
The morning bright, the sun's clear light,
And evening's brightest hue,

Are blended there, with love and care—
The richest given wealth;
By angel's hands, through all the lands,
To bless the world with health.

And when they're stewed, by hands not rude,
In country or in town;
In dumplings warm—in pastry form,
Or baked to waxy brown,

A little cream may add a "dream,"
Ah! who could ask for more?
Till tarts and pies, in visions rise,
Through good wife's pantry door.

THE CHAIRMAN. Next we will have a paper on "Pear Blight and Its Control," by Mr. Howard Reed.

MR. REED. Mr. President, Ladies and Gentlemen: We have had so much of poetry and good feeling here this afternoon that I feel sorry that I have a paper to read which has in it so much of disaster and heartache on the part of some of our fruit-growers, including myself, but the thoughts that I give you I speak from my heart, at any event.

PEAR BLIGHT AND ITS CONTROL.

By HOWARD REED, of Marysville.

"Pear Blight and Its Control" is a subject that the California pear-grower cares little about; it is something he wishes to dismiss from his consideration, something he prefers to forget, if one were to judge by the deplorable condition of most pear orchards in California to-day, and judging also by the half-hearted and unsuccessful efforts of the pear-growers to combat the blight. I have therefore approached the task of interesting this Convention in this subject with much misgiving. I am, however, spurred on by the thought that there yet remains much that might possibly be done toward saving the remnant of California pear orchards, and also her apple orchards, which are as yet practically unharmed by the blight. There are also the pear and apple orchards of our sister states of Washington and Oregon, which ought not to be allowed to perish.

Without going any further, I am frank to say that I have about as much hope of making a trip to the moon as I have of seeing the proper steps taken toward saving our pear orchards. I have long since resigned myself to the fate of losing my pear orchard before many years shall have elapsed. While I feel very strongly that this is an unkind fate and in justice never should have come about, still I would not have you regard me as a common scold because of the criticisms I shall make of those authorities and those conditions which I deem responsible for this great misfortune. Only to live in California is too glorious an opportunity, too great a blessing, for one to be cast down by one misfortune. I insist that I make these remarks only in the hope that some day, some way, a condition of affairs may be brought about, whereby it will not be permitted that such a calamity will overtake any other branch of our great industry, if there be any possible way to prevent it. In my opinion, California's pear orchards ought to have been saved.

The only genuine effort that has been made to stop the ravages of the blight has been carried on under the combined direction of the Federal and State authorities engaged in horticultural work. This work has generally been supposed to have been done under the Waite system, and the failure of this effort has been by too many erroneously and unreasonably laid at Professor Waite's door. It is probably true that the pear orchards were doomed before Professor Waite had ever been invited to come to the State. The growers attempted to administer the pound of cure, but they had spurned the ounce of prevention.

Professor Waite is here and perhaps needs no defense at my hands, but I insist that this work has not been done under the Waite system. I well remember Professor Waite's advent into this fight and I know the line of action that he laid out. I feel safe in saying that in not a single county did the Horticultural Commissioners get behind him in this fight. I am led to believe that it is debatable ground whether or not the County Horticultural Commissioners have sufficient power to act in such matters without the authority of the State Horticultural Commissioner.

As far as I know, the State Horticultural Commissioner's office has never taken any active interest in pear blight. As a County Horticultural Commissioner and in my own interest, some few weeks ago I decided to find out what help could be had from the State Commissioner's office toward fighting pear blight in Yuba County, seeing what a fizzle the County Commissioners had made of their efforts along the same lines in the past. I wrote a letter to the State Commissioner's office in which I recited the fact that there were a number of commercial pear orchards in my vicinity, the owners of which were making an expensive and determined effort to control the pear blight therein. I further recited the fact that in Yuba County there are a number of neglected and abandoned pear orchards, which are teeming with pear blight and which are a constant and terrible menace to those who are endeavoring to save their properties from this destructive agency. The letter concluded by asking the State Horticultural Commissioner for his authority to prosecute the work desired to be done. This letter was signed by myself and Mr. Harney as County Horticultural Commissioners. In reply we received a letter in which we were thanked for our annual report as County Horticultural Commissioners and in which our request for power to act was absolutely ignored. This experience confirms my belief that the State Horticultural Commissioner's office wants nothing to do with pear blight. This office, I believe, has not given as much assistance to Professor Waite as have the different County Boards, none of which has been of any practical value.

Now, strange as it may seem, the parties most interested, the growers themselves, have in many cases met the proffered assistance of Professor Waite and his fellow-workers with bitter antagonism, if not open hostility. They have attempted to belittle his efforts, have tried to poke fun at the Professor and his work, and have successfully held up and nullified the Waite campaign against blight. But I am not seeking a quarrel with any one. I simply seek to draw your attention to the weakness of a system that allows an individual to maintain his property as a menace not only to his own interest and his immediate neighbors', but to a great industry of our State.

Another thing that has interfered with the success of this campaign has been the woeful inefficiency of many of those growers who have tried to make a stand against the blight. Moreover, the inefficiency of the help engaged by the growers in this fight has been surprising and discouraging in the utmost and has in itself rendered impracticable a demonstration of the efficiency of the Waite system.

Now, it seems to me, that it is clear that there has been no fair test of the Waite system, for it matters not how well such work may be done in one orchard, such work is largely vitiated if the work fails of being done in adjoining orchards.

Consider, if you will for a minute, my own position in this matter. My living and my future and that of my family are in a very large measure dependent upon my efforts to control the pear blight. By dint of hard work and strict adherence to the Waite system, and in spite of having been forced to work in gum boots for several months during a crucial period of the fight last spring, I have succeeded in maintaining my orchard with not more than a ten per cent loss of bearing surface.

Now then, I naturally wish to save myself from further depredations of the blight. I find myself surrounded on all sides by orchards fairly rotten with the blight. I find my appeals for aid calmly ignored. And yet the State recognizes the justice of my claim, for laws there are in plenty, but the system of carrying out these laws is so puerile, so ineffectual and so cumbersome that I have no hope of the aid that the State intends to render me.

This leads me up to the question that I desire to ask of this Convention. If I were a lawyer I suppose I would call it a hypothetical question. Supposing that, years ago, before the pear blight appeared in California, we had eliminated politics from the office of the State Board of Horticulture and that public sentiment had demanded and succeeded in placing in this office the very best talent available at whatever cost; supposing, for instance, that our good friend Professor Waite had been Horticultural Commissioner at that time; supposing that his enthusiastic determination and wonderful ability had been supported by sufficient laws and an adequate organization of his official forces, do you suppose that when at length pear blight had "reared its horrid head" in California's fair fields, it would not have been immediately stamped out, if not for all time at least for a generation or more? That is the time when the ounce of prevention should have been applied. And pear blight may not be an isolated case. Even now the citrus industry seems to be menaced by a foe demanding the same heroic treatment that should have been applied to pear blight, and we know not at what time some other pest may appear to work destruction to some other branch of California's greatest industry. This peril will ever be with us; we can not escape it; we will have ourselves to blame if we have not learned our lesson. We, as fruit-growers of California, should stand together and have placed in the office of State Horticultural Commissioner the biggest, the brightest, the best equipped man the world affords for that office to-day. We should fortify the office with all necessary laws, with a sufficient organization, and back it up with a public opinion that will tolerate no opposition.

California is the great orchard region of the world, and we should guard well its interests that our enemies may be kept from entering in, and that we may enjoy the full measure of prosperity to which our glorious climate and fertile soil entitle us.

In preparing this paper the detail of pear-blight work did not impress me as being what would most interest this Convention, and if you feel that you would like to hear a recital of the way I actually handle the blight, I feel prepared to give it extemporaneously at this time or to any interested party in private conversation at a later time.

MR. BOOTH. I took hold of the pear blight some four years ago and I have been cutting ever since. Probably three or four feet below where it is cut off the bark becomes black and dead, and if you cut off the bark a sour smell comes out of it and the wood is rusty. What is the cause of that?

MR. REED. The cause of it probably is that the cuts were not deep enough to rid the tree of the blight.

MR. BOOTH. How are we to account for the blight being down in the trunk six to eight feet from the dead wood?

MR. REED. It went in through a sucker or where the tree was injured in cultivation. You can not always tell how it gets in. Sometimes there will be a little flower start out and the blight will go in.

MR. BOOTH. You understand those trees have bodies from eighteen to twenty inches through?

MR. REED. Yes; I have seen little flowers come out on big trees and in a few days the flower would fall off and the blight would go in through that. There is nothing mysterious about the blight; there is a cause for every bit of it.

MR. KING. I would like to ask, would the gentleman, from his experience, advise that no further planting of pear orchards be made in California because of the serious condition in the pear-blight situation?

MR. REED. My advice to a prospective pear-grower would be not to plant out enough pear orchard so it would cripple him financially in the event of failure. If he knows he can always get some one to handle the orchard without outside help it is a good investment. I have a thousand young trees myself, but I am not going to put out any more. If a man wants to engage in the fruit business on a large scale he had better take something else.

THE CHAIRMAN. We next have a paper from a gentleman who needs no introduction, Mr. George C. Roeding of Fresno, entitled "The Smyrna Fig for Profit in the Interior Valley."

MR. ROEDING. It is with some hesitation that I appear before you to-day. I have read and spoken so many times before on the Smyrna fig that I hope you will be quiet during this essay, and if you do so I will reward you by giving to each of you one carton of figs. (Laughter.)

THE SMYRNA FIG FOR PROFIT IN THE INTERIOR VALLEY.

By GEORGE C. ROEDING, of Fresno.

When Governor Gillett appointed J. W. Jeffrey to the position of State Horticultural Commissioner, I said to myself, "Now the old wheel horses will be turned out to pasture and given that rest and quiet to which they are certainly entitled." Hardly had the thought grown strong enough to become a conviction, when I received the usual fiat from Secretary Isaac, of the State Commission, that Smyrna fig culture was the subject on which I was to orate and grow eloquent at this meeting. Needless to say, I good-naturedly protested and endeavored to convince Mr. Isaac that the Smyrna fig had been discussed by me on so many previous occasions at annual meetings of fruit-growers that I thought it was worn threadbare, hence those who are compelled to endure me again will remark, "Well, it is the same old story—Berwick on parcels post, Stephens on transportation, Roeding on figs, etc. Why don't they kill off some of the old-timers and give us something new?" True, I haven't given you anything on the fig for several years, nevertheless those who have known me from the time I was a woolly-headed boy appearing before you, and had it hammered into them, time and again, that I am the fig man, to be inflicted once more, when I am rapidly approaching the time when I might in all seriousness be placed in the class of men who sit in the front row of a theater drinking in the beauty and sinuous grace of a light opera with its accompaniment of pretty girls and—well, it is certainly crowding the mourners: but to revert to my subject, from which we are sadly digressing.

Let me give you a bit of personal history. I am a native son, born and reared in heroic San Francisco. In the nature of things it must seem strange to you that I ever consented to allow my father to plant me in Fresno and keep me there until I became, as you see me now, a full-fledged son of the soil. My father, a banker and merchant, like many another man, had a wholesome horror of his own particular vocation, and often remarked, as I can well remember in my younger days, that being a bank clerk was all very nice; the salary was not to be sneezed at; the hours were short, and the young men had leisure time to watch and admire the pretty girls (for which you know San Francisco is famous) as they tripped down Kearny street. His sons should engage in other lines, and he has successfully carried his views into effect, for I, as well as my brothers, in spite of our desire to have genteel positions which would give us an opportunity to see more of the gentler sex, were compelled to work with our hands for a living, and our inclination to become members of his staff in the bank was sadly shattered. This briefly narrates my introduction into the realm of horticulture, and to-day I am pointed out, in these annual meetings, as the "Fig Man."

Publicity is not always pleasant to a sensitive nature. Recently I was in a suburb of Los Angeles making a purchase of seeds from a man who did not happen to know me personally. When I gave him my name, he looked at me in surprise and said, "You are not the Calimyrna fig man, are you?" Evidently my appearance when traveling belied my occupation. As my friend, Professor Wickson, remarked in one of his graceful notices a short time ago, I may look like a *bon vivant*, but, to the contrary, I am a painstaking, energetic young man, who really works for a living. Before taking my departure from Los Angeles, I was approached by a reporter who desired an interview about my experiences in Smyrna. I objected, saying I had already written so much about my trip that any remarks would only be a repetition of what had already appeared in print many times. He insisted, however, and I finally consented. The result of that interview was anything but edifying. The artist who accompanied the reporter drew my picture, and, sad to relate, I looked very much as if I had had a set-to with one of the Southern California bug inspectors. So much so was this the case that my friend, Frank Wiggins, Secretary of the Los Angeles Chamber of Commerce, cut out the clipping and mailed it to me with the anxious inquiry, "George, were you all O K when this was taken?" And what the reporter said was even worse. Among other things, I was put down as a United States Commissioner—of what it did not say, but presumably of figs and fig bugs. An amusing experience occurred with a reporter in Fresno several years ago, a new man on one of our leading dailies, who was instructed to interview me on the fig. To his query for information, I replied that there was nothing new. In the course of our conversation he wanted to know if I had discovered any method of eradicating the fig insect. I looked at him for a moment, thinking he must be one of Jeffrey's Los Angeles bug inspectors who are constantly on the warpath for insectivorous gore, and then catching my breath I blurted out, "Jehosaphat, man! Eradicate it! Bless your benighted soul, I have for fifteen years plowed through the Agricultural Department at Washington and harrowed every fruit-growers' convention in California for an equal length of time, in an endeavor to import the bug and get it to 'bugging' in my fig orchard." The story, of course, went the rounds of the press, and as for the boy, I believe he was last heard of delivering a lecture on "If bugs were as big as elephants, what would happen to the quarantine office at San Francisco?"

However, I guess I am an old-timer. Well do I remember my first paper on the Smyrna fig, read in Marysville before the Convention of 1891. It was at a time when the whole subject of caprification was regarded as a myth, and its followers (and there were but few) as self-illusionized cranks. My paper was prepared with the utmost care, my experimental work being carefully detailed, hence I expected it to be received in a manner befitting its importance. How rudely my air castle was shattered! When the paper was called for, I happened to be out, and as it was all Greek to the man who read it, and being rather long anyway, I had the satisfaction of listening to remarks like these: "I wonder if he will ever get tired?" "Who is that fellow any way?" "Say, isn't he long-winded?" "Oh, cut it short." The agony over with, I silently said "Amen." Let me tell you, my friends, if you ever get a bee in your bonnet that you are a great writer and are on the road to fame, just let some one else read your essay and seat yourself among people who do not know you and listen to their criticisms. You will say, "Me for the soil; I'll leave writing to men and women who farm on paper with lead pencils."

My paper was followed by one written by the late B. M. Lelong, then Secretary of the State Board of Horticulture, in which the whole subject of caprification was held up to ridicule. In the annual report of the same year, the so-called male and female Blastophaga were illustrated. The male happened to be the female, and the female shown was in reality the parasite *Philitrypesis,* which fortunately for us failed to become established when the fig wasp was introduced. Prof. C. V. Riley, then Chief of the Division of Entomology of the U. S. Department of Agriculture, and who was enthusiastic in his belief in the ultimate success of Smyrna fig culture in California, severely criticised Mr. Lelong later, for his lack of knowledge on this subject.

I do not wish to burden you with all the details relative to the final and successful introduction of the fig wasp, except to say that it was sent to me several times by correspondents, and although the insects issued from the figs, our capri figs were evidently not in condition to receive them, and they failed to establish themselves. For years I had endeavored to interest various secretaries of the U. S. Department of Agriculture in the subject, without success. It was not until my friend, B. N. Rowley, now deceased, proprietor and editor of the *California Fruit-Grower*, who, by the way, was also skeptical on the subject of caprification, finally consented, after my repeated demonstrations that there was something in it, to bring the matter before the State Board of Trade. I sent him specimens of figs produced by artificial pollination, capri figs, etc., and he delivered an address on the subject. As a result of this conference a committee was appointed, consisting of Messrs. Rowley, Maslin, and Filcher, to draft a letter to Hon. James Wilson, Secretary of Agriculture. This letter went into the subject fully, and as a result Mr. Wilson promptly communicated with Dr. L. O. Howard, Chief of the Division of Entomology, and Mr. Walter T. Swingle, Agricultural Explorer for the Division of Seed and Plant Introduction, who was then studying in Italy in the interests of his division.

Several consignments of insects were sent me in March and April in the years 1898 and 1899, and I took care of the infested figs, placing them under trees which had been previously inclosed in canvas tents. Former experiments along the same line in earlier years had always resulted in failures and I anticipated no better success with these later shipments, but nevertheless determined to give the insects every care. Much to my surprise, in June, 1899, I discovered by accident that the wasp, after so many years of uninterrupted effort on my part, had finally consented to be listed among our prize immigrants.

Since success often leads to forgetfulness, I desire to say a few words in honor of a man who never lost faith in the future of this industry, but who devoted time, money, and land for the purpose of carrying out his experiments. This was E. W. Maslin, who did not complete his work, because he sold his ranch to engage in other pursuits. It was he who, as far back as 1885, fully realized the inferiority of figs grown in California as compared with the world-famous Smyrna figs. In 1885 and 1886 he purchased the best dried Smyrna figs the market afforded, washed out the seeds, planted them in boxes, and when the seedlings were large enough, put them out in orchard form on his farm in Loomis, Placer County. Much time and care were bestowed on the trees, and Mr. Maslin looked forward with fond hopes to a successful realization of his well-directed efforts. As the trees grew, Mr. Maslin got the impression that all were of the same type, and my recollection of the orchard in its infancy coincided, as near as I can remember, with his views. The following is an extract from an essay read by him before the Twelfth State Fruit-Growers' Convention held in Fresno in 1889: "One fact to which I wish to call attention, and a very important one, in relation to the necessity of caprification, is that the leaves of all the fig trees grown from seed and obtained from Thurber are identical in type." The orchard had almost passed out of my mind, and in fact I thought it had been dug up and destroyed long before I succeeded in establishing the Blastophaga, when my attention was attracted to a fig orchard near Loomis, while seated in an observation car of a train Eastward bound. It dawned on me, however, that what I saw was the remnant of the old Maslin orchard in which, in spite of the fact that it had been sadly neglected for a number of years, many of the trees were alive and growing. The insect had already been introduced into the capri figs of my friend, D. Van Lennep, of Auburn, and he kindly consented to send infested figs to this orchard at the proper time. After the insect became established, I visited the orchard several times and made a careful and complete record of it, and although there was not one third of it standing, seven eighths of the trees were capri or wild figs, and hardly two of these are alike, entirely upsetting the ideas advanced by Mr. Maslin in 1889.

Another prediction made by Mr. Maslin read as follows: "We are on the threshold of entering upon a great industry. Fig culture, I confidently believe, will in five years rank in importance with that of the raisin, prune and grape." You were right, old friend, but you miscalculated the time, for if you had said twenty years instead of five you would have been about correct.

When I demonstrated that our little friend, the Blastophaga, had concluded to dwell with us and harvested my first crop of figs of any importance in 1901, I thought I had accomplished something which would benefit California, for I had expended thousands of dollars in my investigations, and had taken care of a sixty-acre fig orchard without deriving one cent from it for a period of fourteen years. I had counted too securely on my success and soon learned that, even after I had demonstrated that California Smyrna figs were all I represented them to be, the public was doubtful. Many thought the trees would not bear and that the insect would soon disappear. My experience is only a repetition of what others have been compelled to pass through before their efforts received recognition. To-day, many of the old trees of the San Francisco *Bulletin* importation of 1882, which have been allowed to grow practically forgotten and uncared for, are producing fine figs, much to the surprise and mystification of their owners, who had never seen figs on them before.

Do you know what the general public says of me at home? That my orchard never bears; that Smyrna figs are a failure in the San

Joaquin Valley; and furthermore, that I don't care whether they bear or not, because I have too much money any way. It reminds me of an experience of mine in Santa Rosa. I, a stranger, spoke to several people for the purpose of learning how Luther Burbank was regarded, and to my surprise the answer was that "he either had wheels or was crazy." And Burbank is the biggest advertisement Santa Rosa ever has had! If the narrow-minded only knew what was good for them and their town, they would never lose an opportunity of extolling Burbank's many excellent qualities, instead of having their little hammer out, trying to knock him.

How ill-founded have been the reports regarding my orchard, is shown by the following facts: Since 1901, it has never failed to produce a crop, and since 1902 the crop has not been less in any one year than fifty tons, and this year we have harvested ninety tons. Had I known seven years ago what I know to-day, my crops would have been thirty per cent larger annually than they have been; but changes in a matter of this kind are not brought about in a single year or even several years, so that it took some time to bring about the desired change in existing conditions.

I learned, when I visited Smyrna in 1901, that their knowledge of the Blastophaga was not only very limited, but also that people who should possess information on a subject of such vital importance to one of their great industries knew far less than I did. Had I not gone fully equipped with specific information, I would have returned more mystified than when I went.

Those who have planted orchards in recent years have had the benefit of my experience and observations; thus there is no possibility of their making any mistakes, providing my instructions are followed. If any one is in a position to discuss this subject intelligently, I think I am. My investigations in Smyrna, my observations at home, and finally the fact that my orchard has brought in returns amounting to over $40,000 since the wasp has been established, is sufficient evidence for insisting that the culture of the Calimyrna fig is an unqualified success. I want to say to you, ladies and gentlemen, that the successful prosecution of this industry has been my life work. I believe that Smyrna fig culture has a great future not only in California, but also in other countries with climates similar to those of our great interior valleys.

Do not think for a moment that the man who withstood ridicule, even after he had demonstrated that Smyrna figs could be produced by artificial pollination; who made a desperate and successful effort to prevent the digging up of the sixty-acre Smyrna fig orchard on the grounds of the original Fancher Creek Nursery (before he came into possession of that place); and who finally, after repeated failures, succeeded in establishing the little wasp, on which the whole foundation of Smyrna fig culture rests, is going to give up one iota of what he has achieved by his own initiative and against great odds. In the language of the poet, "He ain't built that way."

To most of you who are familiar with our horticultural development in its early history, the reason is obvious why fig culture has not kept pace with our citrus and deciduous fruits. All the California figs belonging to what is known as the Adriatic type, and which are produced without the agency of the fig wasp, are decidedly inferior from every point of view to the Smyrna type. This is a fact well known to the trade, and is really the cause for the lack of demand for our dried figs. The output of California dried figs has never exceeded 2,500 tons annually, while the annual output of Smyrna figs from Asia Minor in the fig district of the Meander Valley (84 miles long and only a few miles wide, where all the Smyrna figs are grown) amounts to 100,000 camel loads, or 25,000 tons—more than ten times the quantity produced in this State. Do you know that thirty thousand people are engaged in handling that one crop during the harvesting season, and furthermore that the United States is to-day the greatest consumer of these figs, and all this in spite of the duty? And do you know that California is destined, by reason of climate, soil, and the establishment of the Blastophaga, to wrest this trade from Asia Minor and divert it to our own people? Is this not of itself an irrefutable answer in the affirmative that Smyrna fig culture is not only feasible but highly profitable in this State?

MR. BOOTH. I would like to hear from our old friend, Mr. Maslin, on this subject.

MR. MASLIN. Mr. President, I am very happy to receive the compliment of appearing before you. It has been over a quarter of a century since I became a member and attendant of horticultural conventions. They say that a musician may take a string of his violin and if it is in accord with the bridge he may make that bridge tremble. And so I feel to-day that, after twenty-five years of intercourse with my fellow-horticulturists, they have struck a tone in my heart which I can hardly express to you—gratification at meeting so many intelligent men and the assurance that the horticultural interests of this State are on a firm basis.

I would like to add a little historical knowledge to the fig question. In 1884 I purchased a farm from the railroad company at Loomis. Mr. Rixford had introduced a large quantity of supposed Smyrna figs. All over the State they had proved a failure. In 1885 I sent to Mr. Thurber for a box of figs. He sent me a box and I sowed the seed in twenty acres. I reduced it to about six acres. On one occasion, some time in the 80's, I went to Mr. Shinn's orchard near Niles. He then talked to me about caprification. I thought it was ridiculous, but I commenced to read on the subject. I did not believe it. I went out again and found what he supposed, and what I supposed, to be the wild fig. He cut it open and we found it to be full of pollen. Mr. Shinn had, before that time, imported the Blastophaga from Smyrna and had distributed it in the trees. We took that and introduced it into the Rixford fig. That fall fifty figs matured. Practice was above theory, and I was then persuaded that the Blastophaga was necessary.

On one occasion Mr. Rowley came before the State Board of Trade and exhibited a fig which he said Mr. Roeding had raised by the means, I suppose, of fertilization. We were asked then to introduce the question to Secretary Wilson, which I did; and after many letters, as Mr. Roeding said, he plowed and harrowed the said gentleman to do something. Finally Mr. Howard came out and saw me and said he was going to send the Blastophaga to Mr. Roeding. He received it, and that is the history of the introduction of the fig business. I have not from that day to this ceased to have the fullest confidence in the profit of the fig crop in California. (Applause.)

On motion of Mr. Crandall, duly seconded and carried, a vote of thanks was tendered Mr. Roeding for his generous contribution of figs.

In the absence of Mr. W. Herbert Samson, Secretary Isaac read his paper entitled "The Commercial Smyrna Fig," as follows:

THE COMMERCIAL SMYRNA FIG.

By W. HERBERT SAMSON, of Corning.

The probable home of the edible fig is the fertile part of southern Arabia, where at present the capri fig is wild, and where there are no traditions of its introduction. From Arabia it was carried to Syria and the Mediterranean shores, and in the eighth century before Christ it was found all over Greece and formed an important article of food of both the rich and the poor. The Athenians, on account of their fondness for the fig, were nicknamed "sykophants" (fig-eaters), a name afterwards given to those spies who informed the authorities about the unlawful exportation of figs from Attica. In this province the best figs of ancient times were grown, and so necessary were they considered for home use, that their exportation was prohibited. This prohibition led to smuggling, and guardians and watches were appointed by the government to report those who violated the law. These guardians were called sycophants (from *sykon,* a fig, and *phainein,* to show), and the word became synonymous with the idea of a secret spy. From this usage of the word comes our word "sycophant."

Among the ancient Greeks the fig had a symbolical and mystic meaning, an emblem of fertility and propagation, for the flowers of the fig were hidden, while all other flowers were exposed to view. This peculiarity of the fig surrounded it with mysticism, and it became a sacred symbol in the festivities and worship of one of the Greek gods.

From Greece fig culture spread along the northern shores of the Mediterranean and Adriatic until it reached the southern parts of Italy, where it figured in Roman mythology, the infants Romulus and Remus having been reared under the "spreading crown of a fig tree." From Italy the fig made its way to Spain and Portugal, and with the discovery of the New World it obtained a foothold in all the countries visited by the Spanish and Portuguese missionaries. It is to the Spanish missionaries that we owe the introduction of the fig into California, the first trees having been brought here by the Franciscan fathers. These were the "Mission" or black fig, and this has been widely distributed all over the State.

The most delicious fig on the market, however, is the Smyrna, which derives its name from the seaport Smyrna, where these figs are packed and whence they are shipped to almost every country on the globe.

In 1882 the foundation of this great industry was laid in the Sacramento Valley by the late Governor Stanford. In the spring of 1882 the *Bulletin* Company of San Francisco imported 13,500 Smyrna fig cuttings. Governor Stanford was very much interested in this importation, the success of which was mainly due to his aid in facilitating rapid transit across the continent, and to the fact that he paid most of the expenses. His share of the cuttings were planted on his Vina ranch in the Sacramento Valley.

For the past seven years I have been somewhat interested in the Lob Ingir Smyrna fig, or Commercial Smyrna fig, as it is sometimes called. From my experience I consider it a great success in this State, particularly in the Sacramento and San Joaquin valleys.

This industry has the same disadvantages to overcome as new industries generally do. The greatest obstacle is the fertilization of this fruit, which seems to be hard for the ordinary man to understand. He will see the Blastophaga, or fig wasps, as they are generally called, coming from the capri fig. He will take thirty or forty of these figs and place them on a Smyrna fig tree, all at the same time, when perhaps three or four figs would give better results. In fruiting the Smyrna fig, the amount of fruit on the tree is the first thing to consider. Take, for instance, a tree twenty years old in good thrifty condition. Eighteen capri figs are all that should be placed in the tree the first time, and they should be strung on at least three different strings and placed in three different places on the Smyrna tree. This should be repeated every five days until the profichi crop of capris is exhausted. By so doing there will be very few, if any, of the Smyrna figs that will be over-fertilized, and this is what must be avoided. If too many wasps go into the same Smyrna fig they leave an over-supply of pollen on the female flowers, which causes the fruit to split open before ripening, thus deteriorating it in value.

Following is a description of the Lob Ingir Smyrna fig given by Gustav Eisen: "Lob Ingir; Bulletin Smyrna; Commercial Smyrna (California); Erbegli; Erbelli; Erbeili. Fruit large to very large, 2¾ inches wide by 2½ inches long; decidedly flattened like an onion, being compressed in the diameter of stem to the eye; neck thin, distinct but short, generally straight; no stock or one very short; ribs heavy, uneven, knotted and branching; eye large, with numerous scales of amber tint, opened and about three sixteenths of an inch wide, so that the pulp can be seen through the opening; skin the color of beeswax, smooth and waxy, shaded greenish; pulp pale to dark amber; when unripe shaded red; no distinct iris; seeds large, flattened; tree a strong, spreading, but rather straggling grower, with heavy branches. This fig is the best type of Smyrna fig, and the majority of figs imported from Smyrna to this country belong to this variety. It is a distinct fig, and this and no other fig should be known as Smyrna, if this name is to be used at all. The promiscuous use of the name Smyrna fig can not be too much condemned."

MR. MASLIN. Mr. Roeding said, "How soon we forget." Mr. Rixford, in 1883, imported what was reported to be Smyrna cuttings. The *Bulletin* distributed these. The fig trees which Governor Stanford imported turned out to be what we call to-day the Brown Turk. I desire to state that Rixford of the *Bulletin* was the first man to introduce the Smyrna fig.

MR. ROEDING. I think, however, that Governor Stanford furnished the money to Mr. Rixford to bring the figs over. There are many of those trees growing to-day.

On motion of Mr. Berwick, duly seconded and carried, that two Vice-Presidents be selected by the Chair, the Chairman appointed Mr. Booth and Mr. Stabler as such Vice-Presidents.

An adjournment was thereupon taken until 9:30 o'clock A. M. to-morrow, the members, however, being invited to attend a reception and entertainment this Tuesday evening, tendered by the Women's Civic Improvement Club of Marysville and the Women's Improvement Club of Yuba City.

PROCEEDINGS OF SECOND DAY.

WEDNESDAY, December 4, 1907.

The Convention was called to order by President Jeffrey at 9:30 o'clock A. M.

The report of the Secretary was read by Mr. Isaac.

THE CHAIRMAN. If there are no inaccuracies in the report, it will be accepted without any further ceremony. Colonel Irish will probably be here shortly to read his paper. In the meantime, I have the pleasure of introducing Mr. Leonard Coates, who will speak a few moments on the Eucalyptus.

THE EUCALYPTUS.

MR. COATES. Ladies and Gentlemen: I am not at all prepared to deliver any address on this subject, but I understood from the Secretary that Mr. Walton was going to give us some little talk on the eucalyptus, particularly in regard to its local adaptation. I wrote him that I would be prepared to supplement his talk by showing a few different species of the eucalyptus and mentioning some of their characteristics. I had supposed that this would come up later during the Convention and that Mr. Walton would have talked to us first, but as a little time is at our disposal, I could just mention a few points regarding some of the timber varieties.

You know that at the present time there is a great deal of talk and discussion about the eucalyptus for all purposes of fuel and timber, hard woods, wagon work, and so on. Very little is known about this family of trees except with regard to what we know as the blue gum and possibly the red gum and one or two others to a more or less extent; but from all the reports—the Government reports and the Experiment Station reports—we find there are a great many other species, which while they are planted only a little here and there—a few trees—ought to be known more and ought to be planted more. The Government is from time to time issuing bulletins in regard to the planting and growing of these trees and also in regard to the different species and their characteristics and uses.

I have been interested in the eucalyptus for a long time, more or less, but recently it seems to be such a very important subject, and one which will be one of first importance to the State, the raising of hard wood, not only for our own use but for export—there isn't any question about that—that the hardwood industry of California, I believe will supersede fruit-growing or anything else. It seems impossible that it should be otherwise. We have letters all the time from the East inquiring about the eucalyptus and how it grows in California, and whether the writers can get a supply. We find locally and everywhere that the price of hard woods for ordinary wagon work is advancing rapidly. It was only the other day that I had occasion to go to the local wagon shop to get some shafts made for an old truck. The man looked about and said, "The best I can do for you is to make some shafts out of blue gum, but as far as that goes it is better than any hickory I have ever worked up." There is in San José a planing mill run by a man who has worked in hard woods for forty years—a great many years in the East and for twenty-five years in this State. He is working almost exclusively in eucalyptus and, of course, mostly the blue gum, because he can not get others; but for almost all hardwood purposes, flooring, etc., even the blue gum, which is not considered one of the best varieties, is better than we have any idea. Its seasoning, of course, is a subject of which we know but little; yet all of those matters as to the methods of seasoning the eucalyptus properly will be published in bulletin form by the Experiment Stations and the Government.

I have nineteen species of eucalyptus here—those which are best known. It is a difficult matter to describe these, because very few are known otherwise than by their botanical names. Some of the species are known only by the name of tamara—that is, ordinarily, in a commercial way. The blue gum we all know. The two varieties which were planted years ago, and those which we often had in the largest quantities, are what are known as blue gum and red gum. I can plead guilty to having sold a great many of this variety for red; but it is not the red gum, although similar to it. It is not as valuable as the red gum proper, although it is a much more rapid grower.

I remember at Hanford last year, in driving around during the meetings of the Convention, being shown two specimen trees of this variety. They are probably the largest specimens in the State, over 200 feet high and marvelous in size. But the red gum with me outgrows in height the blue gum and it is hardier; the tenderest growth is not hurt by frost.

One of the varieties here is very different in growth from others we have. It is particularly valuable for telegraph poles. Then there are several varieties—Mr. Roeding can corroborate me in that—that grow particularly well in the warmer portions of the State. From actual experience, the sugar gum is more adaptive than the bulletins and reports would give us to understand. It is spoken of generally as better suited to the coast counties—the mild, moist climate.

I was in Oroville some months ago and found a magnificent specimen growing there, and certainly if it will grow there it will stand plenty of heat and a dry atmosphere, so it will be one of the most valuable we have because of its known properties for hardwood purposes.

The blue gum has been used perhaps more than any other medicinally for oils and so on, but we find from reports made by the medical papers that it is too strong; there is something in it too powerful for antiseptic purposes, so they use the lemon-scented gum.

THE CHAIRMAN. Mr. Coates, will you please tell what you consider the best hardwood eucalypts we have; just the names, please, of about three or four, so that if anybody wants to plant varieties that are successful they will know what to plant?

MR. COATES. Probably the best hardwood varieties would be the red gum (*rostrata*), the sugar gum (*corynocalyx*), the *crebra*, or shallow-leaf iron bark, and this *pilularis*—black butt. Those are as valuable as any, so far as we know, for general purposes of hard wood. All of these have particular and special characteristics and uses, but the matter may be taken up again later, possibly. It is a sort of technical subject, really, the describing of these botanical varieties.

MR. CRANDALL. Might I not suggest that Mr. Coates be asked to write out a statement, just such as he has given us, to be included in the report? It is a very important matter, and he could submit it to the Secretary to be included in the report.

THE CHAIRMAN. I think the Secretary will take the suggestion without any further action. I now have the pleasure of introducing Col. John P. Irish of San Francisco, who will address you on "Labor in the Rural Industries of California."

LABOR IN THE RURAL INDUSTRIES OF CALIFORNIA.

By COL. JOHN P. IRISH, of San Francisco.

Mr. Commissioner, and Ladies and Gentlemen: The labor situation in the rural industries of California is being dictated and victimized by theory. The orchard and vineyard work of this State and the primary processes of labor necessary to be performed in other rural production have been settled often by the metropolitan press and by those who produce nothing but theories, and while this theoretical and newspaper settlement has been going on, the labor situation in the rural industries of California has for the last twenty-five years been continually growing worse and more uncertain. You who are practically engaged in rural production of different kinds know that in many of the important and necessary primary processes of that production it is impossible for you to get reliable, persistent, and faithful white labor, so called, to perform these processes. In all of the stoop-over work of this State white men are not found. It has been tried by the raisin-growers of Fresno for twenty-five years, and no man there has yet succeeded in getting reliable, long-legged, long-backed white men who will work all day in a stoop-over position, or squat with heads down, in a temperature of 110°, and save the raisin crop. All of you know that this year, if you had had a bumper crop of fruit of any kind on your trees or your vines, a large percentage of it would have been wasted for lack of labor to harvest it. The fruit-growers of California have done well during the past season, because they had a small crop and a large price.

The importance of the fruit crop to every country community and to all of the business operations of every country community is shown by what was told me by one of your most successful farmers over in Sutter County last night. When I asked him if the local banks had been in distress, he said no, because the crop this year had brought a big price, had been sold, the money paid for it and put into our banks, and neither banks nor people had felt any of the monetary stress and pinch that have been felt so badly in other parts of the United States. So that the harvesting and marketing of your crops are of the greatest importance to every form of business in every one of our rural communities and in every one of our rural centers of population, like Marysville. Suppose this year you had had to harvest a bumper crop, that you had had to harvest twice or three times or four times as much fruit, the same being on your trees or vines, to get the same gross result in money. You would have found it impossible, if my information is correct—and I have been widely informed throughout the State—you would have found it impossible to secure the labor to harvest and market your perishable property successfully. The fruit on tree and vine does not wait for a crew to go off to town Saturday night and get drunk and straggle back Monday and Tuesday, and some of them not at all. When your crop is ready for harvest and to go into market it must be cared for. This labor that is not willingly performed by white workingmen is done, and has been done in the past, accurately and faithfully by Asiatics, and especially by Chinese. (Applause.) The short-legged, short-backed Asiatic performs all of the stoop-over work, the squat work. He stands any temperature. He works in every sun and clime, and as far as the Chinese are concerned they faithfully perform their contract and keep their promise, whether the eye of the employer is on them or not. (Applause.) The first inroads made upon that supply of labor were made under the shelter of the cry of "Cheap labor." You are not concerned in the cheapness of the labor, but in the fidelity and dependability of that labor. Any raisin-grower in Fresno will tell you that you may pay white men $5 a day to work in that temperature and at that stoop-over task and they may work one day and that is all. You can't pay them wages enough to make them stick to it and save your property.

This labor, performed in times past by the Chinese and in a very much modified volume now by those who are left, was non-competitive with white labor, because it performed these necessary primary processes, the stoop-over labor in the orchards and vineyards. Take the sugar-beet production in this State. In traveling back and forth to my ranch in Kern City this season, I passed the great sugar-beet plantations near Tulare. There the white man came in with a plow and plowed the land, most of the time riding, and if it was hot, with an umbrella over his head. The beets were planted by a machine run by a white man, but when the thinning came and the hand-weeding came and that work had to be done, the white man disappeared from those plantations, because he would not perform, for any wage, the stoop-over work necessary. And so the Asiatics took possession of those fields; they thinned the beets, they hand-weeded them. Then the long-legged, long-backed white man, riding on a spring seat under an umbrella, cultivated with a plowing device; and when the harvest time came, involving stoop-over work, the Asiatics appeared and the beets were taken from the soil, and from that time on until they went into the mill. There white labor, employed at high wages, made them into sugar. From the mill the sugar went into transportation, again requiring white labor at high prices. The absolutely necessary processes having been performed by the Asiatics; then work and high wages were furnished to white men and women, work that was agreeable to them and that they willingly performed; but there was no competition between this white labor and the Asiatic labor in these necessary primary processes, because the white labor would not do it and the Asiatics would. This same principle of non-competitive Asiatic labor runs through the asparagus production on the islands in the deltas, to our celery production, largely to our bean production, and to other productions in which millions of dollars have been invested.

Twenty-five years ago I took what was then the popular view of Chinese labor in California. I committed many sins in taking that view and added my voice to those who were doing their best to corrupt and misinform public opinion on the question of that labor. Finally I concluded that it was my duty as a citizen to take up original investigation and find out for myself. I began that investigation, and at its conclusion my opinions were entirely changed, because the result of that investigation confirmed me in this opinion, that the presence of Chinese in California never inflicted any economic, industrial or social damage on this State. On the other hand, it was continually of economic and industrial benefit to California. (Applause.)

I believe, as an observer of the situation, that the entire fruit industry of this State is founded, not upon the cheapness, but upon the fidelity and reliability of Chinese labor. You have got to have reliable labor to save your perishable property. Then, as the labor is non-competitive, does not compete with white labor, takes that which white labor rejects, why should not your rural land-owner and producer be permitted to have that kind of labor? (Applause.) Why should labor, in itself alien and under alien leadership, in our cities, be permitted to dictate to politicians of California what their policy shall be toward the rural producer? (Applause.) Has the rural producer no rights which Tveitmoe and Furuseth and McCarthy and Cornelius and Casey are bound to respect? You are not interfering with the labor situation in San Francisco or other large cities of this State. You are not dictating to employers who they shall have in their employ. You are not interfering with the laboring people of those large cities at all; but you, on your ranches, in your orchards and vineyards and fields, are building San Francisco; you are building every city in this State. You are adding every dollar of value that is added to its real estate; you are adding to its banking facilities. You are doing it all because if you withdraw the rural production of these vast fields and orchards and vineyards of California the cities of this State shrivel up like a scroll of thin paper in the fire. It is your production that sustains them. Every city built in this State purpled first in the vineyard and reddened in the orchard and was made golden in the fields of California before it rose as a city. Then why should you be dictated to, as you stand as the foundation of the industries and the business and the prosperity of this State? Why should you be dictated to by the people who live in these cities which your enterprise has created? Why should you not stand up independently and say, "We require, in the primary processes of our production, which lie at the foundation of California's prosperity, this form of labor, and, by the Eternal, that form of labor we will have!" (Great applause.)

Now, you have seen the result of the Chinese exclusion law. Economic law will have its way. It moves as resistlessly as a glacier. Following the exclusion of the Chinese and the rapid diminution in the number of that labor, there has been introduced here to take its place every form of labor that is less desirable, and in some instances enormously less desirable than the Chinese labor. (Applause.) You are getting southeastern Europeans here. You know what their habits are. But the theorist rises up and says we should permit only that immigration into the United States which we can assimilate. May God in his infinite mercy look down in all kindness on my descendants who have committed to them the task of assimilating the southeastern European population that is coming in! (Laughter and great applause.) We have got to assimilate, raise them up; and these theorists never reflect that in the process of assimilation it is not the immigrants who are raised up, but American blood that is pulled down. In the process of assimilating this labor what has occurred? In the first place, the youth of the United States has deteriorated. In the last thirty years the age of men at the date of their first conviction for crime in this country has fallen from nearly 30 years down to less than 21. We have created in all of our large cities a juvenile court, especially charged with jurisdiction to take care of juvenile criminals and offenders. As a result of this process of assimilation and the degradation of our own blood in that process we are building in every State north of the Mason and Dixon line what we call reform schools for the same penalizing of incorrigible American youth. Pick up your morning newspaper in San Francisco; read the list of Americans committed to the prisons for any transgressions, and you will see that in seven cases out of ten the transgressors are under twenty-one years of age. In this process of assimilating and opening our labor field to this debased southern and southeastern European immigration we are destroying the future of the republic. An apprenticeship denied in order to leave all the work to the undesirable immigrant! Talk about Chinese competition! What have you to say to the organizations in this country which absolutely deny to an American-born boy the right to an apprenticeship and to a trade? That isn't monopoly at all. (Applause.) It is the problem in all our large cities. And so we go on debasing and degrading our young blood, criminalizing our own youth and condemning them to live in the vice of idleness, in order that we may assimilate an immigration that, in respect to law and order, industry and fidelity, is as much below the Chinaman as the monkey is below the Chinaman.

But we go on saying something because somebody else has said it. If the rural industries of California, the foundation of all prosperity, require this Asiatic non-competitive labor—a labor and form of immigration that we don't have to assimilate—we are not committing that hard task to our sons and daughters, to our grandsons and granddaughters, and our descendants. It is labor that is here to do our work for our wages, to behave itself, as far as the white people are concerned, in an orderly and law-abiding manner—its disorders being amongst its own members—a most desirable form of labor.

But they say there is a race question. Mr. Furuseth of San Francisco, head of the water-front federation, has discovered that there is a great race antagonism. I was reading the latest work on ethnology, Professor Tyler, and I find that the Russian Finns are pure Mongols;

and Furuseth is a Russian Finn; therefore, he is in blood a Mongol, and he is standing up telling us about race antagonisms!

The people of the Southern States and the East have been told that it is race antagonism; that it is the precise analogy of the negro problem in the South. Now, what is the original negro problem? The race problem relating to the negro is based in the fact that he belongs to a race which in all ages and times and in many nations has thrived in a condition of chattel slavery, and no race that accepts and thrives in a condition of chattel slavery has ever commanded the full measure of respect of other nations.

How is it with the Asiatics? When the bill for the admission of California was before the Congress of the United States, as one of the seven measures in Mr. Clay's omnibus bill, objection was made to it by Jefferson Davis and the Southern Senators because it proposed to admit California as a free State, although part of the territory lay south of the line 36° 30′, which, under the Missouri compromise, was to be slave and the territory north free. Mr. Webster, in discussing that, turned to the Southern Senators and said: "Your objection to the admission of this territory is not a valid objection. Slavery, like all other economic conditions, is the issue of certain physical causes. In its physical features, in its climate, in the plan of its mountain ranges and valleys and river systems, California is Asiatic. It partakes of the physical features and characteristics of Asia. Having the same physical features as Asia, it will be subject to the same economic and natural law, and I call you gentlemen of the South to witness that chattel slavery has never been known in Asia and no Asiatic race has ever submitted to it."

That told the story. Webster was a wise man, a man who knew the laws of Nature and who could apply them and trace their influence in the economic laws that govern and control the interests of a people. So these Asiatic races have never submitted to chattel slavery. They are not under the ban and bar sinister that is on the negro, because that race has submitted to and has throve in chattel slavery, and that is the reason and cause of the race problem related to the negro in this country and everywhere else, and that does not apply to the Asiatic. They are not slave born. They do not submit to ownership; they do not submit to chattel slavery. They have their civilization, and there is no such race problem between us and the Asiatics as exists in the South between the Anglo-Saxon and the negro. We know them for the fidelity with which they perform their labor; we know them for their usefulness; and as far as we know them through their disorders, those disorders are amongst themselves and not amongst us.

You know the situation in California as well as I know it. You know that the great fruit-producing industry of this State and the asparagus and celery and other large industries of production that bring millions of dollars into California and into your pockets and into the pockets of the people, money that furnishes work and wages for white people, work that they perform and wages which they dictate themselves—all that depends upon the prosperity of rural production in this State, and rural production in this State depends upon labor that you can rely upon, that will keep its word and do its work, and we know of no other form of labor than that which served this State so well—the laborious, patient, orderly, faithful Chinese.

Now, we have introduced an Asiatic problem here. It is a singular thing to study that the people have been taught to hate the Chinaman on account of his virtues, and they are being taught to hate the Japanese because of his vices. He has our vice of ambition, wants to get on and do for himself, and just in proportion as the volume of Chinese labor in California has declined and the field has been left to the Japanese, the Japanese has shown his unpleasant peculiarities; but the moment that you restore the balance, lift this infamous Exclusion Act which we have enacted against the Chinese and let the Chinese come—in proper numbers—the moment that the balance is restored, that the equilibrium is returned, then you will see the Japanese betraying less of the vices of the white man, because he will have competition in the field. (Applause.)

I say nothing against the Japanese. They show qualities that have been inured in them for ages, because they come of a race and a nation where the soldier has been at the top for ages and the business man at the bottom; the business man a pariah, the soldier a hero; and the Japanese government, realizing that to take its stand with other nations it must have commercial honesty, has begun inculcating in her public schools, from the primary grades to the university, the necessity of recognizing the principles of commercial honor. Japan has learned that to achieve a commercial career she must observe the law of nations, and she has begun the reform of ages of misapplication of principles to her people.

But we can't dismiss this. The crying need, the burning issue in California is, Are the rural producers of this State to be permitted to have that form and kind of labor upon which their prosperity and the welfare of the State depend? You know there are a few Chinese left. The man who gets a Chinese gang on his place feels that he has secured a prize in the lottery of fortune. Last night I was talking with a gentleman who is an owner on the delta, and he said, "I have had the greatest luck on earth. I have succeeded in filling four of my five tracts on the delta with Chinese, and I am perfectly content, because I know the work is going to be done whether I am there or not." But they are disappearing. Every means have been used. When laborers have gone back to China, entitled under the laws to return, and have come back, they have been turned away and deported, under one pretext and another, because the men in charge of this are subservient to the politicians and the politicians are subservient to the great labor organizations of California, and there you are. (Applause.)

Now, as to the fact of the need of this labor and the loss that is coming upon the State unless we are permitted to have that labor, your enemies themselves admit it. One of the metropolitan newspapers, so called in San Francisco, said two years ago that it was better for every pound of fruit in California to rot on the ground than to have Chinese here to pick it. One of your members of Congress, living in a fruit region, said it was better that the prunes should rot on the ground than to have Chinese here to pick them, and if the rural people in his district had had a candidate to vote for that would have expressed their opposition to him he would have been left at home; but unfortunately, as parties were lined, they had no choice and they satisfied themselves by cutting down his vote, by refusing to support him. The rural people of California should believe that this is a burning issue; that it is a question that goes to their prosperity and the prosperity of the State, for there is but one way out and that is to organize.

When the Secretary of Commerce and Labor was out here I had a committee of some thirty or forty gentlemen from the rural districts of California and two from Idaho and Utah wait upon him and tell him the needs of labor, and he was surprised. He said he thought the anti-Chinese association in San Francisco was uttering the whole voice of California, that organization led by Tveitmoe and Furuseth and McCarthy and Casey—Tveitmoe, who served his term in the Stillwater penitentiary in Minnesota and came to California to dictate to you what kind of labor you should employ. He said, "I thought that man was uttering the voice of California." He said, "Now, let me give you some advice. Make your voices heard, sign memorials, send them to me, send them to Congress, send them to your members, and let it be known that there is not this unanimous sentiment against Chinese labor in California that we have been told exists. That is the only thing for you to do."

Now, if this labor has never inflicted economic damage on California nor industrial damage on California, if its performance has always been beneficial and profitable to the people of this State, why should we on this coast be denied the right to draw upon that labor as the people upon the Atlantic coast draw upon the labor of southern and southeastern Europe? Aren't you equal? You pay your Federal taxes. Your heart swells in patriotism for the flag. You love and support the institutions of your country. You face Asia. Asia is to this coast what Europe is to our Atlantic seaboard. We need commerce with Asia.

Can we have commerce and expand our trade when we treat their people as unequal and degraded and refuse to permit them to come to us? No, you can not have it.

Now, in another respect. The magazine writers are dealing with the question of rural life, wondering why it is that the people are abandoning the land and going to the cities. There are several reasons for that, and California has one reason, and that reason is the practical impossibility of getting domestic help upon the ranches of California to lift the burdens off the wife and daughters of the household.

We were entertained by a club organization last night. I have visited those clubs all over this State. I have addressed the meeting of their State federation. I have talked with keen-eyed and lovely natured women in every district in California on this subject, and there goes up from them all the one complaint of the impossibility of getting domestic help to go into the country and lift from themselves and their daughters the burdens. Now, you know that if we are permitted to receive the kind of labor that is needful to our wants, that question of domestic help is solved, because the Chinese when trained make the very best of house servants. I have had experience in that. I, twenty-five years ago, could get a woman. I paid her good wages and she left my family and went away and married; and it went on until my daily task, almost, when I went home was to go into the room occupied by the help and drag out some woman who had been sent there by an employment agency and who was lying in her room drunk, and I would dispose of her only to get another one. And then I got a Chinaman and peace settled over my house, a peace that passeth understanding (Laughter), and no money could take Jim away from my family.

Now, I want to see the ranchers' wives and daughters in this State permitted to take and train that reliable and efficient household help. I want to see the burden lifted off of the women of California. They are doing more than their share. When that is done one reason for the flowing of population from the country to the city will have ceased. Every rancher's wife knows the truth of what I say. It exists all over this State. Why, ranch owners in the San Joaquin Valley tell me that they actually feel ashamed almost to go into their houses and sit down to the table and enjoy the food and the shelter, because they know the burden that it places upon their wives and their daughters, a burden that they feel to be unjust, but which, under present circumstances, they are absolutely powerless to lift because they can not get help. Why should not the women of this State, living in rural life, be permitted emancipation from this drudgery? Mr. Tveitmoe does not send you any household help; Mr. Furuseth does not; Mr. Casey does not. It is just like when the Panama canal had to be dug and Mr.

Gompers and his Federation of Labor passed a resolution informing the Congress of the United States that, in the opinion of Mr. Gompers, who is a Russian Jew, and who fled to this country from oppression in his own country, the Panama canal should never be dug except by American, white, union labor; but he didn't try to send any down there. For my part I was willing to see the entire bunch exported and put to work. (Great applause.) But he didn't supply it.

When your harvest season comes on and your fruit is ripening, and it is perishable property and it may be ruin or profit for you—the saving of that crop—and you go down to Mr. Furuseth and Mr. Casey and the rest of them, do they send you labor to harvest your crop? No, they do not and they won't; and if they sent it it would get drunk on its first day's wages and that would be the last you would see of it. Then why should rural California be under the domination of these men? Why should you not have your rights? Why should you not have the same privilege to draw upon the nearest and most reliable market for labor, as the Atlantic seaboard draws upon its nearest available market?

Another theory has appeared to the effect that when the Panama canal is dug then we will get millions of these southern and southeastern Europeans flooded through the canal, and that will solve the labor problem. You have got them here now. Have they solved any problem? They solved my problem of how to get my grape crop gathered in Placer County, because a gang of Greeks working on the railroad stripped the vineyard in two nights. They solved that problem for me. (Laughter.) Just below them was a gang of Chinese working on the same railroad, minding their own business, and every peach and pear in the neighborhood was absolutely safe from depredation. You are to wait, then, until the Panama canal is dug? If that is to be the case some of you upon whose heads there rests the frost that never melts, like it does upon mine, will have gone to the reward of your labors and a release of your burdens long before the problem is solved. But when you get them here through the Panama canal or any other canal you know just as well as I do that you can not depend upon that form of labor to do the work that must be done in these primary processes of rural production in California. Why not unite, organize, let the country know your wish, express your will? Let the politicians who represent you in Congress and elsewhere know that you have some rights for which you demand respect. Let them know that you desire to inflict no harm upon California; that instead of degrading American blood you propose to keep it pure, as it is, because you don't want to bring here a horde of labor that has to be assimilated. You want a form of labor that minds its own business, takes care of itself, obeys the laws of the country as far as they relate to their relations with the people of the country—the most peaceful, the most useful, the most faithful labor that California ever had. Why not do that?

It is proper for me to say that I have no direct, personal interest in this question at all. I own three ranches. My production is such that I can not employ Asiatic labor, because it is mixed farming and the handling of live stock. Except for domestic servants in my house I have no need to employ Asiatic labor, because it is not adapted to the industries in which I am interested. And how is it with the white labor which I have to employ? On my ranch in Kern County I pay a farm hand $40 a month. He has a good room to sleep in and as good a bed as my son, who is superintendent of the property. He eats at the same table at which my son eats and at which I eat when I am there. This is the twelfth month in the year 1907, and I have there now the twelfth ranch hand I have had this year. He works a month, takes his $40, goes to town, throws it down his throat, and that is the last of him. You ask the ranchers in the San Joaquin Valley and they will tell you the same story. The crying need on those ranches where mixed farming is practiced is for the white labor that will come there and do labor that it can perform, that has not these burdens that attach to the primary processes of labor. They cry for white labor and can not get it, and when we who are practicing mixed farming, who offer steady employment at high wages the year around, and good food—when we can not get white labor to do our work, in the name of God where are you going to get labor to do yours? In Tulare County the alfalfa went back into the ground last spring because white men could not be hired for the harvest. All over the San Joaquin Valley crops were lost and wasted upon these ranches where mixed farming was practiced. When white labor in California won't go willingly for high wages and good treatment and do the work that is attached to it, what are you going to do with those primary processes of labor?

This labor situation is a burning issue, I tell you, ladies and gentlemen, in California, and if we are to maintain our progress, if our cities are to be built up out of the profits that are wrought from the land, then this problem must be solved by the only possible solution, giving us access to that labor which is nearest to us, the best adapted to the uses to which we want to put it. And let us not go on saying something because Denis Kearney said it, but let us look into the facts for ourselves.

As I told you, I am absolutely disinterested personally, but I know the crying need of my neighbors. I go among them; I think my face and voice are known in nearly every rural community in California, and I am determined that there shall be one public man in California who will lift his voice in behalf of the rights of the rural producer (Great applause), who is trying to mind his own business and not dictate to anybody in the cities of the State as to whom he shall employ. You want simply to be permitted to attend to your own business in your own way, make your own profit and build up the State out of your own prosperity.

Now, I have written and distributed quite generally over California a memorial to the Congress of the United States which condenses all that I have said. I am going to leave some copies here; you may take them; you may attach signatures to copies; you may have them signed and send them to me, and I will send them to the President and to the Congress of the United States. This is the memorial:

To the Congress of the United States, Washington, D. C.:

Your memorialists, land-owners, farmers and producers of California and other Western States, beg respectfully to request the earnest attention of your honorable body and of the Department of Commerce and Labor, to the following statement of our needs and of the economic issues involved in the supply of Asiatic labor in the rural industries which we represent.

Long trial and earnest effort have proved the impossibility of inducing reliable white labor to engage in the primary processes of production in the orchard, vineyard, asparagus, sugar-beet, onion, celery, and other great industries in which tens of millions of dollars are invested. In California especially much of this primary labor has to be under fixed climatic conditions which the Asiatics alone will willingly endure. It is labor performed under a high temperature, in a stooping or squat position, which white men will not do. With your memorialists it is not a question of cheap labor, but of reliable labor that will save these valuable crops of perishable property, worth millions in the market. The Chinese Exclusion Act has depleted Chinese labor, and extension of the exclusion policy to the Japanese leaves these imperiled industries exposed to enormous losses, and threatened with ultimate extinction. The opposition to Asiatic labor is found in the cities, due largely to the efforts of agitators who are themselves of alien blood. They and the class they influence will not do the work done by the Asiatics, at any wage. They are repelled by the physical conditions and limitations. For many years every inducement has been offered to them to enter into this service, and they decline to do so. It is evident, therefore, that the labor which is willing to enter the service which they refuse, does not compete with them. On the other hand, such Asiatic labor, by performing the primary processes which it alone is willing to undertake, by passing the product into commerce, furnishes work at high wages to many forms of white labor, under conditions agreeable to it and possible of performance.

Your memorialists are aware that heretofore the voices uttered and the objections urged from the large cities have been taken as the sentiment of the whole people. We find now that our silence has permitted the achievement of an exclusion policy in nowise beneficial to those who have urged it, and at variance with correct economic principles. We get no benefit from the European immigration which crowds the Atlantic seaboard. If that immigration reaches these far states, it is under the same limitations as the white labor that is already here and shuns the work in the primary processes of the industries we represent. Our only resource is Asiatic labor. We affirm that there is absolutely no evidence that these states ever suffered industrial or economic injury from the presence of the Chinese here, prior to the exclusion law.

We present the foregoing reasons for our demand that the Chinese exclusion law be modified and that a fixed and liberal number of Chinese and an equal number of Japanese be permitted admission, annually, under the same restrictions as to sanitary and other proper conditions as are put upon immigrants from Europe. We reject the theory of assimilation, holding that non-assimilating labor to engage in this non-competitive work relieves us of the strain upon our racial and national standards which threatens their subversion in the task of assimilating the millions of European immigrants.

Your memorialists urge the immediate attention of the Government to our needs.

I will leave these here and call your attention to them, and I wish that they would be numerously signed, sent to me in San Francisco and I will forward them to Congress. If anything is to be done on this question in California it is time we move. It is true, the people say the national election is coming and nothing will be done now. Very good. You can lift your voices now, and when you have publicly lifted your voices you will find yourselves more able to lift your voices and declare this question. Step out and relieve yourselves of that bondage of fear which the State has been under to the adverse organizations in the great cities of the State and declare what your needs are and let your representatives know what they are. There is always a time to start reform, and having submitted to wrong and injustice and a policy adverse to your interests, now is the time to stand up and speak and to keep speaking until the remedy comes. I thank you. (Great applause.)

MR. KING. Mr. Chairman, I thoroughly indorse what Mr. Irish has presented to us at this time. I am but a newcomer in California, and I want to say now, had I as a business man investigated the labor conditions in California, I never in the world would have invested a dollar here. And I want to say more than that. If no protest goes out from this rural community you will put a stop to the future immigration of desirable people who will bring money into California, as so many thousands have been doing in the past. You have a manifest duty before you right now, and if you don't wake up to this occasion you will find that California is not going to take the lead in prosperity which she ought to. And I want to go further, and I believe we ought to do this for its influence upon the rural districts, that this Convention should, by resolution, indorse the memorial which it is proposed to send to Congress. It will give courage to the people to whom you send it and will do a vast amount of good in expediting this measure. I make a motion to the effect that this Convention do indorse the proposed memorial to Congress which is to be circulated.

The motion was duly seconded and carried, there being one opposing voice.

THE CHAIRMAN. We can hear Mr. Hecke's paper, and then it will be permissible to discuss the whole question after that.

THE PACIFIC COAST LABOR QUESTION FROM THE STANDPOINT OF A HORTICULTURIST.

By G. H. HECKE, of Woodland.

During the last decade the land-owners and agricultural producers of California, Oregon, and Washington have been confronted with a labor problem that has so far baffled all solution—the scarcity of efficient farm and orchard help at certain periods of the season.

The fruit, vegetable, sugar-beet, and hop areas have increased rapidly with the development of the country, without a corresponding increase of available help to harvest the perishable produce.

In these industries there are conditions that are peculiar to the Pacific Coast. There are certain periods of the season, comparatively short, during which there is an urgent demand for a large number of unskilled laborers to harvest and handle the varied crops. Unfortunately there are other periods of the year during which there is no employment on the farm or in the orchard and vineyard for most of these unskilled workmen.

Commencing with strawberries, cherries, asparagus, and hay in the spring, continuing through the summer and fall with apricots, peaches, hops, beans, wheat, barley, raisins, and prunes, and ending in the winter months with olives and oranges, it may be said that the harvest season goes on from one year's end to another without interruption, but the amount of help required varies with the season. It is this irregularity in the demand that makes the supply so uncertain and wholly inadequate, frequently resulting in disaster to crops and material loss to the producer.

For the preparation of the soil and the cultivation of crops efficient white labor is usually available, but the harvest season, which is necessarily a limited period, requires a vast amount more help, and in a great measure the agricultural and horticultural industries have been dependent upon migratory Oriental labor that has no fixed place of habitation, but is content to begin where crops first ripen and move from place to place as the seasons progress.

During the last four years there has been extraordinary railroad development. Unskilled labor can be utilized to good advantage in construction work. and the demand from railroad contractors for that class of labor has served to further accentuate the labor problem that constantly confronts those engaged in agriculture and kindred industries. Other new industrial enterprises have opened additional avenues for the employment of labor, and so great has been the increase in the demand for skilled wage-workers, that intelligent and reliable white labor is no longer content to engage in menial occupations, and there appears to be room for more of that class of laborers who are willing to do that monotonous drudgery that is inseparable from an agricultural or horticultural life. The problem is, Where and how can we get them? It is not a question of wages. During the season that has just closed, it was impossible to get a sufficient number of reliable white men, *at any price*, to harvest the hay and cereal crops and to gather the products of the orchards and vineyards. And it was not always easy to get a sufficient number of Japanese at a time when the necessity for more labor was imperative. As for the Chinese, they have practically disappeared from the Pacific Coast and are no longer considered as factors in the labor situation.

Conditions have been gradually growing worse from year to year. That this would be so was recognized by the twenty-seventh annual Fruit-Growers' Convention, held in San Francisco in December, 1902. The whole subject was exhaustively discussed at that time, and as a result a committee of fifteen was appointed to devise methods that would induce white immigration from the Eastern and Middle States sufficient to meet the demand in California. Hon. H. P. Stabler was chairman of that committee, and he and his associates worked indefatigably. As a result of their efforts nearly one thousand agricultural laborers were persuaded to come to this State. The situation was temporarily relieved, but partial success only served to emphasize the fact that the relief was not adequate, and that if any further is to be obtained it may be necessary to look to another source.

These Eastern and Middle States farm laborers in most instances proved to be steady, industrious, and reliable men, but it would be unreasonable to expect them to be satisfied to carry their blankets in the wake of the harvesting as it moves from one district to another with the ripening crop. Experience and observation soon taught them that while this is a land of opportunity, and its possibilities can hardly be overestimated, to prosper they must have steady employment. They soon made the discovery that there are certain kinds of field work, which are necessary on account of the character and wide range of productions, which the white race will not endure with patience. Being intelligent, they naturally sought to better their condition. Having frugal habits, energy, and thrift they prospered and acquired the means, or established a reputation for honesty and industry that enabled them to buy or lease farms, orchards, or vineyards, and many of them are now operating such properties on their own account. So, the labor problem promises ever to be a vital question.

Before the enactment of the exclusion law there were enough Chinese in California to meet any exigency in the labor situation. They proved themselves well adapted to that particular form of labor to which so many white men object. They were patient, plodding, and uncomplaining in the performance of the most menial service. They were content to live apart and board themselves. The bosses regulated the prices. These bosses furnished the number of men required, and when the harvest or other work was completed in one locality they were content to move to another. No Chinese laborer ever repudiated a contract made for him by his boss. Indeed, it was a rare occurrence for a Chinaman of high or low degree to violate a contract. As faithful and skilled cooks, they gave good satisfaction and relieved the farmer's wife of many a care and burden.

The Exclusion Act did not operate altogether as was expected. It not only put a stop to Chinese immigration, but resulted in Chinese emigration. They have either gone back to their native land or scattered among other states of the Union until their presence is hardly noticeable and their numbers have no appreciable effect on labor conditions. In their stead we have the Japanese, whose coming is little hampered by any restriction law or treaty provisions. Their numbers are constantly increasing and they are invading every avenue of industrial life. They are not as honest and reliable as the Chinese, but they are more aggressive. They are cunning—even tricky. They have no scruples about violating a contract or agreement when it is to their advantage to do so. They of all are far short of giving satisfaction as laborers in the service of Americans. This is partly due to racial pride and a self-consciousness of their own importance. They are great imitators and tireless in their efforts to acquire knowledge that will enable them to become contractors, or to acquire the control of land by either purchase or lease. They are not long content to work for others; their ambition is to do business on their own account. While they have no organized unions, as we know them, they are clannish and have such a complete understanding among themselves that they can act promptly and in unison in an emergency. The Japanese employer is not troubled with a labor famine. The American producer may suffer great losses in his crops for lack of labor, but the Japanese employer adjoining can always depend on the help of his countrymen.

One of their methods of squeezing the American producer is to contract to do certain work at a certain price, and then in the rush of the harvest season, at the most critical time, when the perishable crops need immediate attention and the producer is completely at the mercy of his employés, demand an advance in the contract price, with the alternative of facing a strike. This is certain to occur as often in the season as the Japanese is certain that he is in a position to enforce his demands. That is not all. Orchardists and vineyardists have often been influenced to lease their property to Japanese by the threat that they will be boycotted and suffer the loss of their crops for lack of labor to harvest them. It is comparatively easy, where the Japanese dominate, for them to drive their American competitors out of the community. In Vaca Valley and in the tokay and strawberry districts around Florin, not only do they lease orchards, vineyards, and gardens, but they are gradually acquiring ownership. The Japanese do not like to work by the day, but insist on contract work, and as a rule the work is slighted and there is continual bickering and trouble about the remuneration.

In the harvest season the Japanese earn as high as $2.50 to $5 in a day in the different districts, commencing with work in the strawberry gardens, and ending with work in the olive and orange groves. This shows absolutely that their labor can not be classed as cheap labor, and on this account very little objection could be urged against them if it were not for their tricky dealings, deplorable commercial unreliability, and their lack of honest business methods. Under these conditions the American employer can not help but contrast his business dealings with the Japanese with those that he had with his Chinese help.

Chinese are barred by the exclusion laws, but the plentiful opportunity for employment at remunerative wages and the mild climate of the Pacific Slope are inducing another Oriental race, the Hindus, to immigrate in ever-increasing numbers, and at the present moment it looks as if they will prove likely to be the most serious menace that has threatened American labor, or disturbed the relations between employer and employé. They are introducing among us a most pernicious caste system. The Hindu has fixed, irrevocable ideas and customs which we do not understand and will not tolerate. They are coming by the hundreds at the present time, and they are likely to increase to thousands in the future.

Both the Hindu and Japanese immigrants are likely to remain here permanently. Their presence is certain to incite race prejudice and may often incite race war, and will be a constant menace to the peace of the country. It is certain that neither of them can ever satisfactorily supply the demand of the American employer of agricultural labor. The supply of available white labor is and always will be insufficient, for the reasons above stated. Hindus and Japs are both unsatisfactory and undesirable. What, then, is the Pacific Coast producer to do? It seems that he must either limit his product to what he and the few white men he can afford to employ the year round can harvest, or else look to some source not now available for the extra labor that is required at certain periods of the season.

The solution is not an easy one. The country can not prosper, old industries can not grow, and new ones can not develop unless confidence and satisfactory relations are maintained between employer and employé. In our anxiety to maintain these relations and protect American white labor from the encroachments of the aliens of other countries, with which we can not compete, it is difficult to convince the public that we may have gone a step too far in excluding altogether those who are adapted to do certain work in which there can be no competition, because white men will not do it.

We exclude the Chinese absolutely, but are opening our doors to the Japanese and the Hindus, although both classes are more objectionable than the Chinese. Such discrimination is unwise and unfair to both ourselves and the Chinese. If a reasonable restriction is deemed advisable it should apply with more force to the Japanese and Hindus than to Chinese, for the latter is the least objectionable of the three, and there are conditions under which we can utilize the labor of a limited number of Chinese laborers without bringing them into competition with white labor, while the Japanese are certain to be a constant menace to both employer and employé.

Suppose that the exclusion law was so modified that a limited number of Chinese were allowed to come to the Pacific Coast? Is it not probable, then, that we would have a class of reliable laborers who would perform certain field labor which men of our own race will not do on account of the physical and climatic conditions that prevail, and which can not be eliminated? It is no experiment. We already know that Chinamen are patient and industrious; that they are content to move from place to place where their labor is needed, and that, next to the sober, reliable white men, they are the most satisfactory laborers in the horticultural and agricultural industries.

Of course to remove opposition to the modification of the restriction law as suggested, it will be necessary to convince the people, and especially the laboring classes, that to continue under present conditions means limitation of the operations of the American producer, to put a check upon progress and development, and to limit the field open to American genius and enterprise. They must also be convinced that to employ Chinese in menial service which no other race can or will perform *satisfactorily* can not possibly bring them into competition with white labor.

In any event, the solution of this question can only be reached by honest, fair-minded, patient investigation, uninfluenced by political expediency or cheap demagogy. The situation is this: We must have more available labor at certain seasons of the year, otherwise landowners will be forced to abandon crops that require coöperative hands and return to primitive methods in which the labor is not such an essential factor. No one will dispute that the tendency among men is to accomplish their purpose with as little effort as possible and with the least possible discomfort. It has been convincingly demonstrated that, owing to existing conditions which it seems can not be changed, at certain times of the year certain kinds of work are necessary for which white labor is not available.

It is not a theory, but a condition that confronts us. It can not be evaded. We can not temporize with it. We must meet it fairly and honestly and with an earnest desire to do that which will be for the best interest of all concerned and will best encourage the development of the resources of the Pacific Coast and the expansion of our commercial and industrial activities.

DISCUSSION OF LABOR QUESTION.

MR. MILLS. If you have a few moments and you will hear me, I would like to discuss one feature of this question. I am an employer of labor—of white labor and of Oriental labor. The statement was made here, and it is all too true, that the white laborer when he receives his pay on Saturday night goes and dumps it into the saloon. What is the cause? Now, I don't want to tread on your toes, but I think I can tell you some of the causes. Recently I was at a large grain ranch where horses were cared for better than the men. Where was there a place for the man to go but in the loft over the horses' mangers, under the shake roof that rattled in every breeze that blew from the north or the south or the east or the west? There was not a stove to dry his wet garments before he went to bed on a stormy night when he came in from the field where he was working for the inhuman man who paid him his wages. I tell you, gentlemen, we have, as employers of labor, a duty as well as the laborers, and that is to house them as Colonel Irish says he houses his. How many ranchers house their men as he says he does? How many ranchers are there who will sit down with their men and give them the inspiration they need? I myself have been a laborer. I myself have been offered the side of a rail fence and a five-gallon coal-oil can to cook my meals on, laboring in California. We must provide comfortable quarters, lectures for the men, music for the men, if you will, if you expect to get, for the money that you pay, the labor that you need. You must make it possible for the man to be comfortable in the quarters that you give him, so that he will not have to go to the saloon and dump his money over the counter and the damnable stuff down his throat. You want to make it impossible for him to find so many saloons, to give him comfort, warmth, entertainment, music, and everything which the social being needs. Give comfort, give encouragement and inspiration, and the men who are laboring for you, the white men, will remember, and I venture the assertion that half of your trouble will have ended. We are not fulfilling the law of Christ to-day in the treatment of the white labor or the Japanese or the Chinese or the southeastern European, and I say, with Colonel Irish, God save us from southeastern Europe and give us any other labor than that. But let us first act right with the white labor that we have, our own brothers from the western prairies, our own brothers from the limits of the Northern Circle. I plead with you—it pays in money, it pays in morals. it pays dividends of righteousness to more righteously treat your men who come to your door to harvest your crops, and not let them lie out along the fence or over the mangers of the horses or in the rickety old barn. You will get help that is worth having if you will treat them right. I know it; I have tried it. I have hundreds of men and I haven't a drunkard or a gambler among them, nor in traveling twenty miles over the property that I superintend will you find one single man who is unworthy of your friendship, nor will you hear an oath in a week, because the conditions which surround them are those that we human beings need. You and I would be in the saloon—I would; I would go to the saloon if I had no other place than the places that many of our laboring men have to inhabit on our ranches. I need some social features in my life. Give more of your money, more of your heart, more of your soul to the settlement of this white labor question, and you will settle it; then get after the politician. John P. Irish said the truest thing—that we are not enforcing our rights at the primary. You men, who are American citizens, go to the primary and send to the convention Americans worthy the name, and you will have in this debasing legislature at Sacramento better men to pass your laws. The whole question resolves itself into the fact that you have been forfeiting your rights as citizens; and God help you more righteously to remember the great trust that is upon you as American citizens, and you will solve the labor question, and many others, too. (Applause.)

THE CHAIRMAN. We have now "The College and the People," by Prof. Leroy Anderson, now of the State Farm at Davis.

PROFESSOR ANDERSON. I have no doubt that this calm and quiet paper was introduced here at this time to give you a chance for good digestion after so exciting a session as you have had in the last hour or so, and so I will attempt to perform my duty in as quiet and peaceable a way as possible. The subject may not mean so much to you as a different statement of it, that is, the bringing of our agricultural education somewhat nearer to the agricultural population.

THE COLLEGE AND THE PEOPLE.

By PROF. LEROY ANDERSON, Director of California Polytechnic School, San Luis Obispo.

The time has passed when there is any serious question as to the usefulness of an education for agriculture. All thinking men—all progressive farmers, horticulturists, dairymen, and stockmen—believe in the agricultural college and the experiment station, because each has done something, or can do something, to aid his particular calling. This unanimity of opinion did not prevail a generation ago, or when you and I were attending school. The agricultural colleges have had a hard fight. They have fought consistently, using every honorable means to make the people see their need of it, and have proven that they can fulfill the need. The college, however, has not fought alone. It has had stanch friends among the rank and file of intelligent farmers and merchants, and in many cases has been led by them into broader fields of activity and into a larger usefulness. In this matter the instruction in agriculture has not differed materially from other lines of industrial training; for in many instances an awakened public has led teachers and school boards into the establishment of schools for manual training in our cities; and in fact, when public funds seemed not available, private fortunes have been used to found such schools. The beginning of secondary industrial schools in this country is credited to such high-minded and far-sighted generous souls.

If the time has passed when the usefulness of an education *for* agriculture is to be questioned, there is likewise no more doubt regarding the value of an education by agriculture. The innumerable divisions and ramifications of farm life and farm processes make it incumbent upon the farmer to know a great many facts and principles if he is to farm successfully. The soil, the trees, and the vines, with their culture, their insects, and their diseases; the animals of many breeds and individualities, with their care and breeding and feeding, all demand that the farmer have a training, an education *for* his work. It is a matter of congratulation that educators, even those who had in former years depended upon mathematics and the classics for adequate mental training, now believe that the same study and thought applied to agricultural sciences and practice will result in an equally well-rounded mental development. The agricultural population and the general public desire that, for the common weal of the nation, those engaged in the chief productive industry should be as well educated as those in any other occupation. Happy are we, therefore, to be assured that the boy who spends his days in the field and shop and laboratory, in conjunction with the lecture room, may come out of school or college as large in his mental calibre, as strong in his moral fibre, and as broad in his culture, as the boy who has spent his days in the libraries and in searching ancient lore. Let us farmers, then, be proud of our calling and hold our heads high, because ours is an occupation which needs a wide training, and in securing which we may find that education which makes men better know how to live.

These comments may be said to apply to conditions in all the states and to all the agricultural colleges. Let us come home to our own conditions and our own State problems in education. Every one whom I have the honor of addressing has achieved some success in his chosen line of agriculture, which in this instance is growing fruits or vines.

Some of you have had general college training, some an agricultural college training, while probably the majority have had neither. The general college training has helped you to solve your problems because of the strengthening of mental processes. The agricultural college has done this, too, and has further given definite instructions as to procedure under certain conditions and has been more helpful accordingly.

For the information which the college gives boiled down, running over, in real scriptural measure, the majority of farmers have sought in the agricultural press, experiment station bulletins, books, farmers' institutes, reading courses, conventions, and farmers' clubs. The large portion of this fund of knowledge has come from the experiment stations of our own and other states, or from field and laboratory investigations carried on by other public bodies such as the State Commission of Horticulture. The experiment stations have made good teaching in the agricultural colleges possible and have given them a greater impetus and a greater means for usefulness than could or has come from any other source. The means for instruction above mentioned are all good and all are recognized throughout the land as imperative in awakening a livelier interest in our occupation and in creating a desire for further and more scientific knowledge, as well as satisfying to a degree this desire.

If you have not had the opportunity to attend an agricultural school, but have been dependent for the wide training needed upon the means of home study, do you wish your sons and daughters to enter your occupation with the same tools, or will you have them better equipped through a regular course of study especially planned for their needs? I am confident that every father and mother says, "I want my children to have a better education than I had." I remember well my father's repeated statement to this effect and how hard he worked to accomplish the end. You want your sons who are to be farmers to study the sciences and the practices relating to the farm, to the end that they may become more interested therein and be able to compel the soil to yield ever-increasing returns. You want your daughters to study the sciences and approved practices relating to the home and thereby become better home-makers.

I am not so sure, however, that you all want your sons to go up to the agricultural college. On the contrary, I imagine you have an idea that the college should come closer to you with its fund of knowledge and store of wisdom. It may not be that you have evolved a scheme satisfactory to yourselves as to just how this closer meeting is to take place, but there is the strong desire which can not be evaded. Is not the trouble here? The college presupposes a high school course of four years, the latter giving no attention to agricultural subjects, and following eight years of grammar school in which agriculture is not mentioned. It is not apparent to you why the boy who expects to spend his life upon the farm should go through so much preliminary training in order to study agriculture in college, and you reason that it should be possible to receive instruction in agriculture in the lower schools. I agree with you most heartily, and will say further that the vast majority of farmers who, in the future, shall have had an opportunity to study their life work in the schools and colleges will have done so in institutions of high school grade; and if by the establishment of such schools we shall not have been able to lead more pupils from the grammar to the secondary schools, the majority even will have received their agricultural instruction in the grammar schools. Assistant Secretary of Agriculture, W. M. Hays, said in an address last January before the Pennsylvania State Board of Agriculture: "The assumption is now proved erroneous that the farmer should be afforded as long a course of college study as persons preparing for the technical professions."

When the college of agriculture was established by the Morrill Act of 1862 it stood as near to the people as it was possible to stand. Its course of study could not have been of so high a grade as now, because there was not the recognized standard of preparatory schools as now. Students could enter with almost any kind of preparation—at least, no more than we now ask for the high school. With the growth of the college and the university, of which it is an integral part, came more vigorous standards. The college of agriculture could not, without humiliation and disgrace, admit students to regular university standing without demanding an equivalent preparation. Nor could its graduate receive the university diploma except his four-year course had given him an equal training with the graduate in mechanics, chemistry, or letters. If he wanted to teach, or enter experiment station work or commercial employ, the vigorous college training was none too high for him.

Thus has the college of agriculture seemingly grown away from the farmer, but in reality it has not. There has entered between the common school and the college, the high school as an intermediate institution whose chief object is to prepare for college and the university. Is not this the school the farmer has allowed to get away from him? The college of agriculture has been following the line that was necessary to preserve its dignity and greatest usefulness, as will be shown in later years, because it has the entire State to serve for both instruction and experimentation. Some of us have been stewing about the college while we have been blind to our local schools, and have let them get as far away from our agriculture as the two poles are from each other. You need to lasso that school in your community and tie it to your agriculture. The larger cities in our State found their high schools getting away from the common people, but instead of lassoing them they started new ones and named them polytechnic high schools. Now, the boy can learn carpentry, iron work, electricity, etc., along with his language and mathematics, and when he finishes can go to college or is prepared to enter a trade. You can not afford to build another high school in your country community, so make over the one you have into an agricultural teaching one, and see how quickly and how surely the college of agriculture will help you. This thought is entirely in harmony with the prediction made a few moments ago, that the great majority of farmers who have had a school training in agriculture will have secured it in an institution of lower grade than the college.

But I am laying out a pretty hard problem for you—harder than present conditions make feasible. The college of agriculture proposes to give you an easier method to educate your children in agriculture before they reach the college than by making it incumbent upon you to reform your local schools, however desirable such an end may be.

By an appropriation of $150,000, made by the Legislature of 1905, the University has been enabled to purchase over seven hundred acres of as good land as lies out of doors, and located centrally to this great valley at Davis. By an additional appropriation of $132,000, made by the Legislature of 1907, the University will be able to complete necessary buildings, purchase equipment, and employ a teaching force to begin instruction in the fall of 1908. Here will be brought close to the agricultural population all that the college has learned and in as elementary, as instructive, and as interesting a manner as is possible. I understand that two main lines of instruction will be established: First, to supplement the means of home study which you now enjoy by short courses in the subjects in which you are most concerned; second, to establish a secondary school.

I have indicated the double responsibility of the University to give instruction to the adult who had not the opportunity of study at college or in agricultural school, and to the youth. This responsibility is not simply a present one, but will always exist; for no matter how many schools may be established there will ever be some who can not attend. Moreover, new investigations leading to new discoveries must continue to be disseminated by literature, institutes, conventions, and short courses at college. So you will be invited to come to Davis to the University farm for two, three, or four weeks to study, to exchange ideas with each other and the instructors, and to become enthused for a new hold on life and on your occupation. You are not asked for a longer period, for we believe you could not come—could not leave your business. Will you accept the invitation now and plan to meet the college half way in its endeavor to come closer to the people?

To the youth who has not become engrossed in his life work, but who is seeking a preparation therefor, a plan of greater attractiveness is being unfolded. When he has completed the grammar school and is about fifteen years old, or more, he is to be invited to spend two or three or maybe four years at Davis, and to the nature-loving youth nothing can be more attractive. He will study of plants, trees, and vines, of horses, cattle, sheep, swine, and poultry, of the soil, its cultivation, irrigation, and improvement, of farm machinery, tools, and implements; he will learn to use forge, and carpentry tools, plan and build buildings; he will study the English language, mathematics, and government. Result: as well rounded a young man as ever graduated from the high school and fitted with the mental and mechanical equipment to become a good farmer, or to go on to college if he chooses to become a teacher or experimenter in agriculture. Will you accept the invitation for your sons, and send them when the doors are open for this grand opportunity for California's grand young men? You must meet the college half way in its efforts to supply the secondary training, or all the money spent in equipment and teachers goes for naught. I am confident that you will not be found wanting.

This secondary school of agriculture, as we are pleased to call it, is not new, even in California. One has been in operation four years at San Luis Obispo, and some of Sacramento Valley's good sons are in attendance. Assistant Secretary Hays says there are more than thirty of them in the United States, and he says two or three hundred are needed. The next move of the National Government to further education will undoubtedly be to establish such secondary schools throughout the nation—possibly one in each congressional district. So our college of agriculture is not treading on entirely new ground and is assured of success from the beginning, provided you send your sons.

As a concluding word, let me say again that the college is standing where it ought to stand as a part of our great University in a position of dignity and honor. I do not believe that you would like to have it lowered by taking a position subordinate to the other colleges or to agricultural colleges in other states. It will meet your needs, your fondest desires for more elementary and practical instruction, by its schools at Davis. The University is grateful to you and the Legislature for your confidence in making large appropriations, and it enters the new field of secondary schools with a determination to administer the funds to the best advantage of the farming people. When you have considered the plan thoughtfully, I am sure you will see that California is to have a scheme of agricultural instruction second to none in the land. But do not forget that your high school and the little roadside school should be teaching agriculture also. If the cities can have a manual-training system beginning in the grammar school and continuing through the polytechnic high to the University mechanics department, why can not we have agriculture running through the entire system—country school, agricultural high, and the University agricultural department? It is not too much to hope for, and some day we shall see it. Will you help?

DISCUSSION ON STATE FARM AT DAVIS.

THE CHAIRMAN. Discussion on this paper is now in order.

MR. MILLS. I would like to ask the gentleman what the qualifications are for entrance to the new school at Davis.

PROFESSOR ANDERSON. No definite plans have been made as yet. For the short course there will be no requirements whatever; anybody can enter; and that is especially for adults, men who are already in some branch of farming and want to learn more about what is being done in the experimental field. The secondary school work is usually carried on after the grammar school. For instance, at San Luis Obispo we admit students who have finished the grammar schools and are fifteen years of age. I have not taken up the work yet and I really ought not to say very much about it, but I think that is the coming thing in our agricultural instruction to-day. It has proven to be most successful in states where it is tried, and our four years' experience at San Luis Obispo shows that it is the proper thing to do.

MR. BERWICK. Mr. Anderson, some of us think it would be a better object lesson if that farm could be made self-sustaining or even profitable. It is so easy to run a farm with a great expenditure of money, but it is so hard to run a farm and make the money out of the farm. Could you make that farm self-sustaining?

PROFESSOR ANDERSON. How do you mean?

MR. BERWICK. It would be a better object lesson for a model farm to pay its own way out of the farm. Is it possible, do you think, in any way to do that?

PROFESSOR ANDERSON. No; it is not.

MR. BERWICK. And for what reason?

PROFESSOR ANDERSON. In asking that you are asking something which you do not ask of any other school. You have a carpenter shop to teach boys carpentry; you don't ask for that to be self-supporting. A machine shop; you don't ask for that to be self-supporting. Where a school is located at a farm the farm must be looked upon as the laboratory of the school, and, taken as a whole, can not be expected to be any more self-supporting than a laboratory in the machine shop. On the other hand, a field of oats, or a field of corn or rye, by themselves, providing there isn't too much done in the way of experimentation, will in themselves show a profit, or may show a loss. So we find on our farms that certain crops grown in the practical way will show results. But, taken as a whole, your farm can not be made self-supporting, and there is no college or school in the United States making it so, so far as I know. The dairy itself will show good returns, but the State will always have to make appropriations for the farm laboratory.

MR. BERWICK. I don't think the thing is quite analogous to a laboratory and a school. You are teaching your young people to produce economically and with profit. I don't see why the State farm should not produce with profit as well as any individual farm. If you do things extravagantly on the farm you are giving a bad example to the young people who are with you, and I think they should learn from the start to pay as they go. Perhaps I am wrong, but that is how it appears to me—that it would be the best possible lesson to a young farmer to see how the State could make that thing pay. I have been myself a victim of theory through life, and I see no reason on earth why your farm should not more than pay its way. I can see full well in a school where the chemical laboratory pays nothing. But when a boy milks a cow or runs a plow or plants a tree or cuts alfalfa, he is a producer; he is making something of value from the start, and I think it would be the best object lesson possible to make that farm pay its way.

A MEMBER. I was at the Davis farm, and among the things that interested me a great deal was the fact that they are going to bring a bunch of earth from Kansas and plant on it some of that Kansas wheat, of which they import 110,000 tons to mix with our wheat. Now, to bring a carload of earth from Kansas and to find out something that might be worth millions of dollars to California, in itself never can be made a profitable proposition, yet it seems to me might be worth millions of dollars to us as wheat-growers of California, and many other things of that kind. It seems to me that it is impossible to consider that side of the question in an institution of learning. We might as well expect the young physician to make the college self-supporting and go to sawing people's legs off just for the experiment. I don't look on the agricultural farm as a place other than for preparing young men to make themselves better farmers, better business men, better legislators, and for securing an education that prepares them for future life, just as well as the colleges prepare for the ministry or the law or medicine, and I think that is the view that we will have to take of the farm at Davis—an expense to the State for experimental purposes, but in the end a great source of benefit and profit.

COLONEL IRISH. Mr. Berwick wants this, as a State industry, owned by the State, to pay. The State is running one productive industry now as an owner, the State Printing Office, and I don't think it is fair to lay the burden on the professors of this farm, that the State, in running its own printing office, might show a profit; one is industrial, the other is a training school. You might as well demand that the chemical laboratory in the University be self-supporting or show a profit; it is for teaching purposes, and the loss comes through imparting knowledge to the students.

MR. BERWICK. I can see very well that in so far as it is an experimental farm it can not pay, but I maintain the most essential thing a farm of this sort can do is to teach the young people how to produce with a profit, and it seems to me the best way to teach them that is to do the actual thing right there on the State farm. If you are bringing soil from Kansas, if you are experimenting in expensive ways, of course the thing can not be done; but simply to run it as a model California farm I still maintain the farm should pay expenses, because if those who best know how can not run a farm so as to make a profit, how can their students do so?

MR. MILLS. Wouldn't it be better for the State to set aside a piece of ground as a model farm?

MR. BERWICK. I assumed this was a model farm. If I am wrong I beg pardon, but I regarded this to be the model farm of the State to show our young people how to farm with profit. It is not analogous to the chemical laboratory.

PROFESSOR WICKSON. Mr. Chairman, Ladies and Gentlemen: I appreciate the fact that there is not ample time for the full discussion of the important issue Mr. Berwick has raised. I want to quote something which Mr. Pillsbury just whispered to me, which is perhaps better than anything I can think of in a minute, and that is that the farm was intended to be made for the students and not the students for the farm; and I take it the significance of that is that the farm is to be used to teach the students to do something and not use the students in order that the farm may be profitable. Of course, there is something in that point. Now, there is another consideration that is near to it, and that is that a model farm has been a failure ever since the first one was thought of, and if that farm at Davisville is to be a model farm we should be the first to ask the State to take it back. We can not use it in that way. It is not possible to proceed along the line of successful operation by skillful men and have your students sitting around on the fence smoking cigarettes and watch you doing things. You have to teach those students to do things themselves. Now, that requires a teaching force, in the first place. The man who does a thing successfully can not always tell why he does it, nor is the mere observer able to take the lesson entirely by observation. He has to be told something about it. That brings in a teaching force. You can not make a farm of that sort profitable unless prices should be inordinately high, because a teaching force is no part of the expense of a commercial farm; it is a part, and an essential part, of the teaching.

Now, we will have to acknowledge at the very outset that we can not teach those boys how to farm successfully by having them stand around and see other people do things. We have got to show them how to do things themselves, and they are going to make a terrible mess of it. Professor Henry said he would never dare in his life to tell the Legislature of the State of Wisconsin how much milk he spoiled every year in the dairy school. I would not dare to even figure on how much good stuff we are going to spoil at Davisville.

(The hour for adjournment having arrived, the Chairman reluctantly brought the discussion to an end and a recess was taken until 1:30 o'clock P. M.)

AFTERNOON SESSION—SECOND DAY.

WEDNESDAY, December 4, 1907.

THE CHAIRMAN. Professor Wickson desires to say a few words further on the subject we were discussing before we took our recess.

PROFESSOR WICKSON. I was complaining to the President at noontime that there was one thing I omitted to say this morning in the answer to Mr. Berwick's claim that that farm ought to be run as an income-payer. I perhaps conveyed the idea that we did not expect to do anything in that direction. Of course, that is wrong. The farm will be run on commercial principles with certain products and certain crops and at times when the special facilities are not directly used in instruction, and there will be an income, which, of course, will go into the funds for the maintenance. The creamery will be run as a commercial creamery all the year around, taking the milk from the University herd and buying milk from the farmers roundabout, so that that will be run for income on straight commercial principles. But during the time that that creamery is used primarily for instruction and men are employed to elucidate the operations and to expound the science involved in the handling of milk, and when the pupils themselves are required, as they will be, to take certain portions of milk and actually make certain butter and cheese themselves, then, you see, conditions come in that will militate against income to a certain extent, because the product which they make out of that milk will not be good. So that there is a divided motive in operation, and the idea of managing things economically for income is not lost sight of at all. But when it is clearly stated that the expenditure for instruction is something which one does not have to meet on a producing farm—and it is mainly for two things: first, the cost of instruction; second, the irregularity of the product and sometimes the actual spoiling of the product by those who are trying to learn; and those two together introduce an element of cost which is altogether at enmity with the idea of making the thing a successful producing establishment throughout.

And the cost of instruction is considerable; probably not less than $15,000 a year will be required for special instructors who will be employed there, and that, of course, will be quite an item of expense in the operation of the farm. For that reason, I simply want to add to my previous statement that if I gave Mr. Berwick the impression this morning that the farm was to be run extravagantly and without the idea of making things profitable, that was not the impression which I intended to convey.

MR. GORDON. I understood that M. Theodore Kearney, of Fresno, left the State University a property estimated at a value of about one million dollars. I would like to ask Professor Wickson whether the University has got possession of it and, if so, what is the intention—is it to be kept as an experimental farm or what? I think it is due the fruit-growers of California to know something about that farm as well as about the one at Davisville.

PROFESSOR WICKSON. I am very glad indeed to make reply to that question. The Kearney estate is still in the courts; it has not been distributed. It is being managed by the executor. The trust company was executor under the will. There are certain contestants who have filed claims. The heirs of Denis Kearney, who died a few months ago, have their claims before the court, but no hearing has yet been had. There can not be a distribution, of course, until these claimants are disposed of. How long it will take them to make out their case, whether they can establish a claim of relationship, nobody can tell until it actually comes into court. As there has been no hearing, there is no date at which distribution can be expected. We simply don't know when that will come. The estate is being managed by the trust company as executor, and I understand that, owing to the particularly good prices of products during the last two years, a net profit of somewhere between $70,000 and $80,000 a year for two years has been made by the trust company, which goes into the estate. There is a considerable quantity of claims outside of direct incumbrances, debts of one sort and another, which this possible $150,000 of net gains for the last two years will go toward liquidating. That business the trust company, under the court, is managing. The University has nothing whatever yet, except expectations. The plan which we shall carry out will be to follow as far as possible two things, one which we conceive to be of value to that district, and secondly, to observe as closely as possible Mr. Kearney's wishes as expressed in his will, and agricultural instruction and research covering both points. I do not conceive that it will be of advantage to us to operate anything like 5,400 acres of land. Probably two thirds of that can be sold and the money used as an endowment to meet the expenses of the institution which will be established there. I do not believe in selling it, however, until we do something in the way of establishment, because just as soon as we do establish something the value of the land is bound to be advanced.

MR. BERWICK. I can understand very fully that a farm conducted on the basis of research would be a non-paying institution. I can not understand Professor Henry's remark about the quantity of milk the students spoil. I should suppose the instructor in charge of the plant, whether they are making butter or cheese or getting cream, would be the very one to see that there was no milk spoiled. I personally have taken green boys—it was an economic proposition—on my farm and made their work bring something into Berwick's pocket, and I see no reason why the State farm can not be run on that same basis. Our boys are pretty keen observers. If they see the thing run at a loss, what is the result? Instead of drawing boys back to the soil, the boy says, "No, sir; not for me. They can't make that farm pay its own expenses; I don't want any farm in mine." And that is the very wrong result that we do not wish to attain by this farm. Why Professor Wickson scouts the idea of its being a model farm I do not know.

THE CHAIRMAN. Mr. Stephens is now ready with his "Report of Committee on Transportation."

MR. STEPHENS. I have handed the report to the Secretary, who will please read it.

The Secretary read the report, as follows:

REPORT OF COMMITTEE ON TRANSPORTATION.

Mr. Chairman: Your Committee on Transportation beg leave to submit the following report:

The Southern Pacific Company, through Mr. H. A. Jones, Traffic Manager at San Francisco, in a communication addressed to this Committee dated November 24, 1906, stated that the company had contracted for the construction of 6,600 refrigerator cars of the latest improved type and that they would all be delivered in time to be put into service to handle California fresh fruit shipments in 1907. Your Committee is pleased to say that the Southern Pacific Company kept this promise in full and that all other initial lines have acted in like manner. The cars are larger and better in all respects than those that had been in use, and we feel that we would be inappreciative and derelict in duty if we did not recommend that the fruit-growers in this Convention adopt resolutions commending and thanking the Southern Pacific Company and the other initial lines for their action in this matter.

We believe that the Southern Pacific Company, the Santa Fé Company, and the San Pedro, Los Angeles, and Salt Lake Company have by this elimination of the private refrigerator car lines done much to promote the fruit industry of California. It is now within easy reach of the transportation companies to more than quadruple our fruit shipments in short time by establishing and maintaining a reasonable FRUIT-TRAIN TIME SCHEDULE.

Better time is necessary. The time made in the delivery of California fruit shipments at Eastern destinations this year was probably the worst in the history of such shipments. It frequently happened that cars were out 12 to 15 days to Chicago, and to points east of Chicago frequently from 16 to 18 days and in some instances 20 to 25 days.

As usual, the time made at the beginning of the season was better than the time made from about the middle to the close of the season, when the best possible service should be given to insure the arrival of the fruit in good condition at destination.

Some think that, as the days grow shorter and the nights longer and cooler, it is not important to see that the ice tanks are kept *full* and that fast time be made in the carrying of our fruit shipments.

Such ideas are erroneous, for the reason that fruit does not differ from other earthly things in its power of endurance, to which there is a limit. Fruit, when fully matured, soon begins to decay and becomes worthless, unless care and attention are given to prevent such a result.

Since the elimination of the private refrigerator car lines from the transportation service, the time consumed in the transit of our fruit shipments becomes the most important factor, and should be given paramount consideration, for upon improved, uniform and reliable time-schedule fruit-train service depends the development of California's great horticultural resources, which are yet, comparatively speaking, in embryo.

Additional facilities must be given by the transportation companies, for when the new acreage, which is very large, comes into bearing, and the many more acres that we are inviting and urging people to come to California to plant to fruit, also come into bearing, better time must be made in the transportation of our fruit products, or heavy loss will inevitably come to many growers.

What the fruit-growers desire is that the agreement entered into between them and the Southern Pacific Company on May 21, 1901, be put into effect, which was as follows:

SOUTHERN PACIFIC COMPANY,
SAN FRANCISCO, CAL., May 21, 1901.

MR. R. D. STEPHENS,
Chairman Transportation Committee,
Fruit Growers and Shippers,
Sacramento, Cal.

DEAR SIR:—

DECIDUOUS FRUIT TRAFFIC.

Referring to the memorial from the fruit-growers of California to the transportation companies through committee of fruit-growers, of which you are the chairman, and copy of which was duly furnished this office.

I beg to say that we have had extended correspondence with our connections, looking to a time-schedule on deciduous fruit from northern California, during the season now opening, that would be as far as feasible in line with the wishes of the fruit-growers.

As expressed to you when I had the pleasure of appearing before the Convention at its session in this city December last, it is the desire of this company to do its share in fostering the fruit industry, and lend it our influence in giving it satisfactory transportation.

Am now able to say to you accordingly that it is the intention of this company to run trainloads of fresh fruit from Sacramento to Ogden within 60 hours, provided, if there is but one train, it be ready for departure from Sacramento not later than 12 o'clock midnight; if two or three trainloads, it will be necessary that the first and second be ready to go out at earlier hours, say at 10 and 11, respectively.

The Union Pacific and its connections have authorized us to say that their time from Ogden to Chicago will approximate 84 hours for shipments thus delivered them in trainload lots, of which 24 hours will be consumed from Council Bluffs to Chicago.

You will observe that this will bring the fruit into Chicago in the early morning hours, as a shipment, for example, which leaves Sacramento on Monday midnight would arrive in Chicago on the morning of the following Monday—this, too, bearing in mind the two hours' difference in time owing to meridian.

If, when shipments begin in quantity so as to make up trainloads, shippers will so arrange their forwardings as to give the whole trainload to one connection through to Chicago, I believe you will find results justify the effort. This can be done without giving one line an undue proportion of the business, by alternating the lines over which the trains would move; but all notify us that unless they can get the fruit in trainloads, they can not make the schedule called for. It will make no difference in our time up to Ogden whether the fruit is there delivered to the Union Pacific or to the Rio Grande Western.

East of Ogden the Rio Grande-Pueblo route, recognizing the conditions under which the traffic moves, will aim to meet the time of the Council Bluffs route indicated in the foregoing.

Shipments for St. Paul and Minneapolis on the one hand, and St. Louis on the other, will be handled from point of divergence on the scheduled trains of the line handling the fruit from the Missouri River.

East of Chicago lines will handle as heretofore, the Erie Railroad Company notifying us that their high-class freight train, which carries the fruit, leaves Chicago in the afternoon, but reaches New York on or about 4:30 A. M. third morning, Philadelphia 6:30 A. M. third morning, Boston 4 A. M. fourth morning out from Chicago.

You are aware that the standard for fast trains carrying perishable freight from Chicago to New York is about 60 hours. Lines east of Chicago point out that to speed up their trains in this business would not mend matters, as the fruit would arrive either in the afternoon, or the early night hours prior to present arrival, and from either the shippers would derive no benefit as compared with present deliveries; further than this, the way is not clear to handling California fruit on faster schedule time than the perishable freight local to their own lines.

I trust that you will concur that the foregoing indicates that the expressions given your Convention of intention to go into this matter carefully, and endeavoring to meet the needs of the fruit-growers as expressed in that Convention, have not been lost sight of, but, on the contrary, are being fulfilled. We trust that the results during the season about to open will bring profit to the fruit-growers and renewed friendly relations with the carriers.

Will you kindly acknowledge receipt?

Yours truly,

WM. SPROULE.

We believe that the readoption of this time-schedule by the railroads, and its strict enforcement by them, would go far and do much to place fruit-growing in California upon a sound, paying basis. Such a time-schedule we believe would go far toward remedying an evil that has done much to retard the development of our horticultural interests, to wit: the fluctuations in prices for California fruit in Eastern markets.

When shipments that are sent out three and four days later than others consigned to the same place arrive and are sold at the same time, an over-supply is the result, which is not all, for the delayed fruit arrives in an impaired condition and brings a low and losing price, which price goes far toward fixing the price for the more sound and perfect fruit.

If this season's shipments that arrived in a decayed condition and were sold at a loss of from $200 to $400 a car could be eliminated from the total shipments for the season, a much better showing would be made in favor of our fruit interests, which, as a whole, is good, but unnecessarily impaired for the reasons above given.

In conclusion, permit us to say that there is no desire on our part to criticise the transportation companies for their unusually poor service given to fruit shipments this season, but, on the contrary, we wish to call the attention of the railroad officials to the evils existing in the present methods of transportation regarding fruit shipments, with the end in view and the hope that the fruit-growers of California and the officials of the transportation companies may get together and act in a spirit of amity and friendliness and adjust any and all differences of opinion that may exist in their minds as to what is best and should be done to promote and build up the fruit industry of California, and incidentally the interests of the whole State.

R. D. STEPHENS, Chairman.
ALEX. GORDON.
A. N. JUDD.

MR. STEPHENS. Now, Mr. Chairman, I move that that report be adopted, in order to bring it before this Convention if anybody desires to discuss it, and also that copies be sent to the different transportation companies, which will show the feelings and wishes of the fruit-growers of the State.

The motion was duly seconded and carried.

THE CHAIRMAN. The report is accepted, and before you for discussion.

MR. STEPHENS. Mr. Chairman, I simply wish to say that the committee has labored with a view of bringing this matter before the attention of the transportation companies, and hopes, as expressed in the report, that there will be opportunities given to the growers and also the officials of the transportation companies to take into consideration this matter. I have had the pleasure of meeting some of the officials of the Southern Pacific to-day and they think there are suggestions in that report which will result beneficially to the fruit-growers of California. What we want is not antagonism between the railroad companies and the fruit-growers, but we want to work in harmony with them and we want to do everything possible to bring about a better condition in the transportation and marketing of our fruits. The elimination of the private car line has removed a very great obstacle and bone of contention. Heretofore, in conventions, up to the last season, we had troubles over that question, and they have been of such a character as to instill feelings of prejudice. The elimination of those car lines has brought us right down to the question of transportation. Now, you see, we are making progress, and if we can keep on making progress along these lines instead of creating discord, as in the past, there will be nothing but harmony. The object of the committee has been to bring about such a condition, and we are very pleased to know that there are no objections, so far as any manifestation of any member of this Convention is concerned, and if there is a gentleman or lady here who thinks there is anything wrong in that report the committee would be very thankful to have a suggestion as to what is wrong, and if based upon good grounds we are willing now to amend it. (Applause.)

THE CHAIRMAN. Mr. Alden Anderson's papers are both combined. He gives the report of the California Fruit Distributors and also "Widening our Markets." Mr. Isaac will now read Mr. Anderson's paper.

The Secretary read Mr. Anderson's paper, as follows:

REPORT OF THE CALIFORNIA FRUIT DISTRIBUTORS.

By HON. ALDEN ANDERSON, of Sacramento.

The shipment of deciduous fruits to Eastern markets for the season of 1907 to date follows, together with shipments of 1906 for comparison:

	1906.	1907.
Cherries	150	98
Apricots	16	71
Peaches	584	699
Plums and Prunes	1,220	1,039
Pears	1,513	1,039
Apples	748*	1,067†
Miscellaneous	22	18
Grapes	2,052	3,460
Totals	6,305	7,491

* Shipment to December 20th. † Shipment to November 29th.

A study of the figures given, together with a study of the statistics of the shipment of deciduous fruits for the last six or eight years, will show that this year there was not an excess of shipments of any one variety of fruit over any other previous year, with the exception of grapes, and on some varieties the quantity is considerably below the average.

One of the reasons there were not greater shipments in some lines was the fact that we had a very cold, rainy spring, which interfered with the blossoming and "setting" of the fruit, hence short crops, particularly in some districts. Another reason was the fact that fruit of the varieties also used for canning or drying was salable at good prices at home and there was no necessity for Eastern shipment to secure remunerative returns.

The increase in the shipment of grapes is very significant, and as there is considerable acreage that will still come into bearing in a year or two it will be reasonable to expect, under normal conditions, an increased shipment over this year, and as I have been requested to say a few words on the subject of "Widening our Markets" I will particularly use the grape shipments as my text, as under normal conditions we will have a greater increase of shipments of this fruit than of any other.

There was a fair crop of grapes, but the increased acreage coming into bearing was responsible for the increased shipments more than anything else. In 1906 there were 2,052 cars (the heaviest shipment to that time) shipped, and this year there were 3,460, or 1,408 cars more than were ever shipped in any one season before.

Sales of grapes this year have been very variable. Some varieties, particularly in the early part of the season, sold for higher figures than ever before, while in midseason the same variety of grapes from one district would bring very satisfactory prices, while from another district the sales would be at a considerably less figure and not nearly so remunerative. The reports from agents and the general response to inquiries as to the reason of low range of prices invariably brought back the reply that those of lower sales were in poor or poorer condition.

Therefore, in considering the possibilities of widening our deciduous fruit markets I can give you, in a very few words, my opinion or judgment of the best way in which to widen them at the present time or to prepare for the necessities of the future, and that is, *better transportation service.* I do not say this in a spirit of fault-finding or of captious criticism, but simply make the declaration as a statement of fact. I am quite willing to acknowledge that the fresh-fruit products received probably better attention this year from the transportation companies than any other commodity, but at the same time truth compels the declaration that the service given, particularly as regards length of time en route, was wholly inadequate to permit the obtaining of the best results on shipments.

In considering the distribution of California table grapes there is a factor that must always be given certain consideration, and that is the importation of Almeria grapes. This year to date there have been imported from Almeria 858,962 barrels of grapes, as against the total importation of 548,000 barrels for the season of 1906. This quantity is equal to 2,226 cars of California grapes and when imported they are packed in sawdust, suitable for storage or long-shipment purposes. I have frequently, by correspondence or personal inquiry, endeavored to get the opinion of people engaged in the handling of fruit in the East as to the competition of these grapes with those from California, and the invariable response has been that the best varieties of California grapes, *in good condition*, are generally given the preference by the trade and the consumer.

Let me quote you a few reports received by me recently from the East as being typical ones. I would particularly have you bear in mind the declaration in all of them that "if Californias are *in good condition*" has been invariably italicized.

From New York: "California grapes are invariably given the preference over Almerias if *in good condition*, but the Almerias are packed in sawdust to keep a long time and when California grapes are eighteen to twenty days in transit and berries are dry and moldy and shake from the stems upon being taken from the baskets the trade can not and will not pay the prices that they would if these grapes could be gotten here in strictly first-class condition. If grapes arrive in strictly first-class condition, which they do at times, the sale price, as you yourselves know, invariably shows that they sell at higher prices than any other kind of grapes offered on this market."

From Philadelphia: "About twelve thousand barrels of Almeria grapes have been sold here this week, six thousand being sold on Tuesday, November 5th, and about the same number was disposed of to-day. We have made an effort to get the consensus of opinion among the trade as to the competition of Almeria with California grapes. Without a single exception we have found that the dealers much prefer the California product, if *in good condition*. This has always been our opinion, and we have recently advised the shippers of California Tokays that although receipts of Almerias were heavy, *good California grapes* have always, and will continue to have, the preference with the trade. Many of the large dealers here have informed the writer that consumers generally have shown a great preference for California fruit."

From Pittsburg: "Replying to your inquiry as to the effect of the sale of Almeria grapes on California grapes, we would say that after studying the matter over carefully we have come to the conclusion that the trade here prefer good *California* grapes *in good condition* to the Almeria. We regret to say, however, that much of the offerings of California stock this year have run to fruit in poor condition. People on this market in our opinion much prefer the California grape to the imported one, and this statement is borne out by what the trade will pay for Californias *in good condition* in comparison with what they will pay for the imported goods, and if the condition of all California grapes being offered was as good as the Almerias being sent here the imported article would not have as much standing on this market as it enjoys at the present time."

From St. Paul: "The trade here will not take Almeria grapes as long as there are *good California grapes* on the market. We believe there never have been so many Almeria grapes on this market as there are at present, and there have been fewer sold up to the present time than any previous year."

From Boston: "California versus Almeria grapes. It is our opinion that while the trade here prefer Tokays, as well as Cornichons and Emperors, *in good condition*, to Almerias, it is nevertheless true that on account of the long time in transit, which makes Tokays, especially, arrive in such poor condition, a great many orders from interior New England points, which would have been placed for Tokays, have been switched over to Almerias. Many California grapes that have arrived here lately have been in poor condition. They are not fit to go away on orders and have to be absorbed by the local trade. If the railroads would get these cars to Boston in from eight to ten days instead of from fifteen to twenty, there is no doubt but what the California grapes would receive the preference at all times and there would be very little demand for Almerias, and there would be less and less imported as time goes on."

Now these expressions, as I said before, are typical ones, and they all go to show that if we are to expand our distribution beyond the requirements of local markets at places of receipt we must get them there in the very best condition.

I have no hesitancy whatever in declaring that if our grapes could have been transported this year on a seven-day schedule to Chicago and a nine-day schedule to New York we would have received $250 per car more than we did receive for the product shipped; and while the time on many of the shipments has been good, on other shipments it has been very, very bad, and on the long-time shipments relatively the greater amount of money is lost or not received on account of the condition of grapes on arrival.

The average time on grape shipments this year from shipping points has been about twelve days to Chicago and common points and sixteen days to New York and common points, while we have had cars fifteen to sixteen days to Chicago and twenty-one to twenty-two days to New York.

When grapes go forward in first-class cars and are well iced and given good attention in that respect, they will not deteriorate as much with this extreme length of time in transit as they otherwise would; but any one who is at all familiar with the subject will acknowledge that grapes put on cold storage at home without the incident of transportation would deteriorate greatly at the end of a period of sixteen days, to say nothing of adding the time for the exposing and sale to the consumer of the product beyond that time.

The energies of growers, shippers, and this Convention should be bent in the direction of using all possible persuasion, arguments, facts, and figures with all transportation companies interested to get them to give us and maintain a schedule of seven days to Chicago and common points and nine days to New York. I believe that such a schedule that can be counted upon and maintained will do more to widen the distribution of California deciduous fruits than any other line of endeavor that can be undertaken at the present time.

Sacramento, December 2, 1907.

MR. STEPHENS. I wish to say that in keeping with the statements there I have the official reports here. I will read just a few. Here is a car that was shipped to Philadelphia; was out 21 days. Car to Boston, 25 days. Another car to Boston, 22 days. Car to New York, 22 days. One shipped to Chicago, 16 days. Another one to Chicago, 17 days. Another one to Chicago, 19 days. Another one to New York, 21 days. New York again, 21 days. New York, 19 days. New York, 20 days. I only make this statement to show you that the statements made therein, both in Mr. Anderson's report and in the Transportation Committee's report, are verified by facts. I think Mr. Anderson is a little in error about the average time; I think the average time is longer than that which was given. But I am very glad to be able to state to you that, for the first time, I think, in the history of fruit-growers' conventions, Mr. Anderson and myself are in sentiment agreed that we believe the most important thing to be taken up and considered is the transportation question; that transportation is the question more important than all others combined having bearing upon the horticultural interests of this State. Now, the officials of the different transportation companies should take notice of these two reports and go at the question with a determination to give us better time, as the Southern Pacific Traffic Manager, Mr. Sproule, did, in 1901, and put that into force—make out a time-schedule you can depend upon, so that a shipper will not ship five cars to New York to-day and five to-morrow and five the next day and have them all arrive there the same day. To illustrate: we had a car shipped at a certain date; we had another car shipped on the same date. Something happened to that car so it had to be transferred. It was about three days later, and the time made on both of them was very bad. They both went to Pittsburg. One was 18 days and the other 23 days to Pittsburg—5 days longer—and it made just $100 a day difference in the sale of that fruit. There was $500 difference between the sale of those two cars. This shows conclusively the importance of good time. Of course, we put in a claim. What became of it I don't know, but I think the railroad company will allow it. In the quantity of cars that have been sent forth and that will be sent forth in the future you will see that $100 a day difference on each car means millions of dollars to the State of California, and therefore I can not repeat too often that this is the paramount question. It has more bearing upon the future prosperity of the fruit-growing interests of California than any other, and I feel optimistic. I believe the officials of the railroad company will take this matter up and give it due consideration. I feel that if we urge it in the proper spirit and the proper manner they will do this for us, because it will be in their interest to do so. Mr. Anderson says that the fruit shipments were very small in comparison with what they had been. That is true. My crop of fruit was about twenty per cent of what it was last year, my neighbors' about the same, and the loss prevailed almost throughout the State, with the exception of a few localities. That shows that if we had had a full crop this year, instead of having 7,000 and some odd cars, we would have had 10,000 or 12,000 cars, so it makes this question of transportation more and more important. Next season, if we have a full crop, and we have as good a grape crop as we have had this year, you will see from 10,000 to 12,000 cars shipped, instead of 7,000, and therefore it becomes important that this interest should be given due consideration. What we want is a time-schedule that we can depend upon, the same as a passenger train, or so that we will not pile up our fruits and our shipments in different markets.

MR. BERWICK. Mr. Chairman, I am very glad to see our Convention so harmonious in this matter of transportation. We have had it sometimes rather acrimonious than harmonious, and I think we owe a very big debt of thanks to Mr. Stephens for his persistent and indefatigable opposition to the private refrigerator car lines, and I beg to move that this Convention tender its thanks to Mr. Stephens for his long, continuous, persistent warfare and final victory in the passing of private car lines. I move a rising vote.

The motion was duly seconded and was carried by a unanimous rising vote, with applause.

MR. STEPHENS. I wish to say that I feel greatly complimented, far beyond anything I am entitled to. This vote of thanks is full compensation for any services I may have rendered in this matter, and I feel that another vote of thanks should be tendered, as suggested in our report. I feel that when there is a disposition manifested on the part of any person or any interest to do that which is right; if they listen to reason or feel that it should be recognized and considered; therefore, Mr. Chairman, I move you that a vote of thanks be tendered to the Southern Pacific Company and all other continental lines for the elimination of the private car lines from the fruit transportation service.

The motion was duly seconded and carried unanimously.

THE CHAIRMAN. I wish to inquire if Mr. Bowers is here or if his paper, the report of the Committee on Prunes, is represented?

MR. CRANDALL. As a member of the Committee on Prunes, I will state that neither of the other members, Mr. McDonald or Mr. Bowers, is here, and owing to unavoidable circumstances, the sickness of Mr. Bowers and the absence from the State of myself, there has been but one meeting, and therefore there is no report to be made.

THE CHAIRMAN. I would like to have Mr. Isaac read a telegram which he has received, and that will set another good man right with us.

The Secretary read the following telegram:

PALO ALTO, CAL., December 4, 1907.

MR. JOHN ISAAC, *Fruit-Growers' Convention, Marysville, Cal.*

President Jordan is delayed on account of illness. Can not reach Marysville to-day.

G. A. CLARK, Secretary.

THE CHAIRMAN. Now, we will hear from Mr. Judd, and his subject is "Tax Discrimination between Farmers and Cities and Towns."

MR. JUDD. Mr. Chairman, and Ladies and Gentlemen: I want to preface this paper with a remark or two. It may appear to you somewhat like our grain used to appear after we got through threshing in the early days of farming in the Pajaro. There was a good deal of reddish wild oats, and we had to keep the grain separated properly so we could tell which we had threshed. Now, there may be some cockleburs and other things in this paper that a re-cleaning might improve, but I am going to charge up the whole field to Mr. Rogers and Mr. Isaac, who selected the article for me after presenting several to them for their approval. I want to say that, as I look at it, taxes are a burden upon an individual, whether it is done by a legalized assessor, or by a railroad company, or by a labor union, or by any other way in which there is unjust discrimination between the farmer and the balance of the country known as cities and towns.

TAX DISCRIMINATION BETWEEN FARMERS AND CITIES AND TOWNS.

BY A. N. JUDD, OF WATSONVILLE.

During the framing of the new Constitution, the especial pet of the agricultural interests was Article XIII, on taxation. This particular article caused more public discussion than all the rest of the Constitution, and, when voted upon, the corporate interests of the entire State were lined up against the agricultural producer. However, right prevailed; but, as is often the case, what the corporation interests could not accomplish by fair means they have done through their several legislatures, and by mutilation in amendments and legislative enactments have destroyed Article XIII to such a degree that a united effort is necessary on the part of the producer to bring about restoration through the courts. Perhaps the most revolutionary and gross violation was the Act of 1883, eliminating cities and towns from road districts, thereby exempting them from taxes for road purposes. This, I hold, is a great injustice, as well as being clearly in violation of Article XIII, Section 1, of the Constitution of California, where it says: "All taxes are to be equal and uniform." Again, same article and section: "To make a tax void the absence of all possible public interest must be shown clear and palpable." While the law of 1883 put upon us unjust burdens, it was left for the late lamented Legislature to wholly disregard our constitutional rights and, against good public policy, add more burdens, in which justice was dashed to the winds. I refer to the Act authorizing and maintaining boulevards, and the Act adding twenty cents more to the forty cents already paid on each $100 by the farmer for road purposes. It appears that this twenty-cent law is not for general road purposes, but to make new roads and, as far as my observation goes, is for private parties, which is clearly class legislation. In further proof of the injustice of our road laws and incidentally of the exorbitance of the road tax in California, I quote correspondence from two counties, one each in Iowa and Illinois, which have practically no road material within their respective counties, and besides have to contend with winter frosts that each spring leave the roads in very bad condition:

ANAMOSA, IOWA, November 13, 1907.

MR. A. N. JUDD, *Watsonville, Cal.*

DEAR SIR: Replying to your inquiry addressed to the County Assessor, say: That we have a consolidated tax which includes State, County, State agricultural college, State university, State normal, poor outside the poorhouse, soldiers' relief, and 1 mill for school fund, bridges and roads. All property in the county pays the same levy to these funds.

Respectfully yours,

W. K. PEARSON, Treasurer, Jones County.

SYCAMORE, DEKALB COUNTY, ILLINOIS, November 14, 1907.

A. N. JUDD, *Watsonville, Cal.*

DEAR SIR: Cities and villages in Illinois pay the same rate of road and bridge tax as farm property.

Yours truly,

L. C. SHAFTER, County Treasurer.

I selected these two counties because they are well settled and each has many streams that demand much bridging, besides having considerably sized cities and towns. Jones County has an area of 516 square miles and a population of 23,000. DeKalb County has an area of 646 square miles, with a population of 35,000.

Is it not a bit singular that the entire agitation and support of our iniquitous road laws come from cities and towns alone? I ask you by these acts do they show that "There is a clear and palpable absence of public interest"? Surely, if they have no interest in the public roads, why all these road laws made without our knowledge or consent while we have to pay for them?

Neither does their responsibility for, I might say, other crimes against us stop at unjust road laws, for they have otherwise tied our hands, causing less of production in the State and bringing nearly to a halt all progress in horticulture, because labor unions, governed by the foreigners who control them, and in combination with political timidity and economic stupidity, with the influence of the cowardly press in the large cities, have put a ban on the only means of procuring a labor supply sufficient and reliable for half our needs. While the farmer has always shown a kind and forbearing spirit with these un-American institutions, the last straw is on and we should call a halt, for they will find that the farmer is built on the lines of his ancestors, who have before saved this country from its enemies. Although he is willing to sacrifice much for defense, he does not like to pay unjust tribute by sacrificing all he has gained.

Again, the farmer sees a great injustice in assessing him year in and year out for the same old watch, gun, wagon, harness, horse, cow, dozen chickens, or fruit trees and vines for often more than they are worth, finally to become a total loss by decay or death, while the merchant, who turns over his goods from one to five times a year with a profit each time, is often assessed, fixtures included, for a little more than the fixtures alone are worth. Recently, when I called a gentleman's attention to the fact that his fixtures were assessed for a trifle less than 2½ per cent of their true value, his reply to me was, "It's dead stock!" The answer brought to mind my old horse, wagon, harness, farm machinery, and fruit trees, that are nearly ready for the scrap-pile and that have been assessed for all they are worth many, many times. This short-sighted policy explains the reason why the cities in California increase in population over 77 per cent every ten years and the country hardly holds its own, and for further testimony I call your attention to Bulletin No. 44 of the United States Department of Agriculture, where it says: "Inequality of taxes and lack of sufficient help is the cause of a large decrease in farm homes in forty of the states and also a decrease of owned farms in all of the states." To further elucidate I will call attention to Plate 5, Volume I, 1900 Census Report, which is very comprehensive. The blue patches which disfigure the entire map of the United States further demonstrate the loss of population in rural America. Again quoting from Bulletin No. 44:

> "Chittenden County, Conn., farms are selling at a discount compared with the prices of fifty or sixty years ago. The lack of steady and reliable help is the cause."

"Worcester County, Mass., farms are not selling as well now as they did fifty years ago. High rate of taxation; high wages for poor quality of farm help is the cause."

"Farm lands in Washington County, Rhode Island, are greatly depreciated. The sale of a farm at a fair price is a rare occurrence. The labor question and high taxes play an important part in the decline of farming lands. Back from the trolley lines foreigners are taking up many of the abandoned farms; only a few American boys are taking any."

"Cattaraugus County, New York, is principally devoted to dairying. Lands are cheap and sales poor, on account of poor and scarce help. One reason of this is that the young men of to-day are getting a good education and ninety per cent of them will not work on a farm. Consequently the old people want to sell the farm. They can no longer run it themselves."

"In Columbia County, the correspondent says, 'I visited nearly every county in New York State buying cattle, and it is a fact a good farm with good buildings can be bought for one half to three fourths of what the buildings would cost to be replaced, in every county I have been through.'"

"Cortland County farms are neglected and help can not be had to work them properly. On 2½ miles of road through our town there are about eighteen abandoned farms, meadows grown up to brush and weeds. A good many farms with fair to middling buildings can be bought for one fifth the price of a few years ago."

"Tioga County, 'If any one wants to get rid of his farm he simply moves off and the number of such farms is growing rapidly.'"

"Hunterdon County, New Jersey; Butler, Beaver, and Clearfield counties, Penn.: Farms are bought until very lately for the timber that is on them, but now pretty good farms for these parts have sold for about what the buildings cost."

"In many of the Southern States a great deal of the good land has not been cultivated on account of the poor and unreliable labor, and this is getting worse every year."

"Columbiana County, Ohio, farm lands have depreciated, simply because our manufacturing cities are offering better wages than we can afford to pay and hence our young men have drifted off to the shops and factories, consequently farms are put on the market to get rid of them at lower prices."

"Marshall County, Minn., the cause of falling prices is emigration of large numbers to Canada."

"Black Hawk County, Iowa," gives the same reason.

"Andrew County, Mo., large young orchards have been chopped down so that the land can be utilized for general farming. Scarcity of labor is the cause."

"Davis County, emigration to Canada has lowered the price of land." Same of Pembina County, North Dakota, also in Cloud County, Kansas, notwithstanding there are millions of acres of virgin government soil distributed over the latter states.

I quote the dark side of the picture all over the United States, for the purpose of showing that California is not alone suffering from the scarcity of help on the farm and being burdened with unjust taxes.

But to return. When the farmer is worn out by a lifetime of hard work, barely eking out an existence, scrimping to save for old age and to educate his children so that they may take their places in the world's affairs without being mocked, cartooned, or made a jest of; or even if, at an earlier date, he moves to town at an increased expense to give the children a little better chance for that much-prized education, he will find that his Nemesis, unjust taxation, has followed him. For he buys his little home, maybe three or four blocks from the business center; it has no income but is all outgo, and here again he adds in taxes much more than his just proportion of the tens of thousands of dollars that are often wasted for the purpose of alleged city government, which he soon finds is made for the sole benefit of a few blocks on what is called "Main Street." Here he finds a difference in principle of distributing taxes for street purposes from what he was used to for road purposes in the country. There the wealthy and thickly settled sections help to pay for roads in poor, unsettled mountain country, while nearly the reverse is the rule in town. His little home is on a 50-foot lot; it is valued by the assessor at $2,500; it would rent for $20 a month, which would give a gross income of $4.80 per front foot per annum, while on "Main Street," under the same valuation, there is had net, less taxes, an income of $33.25 per front foot, renter often paying for all improvements and repairs. (And yet the Constitution says, "All taxes shall be uniform and equal.") It is on these three or four blocks of "Main Street" that enough money has been spent in the last thirty or forty years to pave the entire town with an indestructible pavement, provided, of course, that the money had been intelligently spent; but what are the final results? Perhaps three blocks of a nondescript pavement, which does not like to lie still when the sun shines and besides pleases no one. Here is where the city engineer changes the grade every time he is called upon to establish a sidewalk, gutter, street, or crossing. Here is where he insists upon running all the water on the wrong side of the street, thereby choking the six- or eight-inch outlets that more than three times the amount of water is supposed (by him) to go through, and which are intended to drain the largest part of the city. Now, if by these engineering feats your sidewalk is under water when it rains, you can stay at home. It is on these few blocks where you will find some moral cowardice and even sometimes business graft, born of that much abused abomination the "Indigent Fund," the beneficiaries seldom protesting against a wholesale robbery of the taxpayer, so long as they get their pound of flesh, even if it does perpetuate in office the worst kind of political graft. It is on these few blocks that are to be found all the deadfalls, which debauch the old and corrupt the youth, and where are committed practically all the crimes that cost so much. It is here where all the sweeping and daily hauling of their own dirt are done and where the police force and night watchmen hang out; and yet, notwithstanding all this, as well as the manifest injustice of unequal taxation, there is a fascination about city life that causes many of the farmers' boys and girls (Bulletin No. 44 said 90 per cent) to leave the drudgery and the much-vaunted independent life of the farm, to accept less wages found in the city. Perhaps I should qualify the last statement, for it is a conceded fact that the farmer boy usually inspires confidence in places of trust and sometimes supplants the too-often dissipated city youth. It has been suggested to me that this is one of the reasons for the extreme solicitude for the agricultural interest manifested by the city folks whose especial prerogative is to get up literature to show the best side of country life and to enumerate opportunities for horticulture and manufacture, but who studiously forget to mention that in their town there is any opportunity in the professions, merchandising or trades.

To more fully show you the picture, true to life in California, of injustice the farmer receives and the moral turpitude of the tax-shirker, I quote from Controller Colgan's report of 1906: "In 1861 personal property was equal to 50 per cent of the total taxable property in the State; to-day it is slightly above 16 per cent. In the last thirty-five years we have had an increase of $50,000,000 of personal property in the State, and in the same time an increase of $1,335,000,000 in real estate and improvements. In the last five years the increase of inside personal property is $16,000,000, outside personal property the increase was $20,000,000; inside real estate and improvements increased in the same time $201,000,000, while outside the increase was but $85,000,000." Does this look like a manifest discrepancy, or do things get lost in town when the assessor comes around? And money, too, often gets away, for there is not enough turned in to the assessors in the whole State to pay the first installment of State and county taxes; but if we include all the solvent credits with the money and they would be taken for taxes, eight of the fifty-seven counties could pay all their taxes, fifteen could only pay one half, and ten one third. The rest range down to one thirteenth, except one county, which turned in $350 of money and solvent credits, with taxes due amounting to $56,446.77, yet strange to say the county was delinquent only $630.23. Not a bad showing compared with any other county!

In conclusion, I will quote from an editorial of a leading country daily, which was for the purpose of inspiring confidence in the ten State banks and one National bank of the county. (All of these banks, by the way, in 1906 turned in to the assessor a total of less than $80,000 of money and solvent credits—not enough to pay one third of the State and county taxes of that county.) The editorial in part says:

"The loans of these banks in the county on stocks and bonds, the only security that has varied in value during this stress, only amount to $355,231. This is less than 6 per cent of their resources, and if every dollar of this amount was lost it would be more than covered by the surplus of these banks and could not impair capital or disturb depositors. Loans on real estate of these county banks amount to $2,305,540, and, with the real estate holdings in the banks, make a real estate security exceeding two and one-half millions of dollars. The banks hold in ownership of stocks, bonds, warrants, and other personal securities, $936,164.88. The First National Bank gives the following report, which is to the Federal banking authorities: 'Loans and discounts, $248,531.16; United States bonds for circulation, $100,000; other bonds and securities, $221,243.44; cash and sight exchange, $231,936.59.' "

You will notice that, exclusive of the two and one-half millions loaned on real estate secured by mortgage, the assessor failed to get four per cent of what appears to be taxable property. How many counties in this State are similarly situated? Would it profit the public in general if the assessors would get busy? Has the public concluded, by reading Controller Colgan's report for 1906, that there was, in reality, no money in the State, and that it would be sold out for taxes, hence the late financial flurry?

In summing up the case, the farmer finds that he is never represented in the courts or the legislature. He finds that he is obliged to move to town to get the advantages of schools. He finds that his interests are looked upon all over the United States as the goose that lays the golden egg and a safe beast of burden to carry the responsibilities of the tax-shirker. He finds that in one or more counties of California he is paying eleven times as much for the support of schools, bridges, and roads as is being paid in some counties of Western states that have as good or better schools, bridges, and roads, and also that he has but a small voice in electing the men who spend the money. He finds that his interests are being sacrificed on the altar of prejudice in order to carry out the ideas of an un-American institution born on foreign soil. While in the East he finds himself looking back at the old, abandoned homestead, whose destruction is a monument to the greed and avarice of his fellow men, in the Middle West, through more congenial and equitable laws of Canada, a foreign country is sapping the life blood of the country, as well as depleting the ranks of the once defenders of the nation's life. I predict that when California is as old the conditions will be as bad, unless it is rescued from the hands of incompetent men controlled by unscrupulous tax-shirkers. To show you that it is no dream, note the increase, in the cities of California, of $201,000,000 in real estate and improvements in five years—nearly two and one-half times greater than the increase in the country for the same time. Yet the country's increase in personal property is one fifth larger than that of the cities; although on the farms there are no banks, no department stores, no merchandising or manufacturing, and no Nob-Hill castles to furnish. What think you?

Is it time to begin to assert ourselves? Shall we proceed to wipe out the unjust laws, or just "resolve"?

THE CHAIRMAN. The next number on the program is a very interesting subject by Mr. Paul Shoup, "Common Interests of Fruit-Growers and Railroads." Ladies and gentlemen, I have great pleasure in introducing Mr. Shoup. (Applause.)

COMMON INTERESTS OF FRUIT-GROWERS AND RAILROADS.

By PAUL SHOUP, of San Francisco.

Three years ago the pleasure was mine of addressing the State Fruit-Growers' Convention at San José. Since then many transportation changes have taken place. Some have affected the relations of the railways with the public at large; some more especially the relations of the railroads with the fruit-growers.

Nothing, however, has happened to change the belief then expressed; the final just determination of the relations between the public and the railroads, and what is due each from the other, will come only through a thorough understanding and appreciation by each of the difficulties, trials, and limitations of the other. The affection we have for our friends, and our steadfast confidence in them, are not created solely through knowledge of their strength and virtues, but as well through knowing their troubles and their limitations.

The railroad man in a place of responsibility who has no interest in the business and welfare of the road's patrons, but performs his work in a purely routine way, is not fit for his job. With changing conditions and new problems, that man will have no way ready to meet them. On the other hand, the shipper who blindly demands a certain unvarying service from the railroad, knowing nothing of transportation and caring nothing for the factors that give it uncertainty, in his criticism helps to create antagonism detrimental to all, helpful to none.

A third person need also be considered, one who may be sincere and honest but is neither shipper nor railroad man, and is apt to be without knowledge of the real needs of either. Too often he believes himself a law-giver. He spends one day or two investigating transportation problems that three generations of shippers and railroad employés and managers have struggled with. After a session of an hour with himself and the study of magazine and newspaper clippings, he formulates solutions which he hopes may be accepted by the public.

He never had charge of a train in the face of a mile washout in a storm, with an ax, a crowbar, and a lantern to make repairs. He knows nothing of the game of chess involved in keeping a dozen trains of constantly varying speed capacities moving on a single track over a mountain top against another dozen to be kept moving in the opposite direction, and all within a few hours of each other. But in an hour's speech he can tell you that the railroad must be made to move its freight with unvarying expedition or suffer.

He does not consider that a railroad has not the slightest control over the destinations of its own cars or the cars in its service. He does not realize that the shipper says where these cars shall go and gives them destinations all over the United States, and that the cars received by the road are largely dependent upon the directions of shippers in other sections of the country, maybe thousands of miles away. He does not know that no railroad can tell a day in advance the volume or direction of the tide of traffic, nor gauge accurately what kind of traffic or where at any of its two thousand stations may be offered the next day. No matter how great the magnitude of the country's commerce, nor what unexpected demand may arise in some remote place, our friend will insist that the railroad must immediately furnish cars ordered or suffer fines.

Perhaps, with honesty and sincerity, but without any investigation into the cost of railway maintenance or transportation or construction, without consideration for changing commercial conditions or the nature of the different classes of transportation afforded, or the varying country through which to be given, he will in an over-night committee session prescribe blanket freight and passenger rates. If there be objections he says cheerfully, "Let's try it on anyway and see what happens," following the example of the doctor who always hoped his patient would survive even though he did prescribe for him.

Also our friend will instruct the railroads as to the double tracks they should build, the new depots they should construct, the hundreds of engines and thousands of cars they must buy, and above all the new lines into unknown country they must lay; but all this without a hint as to where the money is to come from to do the work.

Now, the problems of transportation are of as much importance to you as to the railroad. You want conditions to be such as to give you service—good service. Scores and scores of times, business men have said to me, "Your rates are all right; they're not hurting us; we don't care so long as we get the same as the other fellow; *but give us service.*" If you ship for a certain market, the vital element in transportation is that your product reach its destination for that market, as, for example, oranges for holiday trade. If you buy for a certain market, say Christmas gifts for the holidays, the important element is that the goods be received in season. Now, anything that impairs the efficiency of this service, anything that prevents the growth of railroad facilities to meet the growth of commerce, is of real interest to you.

These problems of efficiency as well as of rates are not to be settled by *ex parte* judgment or perfervid oratory. They are to be considered without confusion, one at a time, after careful consideration from all points of view, in the same, sober, common-sense manner you treat other business problems. About some of these problems I wish to speak a word before we are through.

Usually there is publicity for the things the railroad has not done. Its shortcomings have a thousand voices. Once again, I ask your indulgence in listening to statements of a few things the Southern Pacific Company has done, or is doing, to solve these problems in which we all are mutually interested. These are not offered in the light of defense, but as improvements in which I believe you have a personal interest.

The greatest freight transportation problem faced by the railroads is the movement of California green fruit so deftly and quickly that in a trip of two thousand or three thousand miles, or may be to London or Paris, its color, its fine aroma, its delicate texture and flavor shall be as perfect as when taken from the tree or vine in the sunshine of California. Through heat and cold, over high mountains, across deserts and wind-swept prairies, your fruit must be carried quickly in an environment of even temperature.

Three years ago we depended upon a refrigerator company of independent Eastern ownership to supply our green-fruit shippers with cars. The agreement with the Southern Pacific Company provided for cars up to five thousand in number—a number now insufficient. Some of the gentlemen here present will remember the discussion in relation to the Southern Pacific furnishing its own cars. At that time I gave $8,000,000 as the estimated minimum cost of seven thousand refrigerator cars, and stated the fact that the freight charges the Southern Pacific alone would receive from the movement of green fruit under ice would not pay interest on cost, taxes and repair charges on such equipment.

Later, conditions became such that it was necessary to give further consideration to the car supply. And here I wish to point out to you the benefit of associated ownerships of railroads—of consolidation, if you will. That which the Southern Pacific alone could not afford as a business project to undertake, because of the number of cars required in relation to its individual haul, the lines associated under the presidency of Mr. Harriman could and did undertake—all having an interest to be served by such an enterprise. Thus was born the Pacific Fruit Express.

I have heard some criticism of the merging of interest of the Union Pacific and Southern Pacific railways. Why, is not apparent; no one can point out harm resulting. There has been no curtailment of service, no raise in rates as a result. On the contrary, the evidence in behalf of its benefit to California is overwhelming.

At the time of this association of interests the Union Pacific had reconstructed, Omaha to Ogden, a fine highway, but only half the way. The Central Pacific needed reconstruction badly. The line was congested. California products could not be moved with any degree of certainty whatever; very well I remember studying the tissue sheets of car movements to locate cars thirty days out and not yet into Ogden, before and during reconstruction. With the present tonnage, actually more than double that at the time of consolidation, the old Ogden route would be with its grades and curves completely blockaded. But the association of interests has resulted in the expenditure of almost $40,000,000 in reconstructing this main highway, Ogden to California. It extended the interest of Eastern men of wealth and enterprise to the Golden Gate. Since that time the energy and money commanded by Mr. Harriman and his associates have been given without stint to the development of California commerce and California's transportation facilities, whether the job be one of creating mammoth ships to carry commerce to Asiatic shores, the capture of a runaway river that threatened to engulf an area larger than many an Eastern state, the construction of a double-track water-level railway across a bay and through five hills into San Francisco, or the creation in two years of 6,600 refrigerator cars, the best yet built, to carry your green fruit to its market in the best possible condition.

The cost of these cars exceeds considerably the estimate made for 7,000 cars three years ago, because these are much better cars—by far the most expensive refrigerator cars yet constructed, with the largest loading capacity. The average cost is $1,750, a total of $11,550,000 for the 6,600 cars received to date. They were built by the Southern Pacific, Union Pacific, Oregon Short Line, and the Oregon Railway and Navigation companies to care for the fruit business originating on these lines, ninety per cent of which grows in California. To insure greatest efficiency in operation, a separate company, the Pacific Fruit Express, was originated to look after the distribution, use, icing, etc., of these cars. It has its own representatives, but all agents and departments of the Southern Pacific give these cars the same consideration as if they were directly operated. The cars were built specially for fruit transportation. The inside dimensions are: length 32 feet 11¾ inches, width 8 feet 2¾ inches, height 7 feet 1 1-16 inches, outside length 41 feet 10 inches. I believe the shippers who have used them agree that these cars give better service than any other without question. The large inside dimensions make it possible to load the product low, giving full efficiency in refrigeration. The Bohn patent ice tank, proved to be the best made, is used.

Icing is done carefully, and shippers are invited to visit the plants, to inspect the methods, and to satisfy themselves they are receiving all they pay for.

During the season ending October 31, 1906, 5,930 cars of deciduous green fruit were shipped East; this season to November 1st, 7,048 cars. This has been the banner year in the green-fruit business. California has received more money net than during any previous season. Many cars of fruit brought over $2,000 each, while cherries in a number of cases ranged from $3,000 to $5,000 per car. The total northern California shipments of vegetables, green deciduous and citrus fruits, during the season just closing have been 10,912 cars, nearly a thousand more than last year. From southern California the shipments via all lines were 27,533 cars of citrus fruit and 3,477 cars of vegetables.

The prospect for this season is good. Since October 1st over 450 cars of deciduous fruit and 1,400 cars of oranges and lemons have been shipped from northern California—a far greater number than during last year's corresponding period. The present outlook for the southern California citrus fruit crop is 32,000 cars, and 4,000 cars of vegetables—this season, altogether, spelling prosperity in capital letters for California fruit-growers. There has been no shortage of cars so far save a very temporary delay in getting in a supply to the Porterville district, a trouble quickly remedied by borrowing from our neighbor; and without minimizing the difficulty in distributing cars in the face of a tremendous freight movement, the Pacific Fruit Express and the Southern Pacific expect to meet the situation throughout the winter satisfactorily.

The ice shortage of last season is being met by the construction by the Pacific Fruit Express of two great ice-making plants, one at Colton and one at Roseville, to supplement the private companies' supplies; and other plants will be built if needed. Other cars will be constructed as business demands.

The precooling process has not quite passed from an experimental stage. The system being experimented with at Roseville bids fair to prove satisfactory; if so, it will mark a great improvement in fruit transportation, and the gentlemen originating it are to be heartily congratulated.

The refrigerator cars are not only expensive, but because of their weight and their relatively less carrying capacity than ordinary box cars, they are not economical cars to use in the transportation of the majority of other classes of freight. The gentlemen here present interested in the dried-fruit and canned-fruit industries are therefore more concerned with the prospect for increase in other equipment, such as box cars; and you are all concerned with the condition of motive power. But I wish to say here, that we are called upon to face a peculiar situation in the matter of car supply for the fruit industry. Of the total tonnage loaded on Southern Pacific cars last year, only 5.78 per cent—less than 6 per cent—was fruit of any kind: green, dried, or canned. I suppose the green deciduous fruit aside from oranges represented about 1 per cent, and with oranges possibly 3 per cent. The figures for local movements are not easy to obtain. Our total freight equipment last year was 44,294 cars. The Pacific Fruit Express has for service 6,600 cars, or about 15 per cent of those devoted to other service.

These figures indicate relatively how well the fruit traffic has been cared for in California, for practically all of the Pacific Fruit Express cars are now engaged in serving your shipments and will so continue throughout the winter. The refrigerator cars cost twice as much as ordinary box cars, and in proportion to the actual tonnage loaded are more plentiful. This recognition of your green-fruit industry should be gratifying to you. You have captured fruit markets half way round the world in one direction, and I think I may safely say half way round in the other direction, too. And the management of the Southern Pacific is glad to feel that it has had some part in this spread of California's influence. The value of the fruit industry to the State is recognized to be out of all proportion to its tonnage; it is a great factor in bringing us wealth, in advertising our State's resources, in attracting people from all over the globe.

The increase in other equipment received or ordered since 1906 is in proportion to the demands of commerce. The last two years have been a trying time for shippers and railroads alike. All over the United States commerce has outgrown the railroads, and even where money has been available to develop the railroads it has been difficult, as in other lines of manufacture, to secure within the ordinary time, or double or even treble the ordinary time, cars, rails, engines, structural material, and the thousand and one mechanical parts absolutely necessary to a railroad machine, whether an engine slide valve, an air brake, or a patent coupler.

The Pacific System of the Southern Pacific had, in 1906, 1,198 locomotives and 26,148 freight cars out of the total already mentioned. Since then 184 locomotives and 5,429 freight cars have been received or ordered—an increase in motive power of 16 per cent and in freight cars of 20 per cent. Our latest reports indicate an increase in tonnage up to June 30, 1907, of 11.2 per cent and in car mile movements 11.1 per cent and in train miles 11.1 per cent. But the new freight cars are much larger than the old; the engines more powerful. Therefore, to meet your needs during the coming year we will have an increased efficiency in freight cars of probably 25 per cent and in locomotives of 20 per cent, whereas no such increase in business is now demonstrated. The prospects for better service are therefore much brighter. Of course the Southern Pacific is, however, affected somewhat by the car and engine conditions on every other road in the United States, with all of which we exchange business. If they are unable to meet traffic demands, cars which should be returned promptly to the owner move slowly and in some instances can not escape homeward from local shippers. The problem is not local to California, nor to Western railroads. But all indications point to better service. There is a further favorable factor. The value of cars lies not in their numbers alone, but in the rapidity with which moved. All summer the Southern Pacific has had thousands of men employed in supplying additional track facilities. You remember the floods of last spring—the residents of this section do surely—when our line suffered from the greatest washouts in its history, scattered all over the State. After repairs were made—a veritable task of reconstruction—the ballasting of tracks, the relaying of new ties and rails began and has proceeded vigorously throughout the summer. The work between Sacramento and Truckee on the mountainside, to afford train-passing facilities, will illustrate what has been done to meet the new demands of California commerce. It is a road built up a mountain wall, and every foot of level earth on which to lay tracks must be stolen from the mountains. After thirty-nine years of development, twenty-four passing tracks had been built between Roseville and Truckee, having an average length of 1,900 feet. Each of these during the summer was lengthened 700 feet, enabling our operating department to make up trains of forty-five cars with three huge engines, instead of thirty cars with two engines. This work, now finished, practically increased the track facilities of the line over the mountain 50 per cent, and thereby the capacity of the Ogden route for handling your freight 50 per cent.

I will ask your patience to listen to only one more matter of detail in connection with railroad improvements. It marks, however, a great advance. During the last two years the Southern Pacific and Union Pacific have been installing the greatest and most modern safety block system in the United States. At an expense of $5,000,000 this system has been installed over 4,592 miles of track. It constitutes a far greater mileage than that of any other railway system, and indeed is about one third of the improved block mileage in this country. The block system of signals makes for efficiency, for steadiness of movement, and for the more rapid transportation of both passengers and freight with safety.

In setting forth the railroad side of the question there is no disposition to overlook or minimize your difficulties, your necessities. I am trying to show that they are appreciated, and that strong efforts are being made to meet the conditions presented. Railway service is as much a factor in your prosperity as are the cultivation of orchards, the fighting of disease, rainfall and irrigation, and other home problems.

I want to ask your consideration for some of the railroad troubles, as a matter of justice to the railroads and since they affect the efficiency of the railroads, because they are a factor in your business.

The fact is not disputed that railway building has not kept pace with other business in the last few years. One reason is that, compared with this other business, it has neither the same elasticity possible in expansion, nor the reverse. Caution is necessary, for money invested is invested permanently in property that can not be used for any other purpose. But the cardinal reason is the greater returns in other lines of investment, or greater promise of returns, during the last few years. Your attention is directed to an article in the *North American Review* for November, showing the relative returns based on actual values, as near as they can be ascertained, from agricultural, manufacturing, and railroad investments. The figures used are from the Interstate Commerce Commission reports for 1900 and 1905, the special census for manufactures for 1905, the general census report for 1900, and the Yearbook of the Department of Agriculture for 1905. I do not wish to weary you here with the result shown; it is sufficient to say here that for each $1,000 invested the net returns to capital for manufactures were $151, agriculture $98, and railroads $44.

Now, the dollar that goes into the construction or reconstruction or equipment of a railroad is a privately owned dollar. It may freely go into any other form of industry—into a brick block, or a fruit orchard, or a cannery, or a farm, or a town lot, or what not. If you can not hold out reasonable assurance of the safety of that dollar and some return on it, the owner won't invest it in a railroad. During the last year there has been a great depreciation—billions of dollars—in railway securities, because the owners of the dollars invested therein either feared for their safety or thought they saw a better chance to make money through some other investment, and not only have railroads been affected, but also other great industries, copper, steel, coal and others finding their markets largely in railroads. It is not my purpose to go at length into the causes creating this belief. I have already quoted from statistics available to you all, showing that other investments have been better than railroads. Since the date of those figures there has been widespread legislation increasing the expenses and decreasing the rates of railroads. State legislatures alone have passed one hundred and seventy bills, more or less, adding to their burdens, and practically without economic investigation.

The other business of the country—manufacturing, agriculture, mining, lumbering, and so on—has flourished during these last few years as never before, proving beyond doubt that railway rates are not and have not been prohibitive nor a burdensome check upon commerce. In the face of this wonderful progress have come these legislative attacks upon railroads. You are to judge of the relations between the apprehensions of investors and such legislation. Fit the case to your own affairs. What have *you* considered good and safe investments during the last year or so? If fruit-growing and farming had been subject to price reductions in relation to their products by legislative attacks, such as the railroads have received, would not values of farms have been affected? And would not it be more and more difficult to get somebody's privately owned dollar into the business?

The U. S. Bureau of Labor Bulletin 69 of March, 1907, shows increases in wholesale prices since the decade ending 1900 of 24 per cent for farm products, clothing 12 per cent, fuel and lumber 28 per cent—all commodities 15.9 per cent, which in the last two years has increased to probably 20 per cent. Wages paid by railroads have risen proportionately. Relatively, therefore, railroad rates would be about 20 per cent less than in 1895, even if the figures had not been changed. But the rates, passenger and freight, have decreased actually as well as relatively. Lately, notwithstanding that passenger trains are crowded, freight cars loaded heavily, locomotives carrying loads up to their capacity—conditions most favorable to maximum earnings—the increase in expenses and lower rates has been such as to reduce the net revenue to railroads, compared with last year, though the business carried has been the greatest ever known.

This, I think is of interest to you, because it is your problem as well as ours. To increase transportation facilities that will be needed to meet the growth of your business, somebody's privately owned dollar must be invested in railroads. And he won't invest it unless he has confidence that you and I and all the world are going to afford it the same protection as if invested in some other business.

It won't do to say that the general troubles of railroads are due to mismanagement. There is probably the same proportion of mismanagement as affects other important lines of business; for men, whatever their vocations, are not classified as to their honesty, ability, or energy by their lines of work, provided the work be honorable. But all the railroads have suffered—not one has been exempt. The record of security values will show that. The stockholders of railroads have not been turning things up side down; they have been satisfied quite generally with their managements. Men controlling and operating railroads are not different from other men.

This I would like to bring home to you as a matter of vital interest. The people of California have the lowest freight rates, distance considered, in the world to move their products to Eastern markets. Reductions that would wipe out absolutely net revenues to pay interest on that dollar I have referred to would mean an average reduction in the United States of less than 6 per cent in the freight and passenger charges paid to railroads to-day. That means little to you and far less to the average citizen. But the service the railroad gives you, dependent upon the investment of somebody's money, is of vital importance in your business, and you can afford to protect that investment to get the service.

We hear a good deal about water in railroad stock. How about Kansas land, now worth $100, that was worth $1.25 per acre until somebody built a railroad to it?—or the value of the village property until the railroad came and the village was transformed into a city?—or of a newspaper that grew with the city and that now has a value far beyond the cost of its type and presses? Gentlemen, everywhere, in every line of business, men are hoping and striving for some return beyond the mere interest on capital involved—and if they don't manage capably its water will leak from any prospective value that is tied to the capital stock and it will show in the selling value. And sometimes, alas! more than the water runs away, never to return.

The public decides finally property rights and commercial privileges. They have decided to hold the railroads to a different standard—I think I may say a higher business standard—than any other business institution. Let me illustrate what I mean. Into the bread you eat enter many elements of cost, each affecting your pocketbook; the price of seed wheat, cost of plowing, sowing, cultivating, harvesting, of teaming to elevator, of elevator service, railroad freight charges, rolling in flour mill, sacking, perhaps advertising, and jobbers' and retailers' profits. All of these elements may vary according to quantity and individual notion, save the one item of railroad freight charges. The teamster hauling the grain to the elevator can make one rate if he hauls fifty tons, and a lesser one if given five hundred; likewise the elevator; likewise the mill may purchase at varying prices, according to quantity, and the cost of advertising will depend upon the space used, and the selling price to the jobber or retailer very likely according to quantity purchased. The only fixed element in the competition of this one sack of flour with another is the freight. The railroads have accepted the situation; it is to be equal rates to all, and with that policy no one can quarrel. But I would ask for the railroads of the United States, in relation to their rates for freights and fares, consideration and fair play—you are almost as much interested in their prosperity as their owners.

The doctrine of free hate can not win. It will be a sorry country to live in when we all turn detectives and with dark lanterns lay for our fellowmen. I don't think we are badly off. I do believe that common honesty is as characteristic of our business life as at any time in the history of the world. The principal misunderstandings nowadays between corporations and the people are due to the lack of contact and therefore lack of understanding. It is impracticable for a shipper having need of a vast railroad machine to know all the officers and employés concerned in moving his freight, nor is it possible for these employés to know the individual shippers. And the human equation enters into these relations as much as in any other business. If an employé is ignorant or overworked or out of temper a new and undesirable "railroad policy" is established for the time being in the minds of the patrons. There are just about as many "railroad policies" as there are employés; but if you could look into the hearts of men I think you would find a quite general intention to head these policies in the right direction. The vast majority of railroad patrons come in contact with the agents and station men and conductors only; and these men have troubles that I wish you could know of. It would broaden your charity for them. They must be business men knowing the business needs of patrons, rate men able to name rates to all parts of the country, telegraph operators familiar with train work, expert accountants making daily reports covering the great detail of station revenue, lawyers learned in interstate commerce law and versed in the statutes of the State ranging from a carrier's liability for baggage left on a platform to the law limiting the time live stock can remain in a car.

The men governing railroads are like other men—and if we could solve the problems of distance and have all these troubles discussed over a back fence as between neighbors, I think we would get along with very little misunderstanding.

This, on the whole, has been one of the most prosperous years in California, and the fruit-growers have largely shared in this prosperity, so far as the returns are in. Immigration from the East has reached high tide. We are getting more neighbors and, generally, good neighbors. All this means more rural facilities, mail routes, telephones, schools, churches, better wagon roads, steam and electric lines; all of the conveniences and additions that mean so much in rural life. The pressure of population has been increasing property values, too; and because of the great diversity in California products and the growing demand for them, I see no danger from any so-called overproduction, though of course we must expect lean years as well as fat ones.

The Southern Pacific Company and associated lines will continue to advertise California and California products throughout the world. In the past year we have circulated some two million pieces of advertising matter about California, sent to the East nearly five thousand wall pictures, furnished five thousand prints of photographs for Eastern publications to picture California, loaned to Eastern lecturers three thousand lantern slides, and sent over the face of the earth a million copies of *Sunset Magazine*. This work we will continue.

Since the fire the Southern Pacific has spent for equipment to care for California business $16,650,000, and for track and terminal improvements nearly $10,000,000. This speaks confidence in California as eloquently as may be.

There need be no hard times in California. If we have faith in one another, faith in the State's resources, cheerfulness and confidence in our business institutions big and little, all will be well. And there is nothing in the past of California that justifies anything but the greatest confidence in the future. Let us do without the calamity-makers.

In the absence of Mr. B. A. Woodford, the Secretary read his paper on "Marketing Citrus Fruits by the Growers," as follows:

MARKETING CITRUS FRUITS BY THE GROWERS.

By B. A. WOODFORD, of Los Angeles.

The above method of placing in the markets the products of our citrus fruit orchards originated practically with the advent of the Exchange in 1893, so that in treating of this subject we must look largely to the operations of that organization during the last fifteen years, although various individual citrus fruit-growers and various associations of growers independent of the Exchange have, during the same period, with more or less success, handled their own marketing problems independent of any other marketing factor in California.

Oranges and lemons have been grown in California for nearly one hundred years, but until within the last thirty years the only variety of consequence was the Seedling, planted largely by or through the influence of the padres who were in charge of the early missions.

Beginning with 1874, the Washington Navel was introduced into California, and that variety now furnishes three-fourths of the entire orange shipments, the Valencia Late being second in volume of output, which variety is largely increasing and bids fair to finally become as large, in total output, as the Washington Navel itself. Lemons have only been produced in commercial quantities during the last twenty-five years.

Twenty-five years ago the annual total shipment of oranges was barely 30 carloads; fifteen years ago, 4,000 carloads; and during the last three seasons, approximately 30,000 carloads each year.

Difficulties in marketing arose when the volume of business began to increase largely, and reached an acute stage when the shipments were only 4,000 cars yearly, at which time the growers were absolutely at the mercy of the speculative buyers, or shippers, on commission, the producers themselves having no direct voice in the marketing of their product. In the season of 1892-3 these marketing difficulties became so serious that, in instances without number, not only did the grower receive no returns whatever for his fruit, but also, in addition to contributing his crop, was compelled to pay the freight and packing charges which the gross sale of his fruit did not cover.

Various methods of combination among the then existing shippers and among the growers themselves were tried, with a view especially to regulating shipments and distributing the fruit evenly in the various markets of the country, but these efforts were spasmodic, irregular and short-lived, and only partially successful.

In some sections, growers undertook to ship and market their own fruit and in a few instances the growers associated themselves together, marketing on a mutual basis. Owing to the failure of the combinations among speculative shippers, and owing to the disasters that beset the growers in the marketing of their product individually, and encouraged largely by the experience of a few growers who had united in associations, a convention of the growers themselves was held in Los Angeles, on the 4th day of April, 1893, the purpose of the meeting being: "To provide for the marketing of all the citrus fruits at the least possible cost under uniform methods and in a manner to secure to each grower a certain marketing of his fruit and the full average price to be obtained in the market for the entire season."

Immediately following this convention, organizations of associations and district exchanges were effected in all the principal citrus fruit districts, the associations for packing, and the district exchanges for marketing, which was done at first through an executive committee composed of one member from each district. This plan was followed for two years, but on October 21, 1895, the Fruit Exchange was incorporated, since which date the marketing of all the fruit controlled by the various district exchanges and associations has been exclusively in the hands of the Southern California Fruit Exchange, or its successor, the California Fruit-Growers' Fruit Exchange, except during the period of seventeen months from April 1, 1903, to August 31, 1904, during which time the Exchange interests combined with various speculative and non-Exchange interests, under the name of the California Fruit Agency. The net results obtained during the agency were not satisfactory to the growers, and on September 1, 1904, the Exchange resumed the sale of the fruit it controlled independently of any other factor.

The Agency period proved conclusively that the interests of the growers themselves do not readily harmonize with speculative interests, and that in order to achieve the most complete success obtainable the growers must themselves handle their own marketing operations.

The principle of the Exchange lies in each member being entitled to furnish his pro rata share of the fruit for shipment to the various markets of the country, giving every grower the opportunity to ship his proportion of the fruit from day to day and week to week, and an opportunity to obtain his fair share of the average price of all markets during the year. All books and accounts are open to the inspection of each member, the whole basis of the Exchange being one of coöperation.

Growers near each other, who so elect, unite in packing their fruit, own their brands, and make such rules as they see fit for grading and conducting their business up to the time of shipment. Usually these organizations of growers own their packing-houses, although in some instances the packing-houses are rented. Every member is given a like privilege to pick fruit and every grower's fruit is separated into different grades according to the quality, weighed, and thereafter usually goes into a common pool and takes its percentage of the returns according to the grade. Any given brand is the exclusive property of the association using it, and the fruit under this brand is always packed in the same locality, and therefore is of uniform quality. This is of great advantage in marketing, as the trade soon learns that the pack is reliable.

There are now eighty-six of these organizations of growers operating through the Exchange, covering every citrus fruit district in California and packing over two hundred reliable brands of oranges and lemons.

The District Exchanges are composed generally of several associations of growers operating in localities near each other, or in one locality, and the matter of shipping and marketing is controlled by the District Exchange, upon consultation with the associations and, through the associations, with the growers themselves.

The California Fruit-Growers' Exchange, or the general or central body, consists of one stockholder and director each, selected by the various local exchanges. The governing power of the central organization thus remains in the hands of the district exchanges. Thus from top to bottom the organization is planned and controlled absolutely by the fruit-growers and in the interest of all members. No corporation or individual, except the growers themselves, receives either dividends or private gain from the Exchange operations. The duties of the Central Exchange are found largely in the placing of the fruit in the various consuming markets.

While the Exchange has, through its operations in California, freed itself from speculative trading by taking its business out of the hands of the middlemen here, it has never opened retail or jobbing houses in the consuming markets, but has and does put the fruit in the hands of legitimate dealers for distribution, and to do this has established exclusive agencies in all the Eastern cities of the country, employing in these agencies active and capable men of experience in the fruit business, for the most part on a salary and having no further business of any kind to engage their attention. None of these Exchange representatives are permitted to handle any other than Exchange citrus fruits. These agents sell to smaller cities adjoining their headquarters, and over all are two general or traveling agents, with authority to supervise and check up its various offices, the headquarters of these two general agents being Chicago and Omaha respectively, where complete information is kept of all the business transactions of the Exchange in all markets. This information is gathered from day to day and distributed by these general agents among all markets, thus making it impossible for a customer to take advantage of any Exchange representative in any market, and, knowing the consumptive needs, and the price being obtained in all markets, a proper distribution of fruit is effected, thus preventing an over-supply in one section of the country while a shortage might exist in another.

Approximately 35 to 40 per cent of all the fruit shipped by the Exchange is sold at public auction at point of consumption, the remainder being sold at private sale.

The Exchange has the most complete system of gathering trustworthy information regarding supplies, market conditions, etc., of any factor engaged in the citrus fruit business, and, owing to the volume of its business, the Exchange can furnish this information at a much less cost to its growers than any other selling agency.

During the history of the Exchange, the output of the State has increased from 4,000 to 30,000 carloads yearly, and the shipments by the Exchange have increased from less than 2,000 to above 16,000 cars yearly, and in percentage of the whole crop from 25 per cent in the earlier years to 55 per cent during the season just closed, clearly showing the popularity of the Exchange with the growers.

In 1893, when labor and material were much cheaper than now, the charge by the speculative or commission shippers for packing each box of oranges was 40 to 50 cents, to which they added a charge for selling of from 7 to 10 per cent on the delivered price, making the total cost to the grower for packing and marketing from 60 to 75 cents per box, as against an average cost of about 35 cents per box for both packing and marketing during recent years to Exchange members. Other growers, as well as Exchange growers, have benefited through the Exchange's handling its business at actual cost, in that speculative shippers must charge about the Exchange cost if they expect to get fruit from the growers.

During the last three seasons since the Exchange resumed its own marketing operations after the downfall of the Agency, it has shipped a little more than 43,000 cars of oranges and lemons, and has distributed among its growers therefor a little over $28,000,000, with a loss on account of failure to collect and in transmission of funds of only $310, this amount being only part of the returns on one shipment of the 43,000, a record that will hardly be surpassed in the years to come by any business organization.

In addition to packing and marketing the fruit of its growers, the Exchange has always taken a keen interest in transportation and tariff matters. The cent-a-pound duty on imported citrus fruits was obtained largely by the Exchange membership, through a committee composed almost exclusively of Exchange people, and the somewhat reduced icing charges, the reduction of the freight rate on lemons, as well as a smaller reduction in the orange freight rate, were brought about either by the Exchange alone, or with the assistance of other growers not

Exchange members, through the Citrus Protective League, these transportation savings amounting to $1,000,000 yearly.

The Exchange is not a trust in any sense. It does not seek to control production or arbitrarily to fix prices. It does undertake, so far as possible, by coöperation, to displace the competition of one grower with another in the matter of packing and marketing their fruit by purely economical as distinct from trust methods. It insures to every grower the full reward of growing good fruit and to every association the benefit of good grading and packing.

Through the operations of the growers in packing and marketing their oranges and lemons, as outlined above, the industry has greatly prospered and has assumed immense proportions. While it is not claimed that all the difficulties of an orange or lemon grower can be avoided by becoming a member of the Exchange, and while difficulties will from time to time surely beset the citrus fruit business, just as is the case in iron and steel, hogs and cattle, corn and wheat, and all other lines of business, still the growers of citrus fruits will undoubtedly find in the future, as they have in the past years, that by standing with each other in these packing, marketing, and other matters that are of common interest to all, the difficulties that have to be met from time to time will be reduced to a minimum and the greatest net amount obtainable for their products will be received.

The citrus-fruit growers in California who market their products through the California Fruit-Growers' Exchange have an enormous volume of business, large enough to maintain their selling organization in every part of the world at a reasonable rate of expense. There are great possibilities, however, for an enlargement of the coöperative marketing plan as now practiced by the Exchange to the benefit of other California producers. During the last two seasons many applications have come to the Exchange from growers and organizations of growers who produce celery, cantaloupes, and other fruits of the soil, urging that the marketing of their commodities be included with citrus fruits. All such applications have been refused, with the single exception of a considerable portion of the deciduous fruits of California.

The benefits to be derived from an enlargement of the Exchange marketing plan so as to cover other products of the State would not only be in obtaining these marketing services at actual cost by the growers of such products, but undeveloped markets, not only in this country, but throughout the world, could be more vigorously exploited than is now the case, when all these producing interests act independently of each other. Offices in all the principal cities of Europe, in the Orient, in Australia, and in other parts of the world, under competent local management, advertising and pushing the sale of California products only, would surely result in an increased demand and increased prices for the products of the State.

THE CHAIRMAN. We will now listen to Mr. F. W. Crandall's paper, "The Great Canadian Northwest as a Market for Fruit."

MR. CRANDALL. Mr. President, Ladies and Gentlemen: I will preface my paper by a word or two in which I hope to explain somewhat my position. I have been making quite an extended trip in the Dominion of Canada, during which time I have seen developing and developed a sort of a mad rush on the part of people to that section, and it has been somewhat of a study with me to learn the reasons, the objects, or the advantages of this movement northward, and in order to do so I have traveled over the country considerably and studied the conditions and will try in a brief way to give you some of the ideas that have come to me.

You will note that in my paper I will not deal at all with statistics. They are dry enough when you haven't anything else to do, and they are certainly too dry for a fruit-growers' convention; but I will try to give you some facts just as they come to me, not in a labored way. I hope those of you who are interested in the apple question will examine carefully this fruit on the table and take it away with you. I picked this fruit from the trees just a few days ago. It seems perfectly contradictory to pick from the trees apples which are perfect in development and preservation when within a few hundred yards there is snow which has been on the ground for a month or six weeks and the ground is frozen hard enough to walk upon or ice to skate upon, and there are so many of those conditions that it seems peculiarly interesting to take up this subject.

THE GREAT CANADIAN NORTHWEST AS A FUTURE MARKET FOR CALIFORNIA FRUITS.

By F. W. CRANDALL, of San José.

I had the honor of reading a paper at your convention four years ago on the subject of the "Fruit Markets at Home and Abroad." Just previous to that convention I had returned from an extended trip through the Eastern States and Europe, the principal object having been to exploit the markets on the other side of the Atlantic, and to learn the methods which must be employed in order to meet the requirements of that trade. The discussion and interest elicited from my paper was so general that it seemed to me a similar paper, treating on the conditions just across the northern border of our country, which is at present coming to the front as a fruit consumer more rapidly than any other section on earth, might prove of equal interest; hence I gladly give you the results of observations during the past four months, covering not only the grain-producing sections of Saskatchewan, Alberta, and British Columbia, but also the new fruit country, which is being discussed so much, which embraces the territory adjacent to Kootenay, Arrow and Okanogan lake regions, in southern British Columbia.

The motto "See America First" has been taken up with much vigor by many organizations in the United States, and it has developed the fact that one can find as grand scenery and as beautiful mountains, right in our own country, as can be found at the end of long and expensive trips abroad.

I doubt not that similar results may be realized as to our future market for both fresh and cured fruit, if properly exploited, right in our near neighbor Canada, and such exploitation would cost less, and the results be vastly greater, than could be attained by such countries across the water, as France or Germany, which in years of plenty have little need for our fruit productions, while Canada will always be a good customer. It is not when crops are so short as they have been the present year that new markets appeal to fruit men, although even this season the prices were so much higher than in former years that it had the effect to curtail sales as to volume very much.

The rapid settlement of any new territory near us, especially where fruit can not be grown to any great extent, seems to me has a special interest, and we must be alert to gain every advantage possible from such conditions.

This paper will deal more particularly with what is known as the "Canadian Northwest," and while east of the province of Saskatchewan takes at the present time much more of our California fruits than the three provinces mentioned, I shall not include them in my investigation.

We have been prone to look upon this great Northwest Territory as vast stretches of mountain and prairie land, valuable in the most part for hunting and trapping, and of late used to some extent for grazing, not considering it seriously as a great agricultural section, which it really is; in fact, I had very much the same idea, until in quest of better health I made the trip up there, spending upwards of four months, and found I was mistaken. The area embraced by these provinces is nearly 700 miles from north to south, and 1,100 miles from east to west, or an area of nearly 770,000 square miles, and it is safe to say that one half of this vast area is suited to agricultural uses and will rapidly come under cultivation, while the other one half includes mountains and lakes.

Think of an area of two and a half times as large as the State of California, fertile soil, level or undulating and well watered, and what this will mean when it is settled, as it will be, at no distant day, with a family on an average to 160 acres. But you say, it is so far north, what can you grow? True, it is north and far north, at that; but, even so, climatic conditions seem most contradictory. At more than 700 miles north of the 49th parallel, which forms the northern boundary of the United States, wheat and other cereals are grown abundantly, as well as most of the common vegetables, and as soon as transportation facilities are provided these more northern sections will become great grain-producing countries, no doubt exceeding an average production to the Dakotas or Minnesota, and few, if any, failures.

Much of these lands still belong to the Canadian government and are open to settlement on favorable terms, while other large tracts are under railroad control, having been granted as subsidies to induce and assist in building roads into these localities.

The Canadian government is doing everything possible to bring settlers into this country, while at the present time two lines of railway are heading toward the Peace River country, and no doubt will extend their lines through Yukon, to Alaska. Edmonton is the most northerly railroad point on the continent, a modern city of 12,000 population, and is at the present time the terminus of three railroads, C. P. R., G. T. P., and C. N. R., two of which are pushing their lines through to the coast, thus opening up to settlement rich and promising sections, and paving the way for a rapid settlement of the great Northwest.

So great has been the movement that during the past year or so nearly all the great American magazines have had more or less to say concerning the development of this country, staff writers having spent much time there, and large numbers of people are being drawn from the United States. The tide of immigration is by no means letting up, and it is safe to say that from the United States alone 150,000 to 200,000 people have crossed the border to invest in Canada cheap lands during the past twelve months. Don't think for a moment that these are a lot of "ne'er-do-wells" or "shiftless" people who are going over. Far from it. I personally have met hundreds of them in Alberta, and will say that a more enterprising and intelligent class of farmers would be hard to find, and the greater portion of them have considerable means, too. If this may be taken as an earnest of what may be expected to continue during the next few years, the United States will certainly be justified in making a rigid inquiry to offset, if possible, this great drainage from our progressive population.

The cheapness of land has always been, and always will be, an inducement, and while climatic and other conditions are also favorable to go with it, it makes it doubly attractive as a matter of investment. Canada land companies are alert as to this feature, and are not leaving a stone unturned to present their claim in the most attractive way possible; but I must say, with the exception of a few unreliable concerns, the actual conditions one meets are such that it is not possible to offset, by sound argument, these statements which are circulated freely all over the country, especially among the agricultural states of the Middle West.

The United States is not by any means alone in furnishing settlers, for the various European countries are sending large numbers, in some instances entire colonies being made up of Germans, Poles, Hollanders, and other nationalities, in this method helping to establish helpful and social advantages. Japan, not to be outdone by other nations, is also looking to the settlement of a large number of her subjects in these provinces, unless the Government prohibits such a move.

The Canadian Pacific Railroad is spending nearly $5,000,000 in the construction of the largest irrigation project on the American continent, putting under ditch nearly 3,000,000 acres of level land near Calgary, in Alberta, these lands having come to them as a subsidy from the Government. Even now the work is well advanced, and next season perhaps 500,000 acres will be under water. Sugar beets, alfalfa, and grain will be grown on these lands, but fruit seems to me to be out of the question.

No matter how great may be the developments in other directions, they must look for most of their fruit requirements from other sources than Canada, and of all this great territory there is only a very limited area in southern British Columbia where fruits can be successfully grown.

So much has been said of the progress and future possibilities of fruit-growing embraced by the Kootenay, Arrow and Okanogan lake regions, that a few weeks ago I decided to take a trip through these sections and study the conditions carefully, and I am just now returning from this trip.

I met two distinct surprises: one is the large number of varieties of fruit, as well as the quality of fruits, produced in these sections; the other being the extremely limited area which is adapted, or can be used, for the culture of fruits of any kind. Nature has seen fit to give these sections a climate which so differs from the country roundabout that it is almost beyond belief. Surrounded on all sides by snow-capped mountains, so rugged as to preclude any attempt to cultivate in any way, these small tracts along the lakes and up the mountain streams seem quite out of place in having a mild and temperate climate. But little snow remains on the ground more than a few days at a time. The principal lands which are now devoted to the culture of fruits, or in fact ever can be, in these sections, owing to the mountainous and climatic conditions, changing within short distances, are the narrow parcels of partially level land which lie between the lake shores and the sharp incline of the mountains. Some of these parcels are but a few hundred feet in width, and extend in long, narrow strips parallel to the shores of the lake, while others lie along the course of the streams and may extend for several miles from the lakes into the mountain cañons.

The greatest areas which are available for fruit purposes lie along the Okanogan Lake, on both shores, east and west, and it is probable that in the aggregate from 25,000 to 35,000 acres may be planted. These lands are now mostly in the hands of speculators and are held at from $75 to $200 per acre and will average probably about $125. The terms on which they are sold bring the payments due in two or three years, which is before anything can be realized from fruits grown on the lands.

The cost of the land is by no means all the expense, as in many instances it requires as great an outlay to remove the stumps and prepare the land for fruit as the original purchase price of the land. Then, in addition, there is the long, weary wait for trees to grow. This is softened somewhat by the raising of berries, or some other product, between the trees while they are too young to bear, and thus far it has been very profitable.

The orchards through this section, though young, are great producers, the principal tree fruits being apples, pears, plums, some peaches, cherries, and crabapples. So late as the 25th of November I picked apples from the trees at Creston, and while the mountains surrounding were covered with snow down to within a few hundred yards of the orchard, still the fruit was unharmed.

The statistics as to the fabulous quantity which some of the orchards turned off would sound like a reproduction of the "Arabian Nights." From the very best authority I was told that as much as $1,800 was realized from single acres of orchards in a single season, and these statements were verified by sworn affidavits. While I in nowise discredit the foregoing statement as to the amount realized from a single acre, still at the same time I would not advise any of our California fruit-growers to sacrifice their orchards at bargain prices to go into this section for the purpose of fruit-growing; not that fruit growing under intelligent conditions would not be profitable, but the general lay of the country is such that one will not be surrounded with unique social conditions, which we enjoy to so great an extent in our orchard sections of California.

The scenery is magnificent—grand. Trips about the lakes are extremely interesting and healthful, and it is a fact that the means of transportation and communication already furnished are all that can be asked or expected for such a rough, mountainous country and one so new and sparsely settled.

There is no doubt, also, that the marketing facilities for the fruits grown are the best, and will *continue* to be good, for within a day the products can be landed in most of the larger cities in Alberta and British Columbia.

Granting all that can be said, or may be said, it still remains that for canned fruits, as well as for cured fruits, this great territory must look to other than within its borders for supplies; and while Washington and Oregon will get their full share of this trade, it is from California that most of the fruit supplies must come, and with a population which at a conservative figure can not be placed at less than ten millions of people at no distant date, it seems most reasonable to expect a great future market from that direction.

I believe the conditions are such as to justify us in making a very careful canvass of the situation, thus placing ourselves in a position, not only to obtain, but to hold, this great country as our own market, and with the present favor which our California fruits receive, and by employing honest methods in packing, which should at all times obtain, we have great advantages over any other source of supply.

It behooves us to treat with the Canadian government for more favorable duty charges, which, owing to the fact that most of our fruit products do not compete with any like products of their home growing, I believe could be secured with very little trouble, and while I am not prepared to say that we will ever be able to compete, in the markets of the world, against the wheat, oats, barley, and live stock which will pour out of this vast region, I do not look upon the possibility of a sufficient area of fruits of any varieties to be developed in western Canada to, in any great extent, affect our marketing from California vast quantities of our fruits, both fresh and cured, and it seems to me no time should be lost in working out a system for securing this business.

THE CHAIRMAN. There are a few minutes yet that can be utilized as you see fit.

MR. MILLS. There is a man among us who has been very greatly interested in the farmer and his work. He has done more than any other man, I believe, in this State to advance our interests. Judge Shields of Sacramento is here, and I am sure you will be glad to hear from him.

THE CHAIRMAN. We will be glad to hear from Judge Shields.

ADDRESS BY JUDGE PETER J. SHIELDS, OF SACRAMENTO.

Mr. Chairman, Ladies and Gentlemen: I am completely taken by surprise at this very substantial honor and in presence of the breadth and variety of the discourses which have been presented. I am reminded of the incident of a peculiar old character we had down in Sacramento who was asked to address a body, and when asked upon what subject he would speak said he would leave it to the chairman. After thinking it over awhile the chairman announced that he was going to talk on the history of the world. It occurs to me that if I review the suggestions which the papers this afternoon have presented to us my subject would be almost as broad as that of old Jim. One thing that I do want to say, and that may be of some value in crystallizing an idea that has already been advanced by Mr. Mills, is that we would gain a great deal more in these meetings if we had fewer papers and discussed fewer subjects and threshed out those subjects more completely until we exhausted their possibilities. There were a great many things said to-day that were very valuable. There have been a great many ideas advanced which go to the moral order and safety of society, and I think we would have had much more benefit if we had discussed those things at length.

I was reminded, as I heard the different speakers read their papers, of what different views we took of life and of what different conceptions we had of our various duties to society. Take, for example, our friend Mr. Judd, who read to us such a vigorous and thoughtful paper a short time ago. We gained the idea from that paper that if our tax system were equalized, if our system of raising revenue were placed on a just and safe basis, most of the ills which afflict us would be eradicated. It would have been a very fruitful subject for discussion if we had followed out that thing and sifted some of the chaff from the wheat which that article contained.

It may not be unprofitable for me to give my views on two or three things which have been brought before us, and though they are hasty and crude, yet they are in the nature of discussion. I do not thoroughly agree with Mr. Judd, for example, that the manner of unequal taxation upon the farmer has been responsible for all the consequences which he so seriously and thoroughly outlined. I think that one of the things which has cursed the growth of America has been the idea of haste. We wanted to do it all in a day, and I think that the inequalities in our taxation and the prostration of some of our agricultural interests and the abandonment of some of our agricultural territory have been due to that more than to the causes somewhat emphasized in that paper. We have been building civilizations based upon cities; we have been trying to build up commerce; we have been trying to get the balance of trade on the right side. We have been doing things for to-day instead of for the future. We have entered into a new country and built it up; we have built "Lusitanias" which will bring any quantity of people every two or three days and land them here. We have been living off the richness and the fatness of the land and have been skimming it off, and so we have gone out and we have plowed with steam plows and we have harvested with combined harvesters and we have slashed forests and burned millions of feet of lumber where it was in our way. That is one of the reasons why the cities have grown disproportionately large. We have not done anything to build up our agricultural industry; we have not done anything to make agriculture live, prosperous; we have not done anything to lift it, to make it attractive, to refine it.

Another reason why our farms have been abandoned—and I confess the showing made with respect to the abandonment of farms in Eastern States is really gloomy, but I think a little reflection will tell us some of the reasons for it—is that we have not got enough people to cover our land. The people settled in the East and skimmed off the richness and then they moved to another farm, and they have come clear West that way, taking new land and skimming off the richness. I do not doubt that there is considerable inequality in the taxation of farms and it is a good subject to bring before this Convention, but I do not think it has been responsible for everything stated in that paper.

I was deeply interested this morning in the address of Colonel Irish. There was a vote taken in which there was one man against Colonel Irish. It might be the part of discretion for me to join the multitude. There is a good deal to be said on both sides of that question, and it might not be unprofitable for me to suggest a few of those things. It does occur to me that it is a dangerous thing to introduce into this country an element which is menial and dependent and servile and expect to build up the country on it. There is no doubt that, right at this time, we do need that kind of labor. There is no doubt that is one of the penalties we are paying for importing them, but if you look at any community where that thing has been done for any considerable time, there have been a train of evils which have followed it which are pitiable and which will be atoned for in blood and in sorrow and in the degradation of the people. How easy it was for the Southern States to say: "We have rich land here; we can grow wonderful crops if we have cheap labor; we must have this class of men to do our farming for us"; and so they brought the negro in because it was a good thing for the short sight. Well, what a debt it has entailed upon us and what an infinite price we have paid; and if there was such a thing, what a much more infinite price we would pay to sweep it out!

I remember what was said about the immigration from southern Europe. It was brought in to meet the demand; it was brought in to exploit the richness of the country. One thought occurred to me, that Colonel Irish was rather over-drawing the picture. In the first place, a great many of the men whom they bring over from that country—and they are brought over although the contract labor law is to the contrary—are mature men; they are unmarried men. Great numbers of them go home; great numbers of them never marry and they raise no children. Some of them are past middle life. There are very few of those people who come here and permanently settle down and who marry and add a quality to our society which we have to absorb into our social and into our industrial life. That can be seen to be a little bit out of proportion.

I knew a section of California that was very rich, where a great many Chinese were brought in—and I speak without feeling and without demagogism, because on the farm where I grew up we employed many Chinese. They were very affectionate and I recall, among my childhood memories, many tender recollections of that class of people; but they are distinctly inferior; they do the smaller things and they do the humble things. I knew, as I said, one section of this State where those men came in in great quantities, and the result was the boys and girls of that country lived an easy life. They were not trained industrially. They had high-minded notions of their quality and their class, and I look back in sorrow to think of the grand old families that raised up worthless and no-account sons and daughters. Now, we are in an emergency. We brought those people in here as we would bring a lame man who has a crutch, and afterwards you can not throw them off in a moment. But when we are discussing a policy that we should enter on permanently, over a long period, we must think of our relations to this world. Now, a man is born here and is confronted with two serious considerations. The first purpose, probably, of a man's life is the pursuit of happiness, but he must not lose sight of the fact that others are to come after him; and no act is performed wisely and justly and with perfect honesty that is not done in light of the fact that you are a trustee of the future; and so, in considering whether or not we should enter upon the introduction of a very large element that we can not assimilate, I think we should think considerably about it. I would rather see this country built upon the basis of being the model community of the world than to see it the richest community. I would rather see it built upon a basis of quality than of quantity. I look back with a whole lot of regret to my boyhood and find how it has been modified in many cases; how it has been degraded by the course we have entered upon. The only success that was pictured to us was that of making money, and quantity in all instances was required and demanded in that case. A man had to build a railroad, he had to erect a sawmill, he had to construct a line of steamships; we had to get the balance of trade right; we had to get an enlarged standing relation to the nations of the earth; and the result was that we demanded speed and we enforced speed, and we didn't put any condition upon it, and now we have in this country a powerfully, infinitely lofty structure of commercial enterprise, and we are commencing to realize that we did not build it soundly and we are experiencing the first shocks of a moral earthquake that is just as sure to shake us down to decent levels as the sun is to shine to-morrow; and I would like to have that idea dominant in every one of our laws, the idea that we are going to live to-morrow as well as to-day, and that whatever we do in adopting policies for social growth or for the construction of states, it is well to take the larger view of it.

There was another subject that was spoken of this morning by Mr. Mills, and I want to agree with him in that, and as long as Colonel Irish is not here I can go after him without hesitation. In the condemnation which he visited upon the heads of our laboring people of California, I was profoundly impressed with the moderation and the propriety of the language of Mr. Mills. In the methods we have adopted to get there, no matter how, we have brought up this society of men. After all, we are very proud of what we are, and we are very liable to look down on the other man and condemn him for what he is not; but to a greater degree than we think, we are the creatures of circumstances with which we have been surrounded, and while a man may to some extent select his path, there are a great many conditions which surround us over which we have no control. This civilization of which we are members and of which we are factors has been responsible for making that man what he is. We have given him a bed, and I have seen it so often on the side of a straw stack. I have seen him come in after a hard day's work, with his garments wet and soaked, and he has been turned into a cold loft. We have denied him social recognition; we have denied him education; we have forced him out of this and out of that and he has got to find a back room some place, and that back room has been the saloon. He has gone into the saloon and found a bright light and some chums who will recognize him, and then after we have pushed him in there and made it impossible for him to go anywhere else, we damn him because he goes there. Now, I just simply say that on the side, and in justice to a class of men of whom I am afraid we have not been sufficiently considerate and a class of men to whom we have been unjust.

There was another subject brought up this morning that I did want to talk about, and that is the subject which lies so close to Professor Wickson and myself, and if it had not been so very near 12 o'clock I would have liked to answer Mr. Berwick just a little bit—and Mr. Berwick, by the way, is a good deal like Colonel Irish—but I am so sure I am right in this matter that I am not even afraid of Mr. Berwick. We don't want to have the State Farm a self-supporting institution any more than our public school system, and that is all outgo and no income. But, as I said before, we want to take a longer look ahead, we want to take the broad view. I will tell you how it is self-supporting, just in the roughest sort of way. I recall that at one of the experiment stations in Minnesota a professor developed a wheat that is worth ten or twelve million dollars a year. That professor was getting probably $2,500 and the whole expense was probably $25,000 or $30,000, and in return for that he gives you $10,000,000. I believe the corn crop of Illinois has been estimated by the corn-growers' association to have increased from ten to thirty million dollars. The same thing has been done in Iowa. What could it do for us out here? Think of all the things we have that can be improved, and of the millions of dollars that can be added to the dairy product by improving the character of the cows; think of the added value by improving the character of the poultry, by improving the orchard by teaching you a little bit more about the varieties to plant. The possibilities of it are perfectly dazzling.

And then there is another way that this institution pays its way, and that is that it has a tendency to solve all the problems that have been raised here to-day. It will stop this abandoned farm proposition; it will help equalize taxation; it will solve the labor problem; it will keep the boys and girls in the country and strengthen society on that side rather than on the side on which danger lies. The boys who attend the Davisville school will become enthusiasts. They will be happy themselves and they will draw others into the circle they occupy, and how the State will be enriched as a result! We will have less crime, less pauperism, less insanity, less reform schools. We will have a higher standard of moral life. We will solve the divorce question, because whoever heard of divorce among country-dwelling, farm-loving people? We will have more school houses and we will obey our strenuous and wise President in filling them, and in a thousand ways the Davisville school is going to pay its way. It is going to pay it in fitness of its students for citizenship, in morals, and in patriotism. I listened with much interest to Professor Anderson and wished he had put much more fire and emphasis in what he said. I am like Mr. Judd, and think I have a solution of all the ills to which we are heir. I believe it is to have more farmers, better farmers, and then we will have better politics and less taxes and the whole life will be elevated.

Professor Anderson made a plea that the people would meet the Legislature half way. I want to speak for the people and say that we want the college to meet the people half way. I have been before the Legislature, a beggar for my pet theory, and I have found nothing but an extended hand and an open heart and a disposition to give for the growth and the promotion and the extension of agricultural education, as it is expressed and outlined in the Davisville idea, all money that is needed, and wherever I go among bodies of this kind and meet people of this type I find an equal disposition to send their sons there just as fast as the place is organized to receive them. And so I say to Professor Anderson, that if he will go ahead and equip that institution, our boys and girls will go there in flocks and the Legislature will pay all the money that is necessary to keep them there, and then we will have a better California and will have less of the evils that torment us to-day, and will have less of the evils that will torment us hereafter. (Great applause.)

MR. BERWICK. It is rather a dim, religious light to talk in, but I would like to say a word or two. In the first place, I don't think that the average working hand is the light-hearted man he has been pictured to be. I have not forgotten my own experience. My men that I have employed have not been at all ill-used. I am also running a school myself on the basis of making it pay. I have been successful in doing it. It has been my family school. We have made the farm pay in a small way. I still think that if, as an object lesson, we could make that State Farm pay it would be an exceedingly good thing for the students who will go there.

An adjournment was here taken until to-morrow at 9:30 o'clock A. M.

PROCEEDINGS OF THIRD DAY.

THURSDAY, December 5, 1907.

The Convention was called to order by Chairman Jeffrey at 9:30 o'clock A. M.

THE CHAIRMAN. Members of the Convention, there has been a request from some one in the audience that Mr. Crandall have five minutes for the purpose of explaining the maps he has here. If there is no objection, Mr. Crandall may take five minutes.

MR. CRANDALL. Yesterday, at the close of the few remarks that I made in my paper I expected to point to the maps that I have here, showing you something of the location, as I promised you in the paper. Judge Shields' remarks cut that out. The lands which are being offered at present for settlement—I am speaking particularly of orchard and fruit purposes—lie along the Kootenay and Columbia rivers and the extension of these rivers which form the Arrow, the Kootenay, and the Okanogan lakes. This is simply a widening of the Columbia River and the Kootenay River. These are the only lands suited to orchard purposes. Looking here, there seem to be quite wide scopes of land, but let me explain. In California there is much land being offered near by on the merits of what other lands produce. Upon examination you will find that the character of the lands is entirely different from the lands producing these great crops. The same may be said of much of these lands which are being offered along these rivers and along these lake shores. They are being offered on the strength of the quality of the other lands, but are in nowise of an equal character or producing possibility; therefore, if any of you have a bug in your bonnet and think you want to go into that country, don't, for Heaven's sake, buy land on paper. Go there, and you will find that more than one half the land which is being offered at these fabulous prices is nothing more than almost upright portions of land, made up very largely of rocks, with a very great absence of soil. So much for that.

Now, there are several questions that some of our friends wanted to ask. One was in regard to the quality of the fruit there. I can say that, so far as strawberries and other berries are concerned, they are excellent, the quality is fine. A dish of berries which are picked and brought down from those orchards and set on your table will fill the room with a delightful aroma. The apples, although they look well, are in many instances fibrous and coarse, have a sort of wild flavor, and are not pleasant to eat, as are our Oregon apples.

THE CHAIRMAN. The point, Mr. Crandall, is, none of us want to leave California. We want to know how we are going to supply that market, what kind of fruits they will need, and how are we going to reach it.

MR. CRANDALL. That question, I think, was brought out in the paper I read yesterday when I referred to canned and dried fruits.

THE CHAIRMAN. How about the green fruits?

MR. CRANDALL. I am very much of the opinion that, aside from oranges, lemons, and prunes, the green fruits will be supplied from the Oregon and Washington sections, and also the fruits that they grow in these territories. Oranges and grapes are now and will be in great demand. I ate California grapes in Edmonton that were grown above Los Gatos, and our oranges, raisins, and nuts are on the menus everywhere; nearly all are supplied from California.

MR. BERWICK. Isn't there a large and growing demand for early fruits in Victoria and Vancouver?

MR. CRANDALL. There certainly is, and I am sorry to say that many of the berries and fruits from the Okanogan and Kootenay countries reach those places almost as soon as our California fruits. The reason for their ripening so quickly is the exceedingly long days they have in that country. I have read the newspaper in the morning at between two and three o'clock without artificial light and I have read a letter from my wife at a quarter-past ten at night without artificial light. It is those very long days that force, within a very short period, the development and ripening of fruit.

For the balance of the morning session Mr. H. P. Stabler acted as Secretary pro tem., in the absence of Mr. Isaac.

MR. KING. Mr. Chairman, will there be an opportunity for those going on the excursion to get into the orchards and see what they are doing with the white fly?

THE CHAIRMAN. There will be an opportunity, but while the fly is in its dormant state there may be some scattering.

MR. KING. There are several of us after information, and if one may go in and see practical demonstration of what is being done it would be better than what we can get out of print or from some one's explanation.

THE CHAIRMAN. The order for disinfecting those trees makes provision for the work to begin on December 15th, so no work is actually being done. The Commission thought that by the 15th of December the flies would all be attached to the leaves and there would be no danger of carrying infection and that it was best not to begin until the 15th. So there is no work being done, although Mr. Carnes, Mr. Maskew, Mr. Whitney, and the County Commissioner there, have got a plan all outlined. They have inspected all of these 999 lots; they have got a map drawn showing the boundaries of the detected part, which is very small. That is all to be defoliated and all the other 20,000 trees in Oroville are to be fumigated; so we have worked out a thorough system of checking every tree. Every tree in the 20,000 will have a number attached to it by a tag. If you go to Oroville you will find our little office there and at that office you will find samples of all the white flies in the section. I think there are anywhere from five to twenty different species there, all mounted. I will say with regard to the Marysville fly, that after an examination by our best experts they are able to find the fly on only four trees, which have been destroyed, so practically it seems that the fly has been exterminated here, though we can not say for sure. Now I will ask Mr. Stabler to read Mr. Kellogg's paper.

The Secretary pro tem. then read the paper of Prof. Vernon L. Kellogg.

SOMETHING WE NEED.

By PROF. VERNON L. KELLOGG, of Stanford University.

Two years ago I had the privilege and pleasure of reading a short paper to the Fruit-Growers' Convention on the subject of the relation of pure science or scientific investigation to the interests of the California orchard men. In that paper I tried to point out the final dependence, in the long run, of successful horticulture on scientific investigation, and suggested the importance of a recognition on our part of this fact, and pointed out in general terms the advantage we might gain by acting on the basis of this recognition.

In this brief paper I wish to show that horticulturists elsewhere have recognized the value of scientific studies and have acted to their own advantage on the basis of this recognition. And I wish to indicate, in specific terms, how we, too, may act advantageously on this basis.

California's annual horticultural product is worth approximately seventy-five million dollars. Its farm product is worth about as much more. Each year injurious insects lessen the possible fruit product by a variable fraction: one fifth is the general estimate made by economic entomologists for the country at large. California insects will surely not allow their figure to be lower than the average. She spends, this State of California, practically no dollars a year for definitely directed, specific, competent, original investigation of the life history and habits of these ever-present, active enemies of her fruits.

New Jersey's annual fruit product is worth something less than a tenth of California's. She supports an actively investigating State Entomologist at a cost of about $7,500 a year. To be sure, this entomologist has to study mosquitoes and field crops and dairy pests as well as fruit pests.

Nebraska's horticultural and agricultural annual product is about equal to California's fruit product alone. She supports an investigating State Entomologist's office at an expense of $4,000 a year.

Minnesota's annual total agricultural product is worth $150,000,000 a year, perhaps twice the value of California's fruits. She expends something more than $10,000 a year for investigating insect pests.

The State of New York supports an investigating State Entomologist's staff at an expense of approximately $10,000 a year; and the entomological work of the two experiment stations at Geneva and Cornell costs $10,000 a year more. All this is over and above the $25,000 a year expended for nursery and orchard inspection work and quarantining.

I could tell you of other states. It would be tiresome. The point is, other states have recognized the worth-whileness of having thorough scientific study of their insect pests that they may fight them effectively. California does not do this. We pay out several thousands a year for quarantine work. We pay practically nothing for thorough, original investigation of the characteristics and ways of our enemies, that we may learn of our vulnerable points and direct our practical efforts against them successfully.

Some questions may be asked. Are our pests in California all different from the ones in other states? If not, why not take advantage of the investigations of other states and thus get our knowledge for nothing. Answer: Many of the California pests are different from those of the Middle West and East. Those that are not have different habits and seasons and ways, as indeed a moment's reflection on our radically different seasonal and general climatic conditions will suggest to any of us.

Another question. What is the money used for that is appropriated to the insect-pest side of the Horticultural Commissioner's work? Answer: Almost exclusively for quarantining, inspection and importation and rearing of beneficial insects. Not for discovering new facts, not for long, thorough, scientific investigation of our pests. There isn't money for both sides of the work, and quarantining, absolutely imperative, uses it up.

Still another question. What about the entomological department of the State University? Answer: Primarily it is of necessity a teaching department; the entomologist and his staff must first teach to large classes of more or less uninterested freshmen and sophomores the rudiments of entomology. Then must go time and energy to the compiling of bulletins and the answering of a host of questioning letters like the classic one received by Director Roberts at Cornell several years ago, "My ducks are dying. What shall I do?" Finally what time and strength are left may go to long, thorough scientific investigation. Well, what time and strength *are* left, do you think?

What we need in this State is an adequately supported staff, or bureau, or office, wholly out of politics, not necessarily connected with either the Horticultural Commissioner's office or the State Experiment Station—but not necessarily *not* connected with them—for the intelligent, persistent, thorough, original investigation of California pests and the conditions under which they work. Such a bureau or staff could be supported for $5,000 a year. If one dollar out of every $15,000 gross received by California fruit-growers were put aside; or expressed in another way, if one prune, one peach, one orange, one cherry, one grape, were put aside for every 14,999 prunes, cherries, peaches, oranges, etc., sold, such a bureau could be supported.

And would it pay? I tell you it would. I have been in California long enough to be first surprised, then shocked, then saddened by the short-sightedness displayed in regard to this matter of really knowing the ways and facts of our enemies of orchard and vineyard. And other states show by their actions that they know that knowledge pays. Perhaps we ought to be satisfied to raise, despite our leniency to our enemies, more fruits than other states. But we are not satisfied when we remember that it makes our twenty per cent of loss just so much bigger. Let us cut down this loss. We can't cut it wholly out. But we can save a few millions by spending a few thousands. This sounds like Tonopah or Alta Vista heights. But it isn't. It is because the knowledge of science is practically free. Nobody speculates in pure science.

Now, I must interject a personal word. I can write what I have because I have no ax to grind. I have my own life job. It's better than any you can give me. I am disinterested except for the interest I have in California and my fellow horticulturists. For I, too, as what Santa Clara Valley resident has not, have a few prune trees. I can clamor for money and for the establishment of a position with an easy conscience and no face of shame—for I am clamoring for somebody else. Who he is I do not care—except that he be honest, competent, thoroughly trained, eager to work and in love with just the kind of work he is to do. Such men there are. And they can do much for us.

We have even produced a few young men in our laboratories giving much promise. And what happens to them? Does California get the benefit of their work? Not at all. My best graduates are government entomological workers in Japan, in Hawaii, in our own country outside of California. When we get a young man like Dudley Moulton ready, he is snapped up by the government service just as soon as he gets to helping Santa Clara County in a way worth while. Carl Morris is tackling bravely the big thrips job in the same county. He needs time and backing. It is a serious and a large undertaking. He can not go out and begin killing thrips to-morrow. It will only be after weeks and months of close, careful study that he or anybody else will be able to get to killing. But it is his kind of work and Moulton's that in the long run counts most. Tackling the big jobs and going at them from the ground up is the sort of thing we orchardmen sorely need in California.

Get a man with a couple of assistants; give them living wages; a little office, not large, for out-of-doors will be their principal workroom; and give them time and encouragement to investigate. Don't expect them to wave a stick, or throw dust in the air, or puff smoke out of a covered wagon like the Indian medicine man or a rain-maker. Don't demand a general exodus or a wholesale mania of suicide on the part of the insect pests when these men begin to study. And don't urge them to throw dust in your eyes. They can do it all right enough—for a while. They can talk Latin words and prophesy good news. But guff is not the stuff we want. And sensible men know that results worth while do not come in a day or even a month. They come from long, persistent, thorough, scientifically honest study and work.

Well, you can get just that for a few thousand dollars a year. Adequate support by the State through legislative appropriation or directly from some organization of fruit men—just as the sugar planters of Hawaii maintain their own special entomological investigating bureau—for scientific investigation of the insect and fungous pests of fruits is needed sorely. There is great, great need of more knowledge. This knowledge can be got. How it can be got I have tried to tell you. And that is all that I came up here from Stanford to say.

Mr. Ehrhorn read the paper by Mr. E. K. Carnes on "Practical Work in Combating the White Fly," as follows:

PRACTICAL WORK IN COMBATING THE WHITE FLY.

By E. K. CARNES, of San Francisco.

The practical work against the white fly in this State, undertaken by the State Commission of Horticulture, in so far as it has progressed, up to the present time, may, for the purposes of this paper, be divided into the three following stages: The work at Marysville, the work at Bakersfield, and the preliminary work at Oroville.

Upon the discovery that the white fly (*Aleyrodes citri*) had at last made its appearance within the boundaries of this State, the citrus interests of California were at once brought face to face with the gravest problem that has confronted that industry for many years. The Florida white fly being undoubtedly the most dreaded of all citrus pests, and known the world over as the one most difficult to combat, the announcement that this dreaded foe of citrus culture had finally eluded the quarantine guardians of this State, had gained admission, and was firmly established on various trees and plants in the city of Marysville, brought forth exclamations of fear from every corner of the State.

One of California's foremost industries is that of citrus culture; the yearly revenue produced from our present planting reaches almost forty millions of dollars. The distribution of this enormous fund finally reaches every industry in the State; consequently, when it was announced that this great industry was threatened to the point of almost complete destruction, by the invasion of this Florida pest, the most drastic measures were necessary to be enacted and every effort exerted in an endeavor to stay its march and attempt to eradicate it at its point of first discovery.

Unfortunately, that point was the beautiful city of Marysville. How it came to be brought here is somewhat of a conjecture, which probably will never be satisfactorily solved. After due deliberation in proportion to the danger which confronted us, and after submitting specimens of the pest to all those in authority, even up to the highest in the United States Government, and in each case the classification being verified, we then knew that we had a battle before us with the worst of all citrus pests.

California has stood in awe of this particular species of insect pest for many years, and as far back as 1901 quarantine regulations were enacted against the possible introduction of the same into our State, and since that time a great deal of study has been devoted to the pest; all works on the subject were freely consulted and its life history carefully considered; all remedies and artificial means of eradication applied in other states were watched with much interest; different experiments were noted and filed for reference, should the pest ever make its appearance in our State, so that we would be in shape to handle the same, in the most intelligent, practical manner, and avoid the mistakes of theoretical ideas and impractical experiments.

Upon the first appearance of the pest in California, the forces of the State and County Horticultural Commissions were at once brought together on the subject, the point of infestation was visited, and inspectors were placed in the field, the ground gone over very carefully to ascertain the boundaries of infestation, ways and means of procedure discussed, various ideas that had been tried in an experimental way in other states were considered and the works on the subject again carefully gone through, with the result that the previous knowledge of the pest almost entirely consisted of its habits and life history in other states and other climes—with the exception of a little field work in Florida—which was more in the way of a scientific experiment, from which, apparently, no practical results were obtained. All other artificial means of eradication were carefully considered; spraying had proven a dismal failure; fumigation had recently been employed by the United States Government in an experimental way in Florida, with the assistance of one of the County Horticultural Commissioners of Los Angeles County, and had proven quite satisfactory; but this method of treatment could not be considered in this case, for the space of time before another brood of flies was due to appear was quite short, and the size, location, and number of the trees were such that to have attempted fumigation would have necessitated practically the use of every fumigation tent in California. Other means were considered, with the result that they were shown to be impractical under the present conditions. The peculiar habit of this insect in attacking only the leaves of its host plants gave hope of the success of a plan of attack which it was finally decided to inaugurate. Most of the trees affected were seedling varieties, and had no commercial value; again, they were badly infested with several species of scale insects. These facts were taken into consideration, and it was decided that the only possible plan of campaign that gave any promise of success was to promptly defoliate the trees. Time being the essential feature, to prevent the immediate danger of spread; also, by defoliating we would clean up the other pests mentioned, and leave the trees in shape to bud to better varieties, making them commercially valuable as well as ornamental.

In addition to our regular preliminary work, practical men from the county commissions, and men representing enormous horticultural holdings from all over the State, who have had years of experience in fighting all sorts of injurious insects with all known remedies, were sent to the infested section—these sober, conservative horticulturists were taken into conference before the final plan of campaign was announced.

Consequently on June 12, 1907, the defoliation order was issued, the same being sent to all the county commissions in the State, as well as in the infested county, as prescribed by law.

It was also necessary to determine what plants besides the known host plants might be infested, and inspectors were placed in the field—careful, experienced men—with the result that additional host plants were discovered that no writer on the subject had known to be such. One especially was the lilac (*Syringa vulgaria*), which was found to harbor the pest in goodly numbers. As this shrub was not mentioned in the defoliation order, considerable objection was made to defoliating them on this account, but only in a few cases was much difficulty met with.

In outlining our campaign, the first step in the work was to carefully consider the life history of the insect—to discover its most vulnerable point of attack.

The life of the insect is divided into four distinct stages: first, the egg stage; second, the larval stage; third, the pupal stage; and, fourth, the adult or winged stage. The flies pair very soon after emergence, and the females generally begin depositing eggs in from twelve to thirty hours; they seem to prefer the under side of the very young and tender leaves, except in cases of very bad infestation, when the old leaves are also covered. Writers differ on the number of eggs deposited by each female; but they seem to agree on from twenty-five to seventy-five as the limit, warm weather being conducive to prolific oviposition and cold weather the reverse. The eggs hatch in from three to twenty days, depending upon the temperature; however, a large percentage of the eggs are unfertile. The young when hatched somewhat resemble the young of a scale insect (*Coccidae*), and crawl around for a few hours before they settle, which consists of inserting the mouth parts into the leaf and the secretion of sufficient wax to fill the space between the insect and the leaf. It now becomes a fixed form, until after passing through the last stages of the nymph form, where wings are formed in both sexes and the entire structure of the insect changes or undergoes a molt and the delicate white fly emerges, leaving the molt attached to the leaf, which is quite conspicuous. In normal conditions the insect will pupate in from twenty to thirty days, and the mature fly will issue in from ten to thirty days thereafter, making the time of one brood from egg to adult about forty or fifty days in summer to six months in winter. While the life of an individual adult fly is very short, being from three days to a week, according to various writers, many mature flies were kept in confinement alive for twelve days in some of our experiments. The first brood appears in the spring in large numbers and are present for a couple of weeks, then suddenly disappear after laying their eggs. This brood is well defined. The next brood appears in midsummer and is not as distinct as the spring brood. From this time on there is a tendency to continual breeding until cold weather appears, when the adults entirely disappear, leaving only the fixed forms firmly attached to the leaves, and no adults are to be seen until the spring brood issues.

At the time of the discovery of the pest in this city, the spring brood was at its height, and thousands upon thousands of adult flies were in evidence. From a knowledge of its life history, it was seen that the first opportunity to attack the pest was immediately after the disappearance of the adults of the spring brood, which would leave us only the eggs, larvæ, and pupæ fixed forms to deal with. As the pest only attacks the leaves of its host plants, by destroying the foliage of such, with the fixed forms attached to them, presented the most practical plan of campaign possible in the limited time between broods. To insure success all the food plants must be located, all the foliage from such removed and destroyed, and the work completed before the issuance of the midsummer brood. It seemed almost an impossibility, even under the most favorable conditions. With the enormous amount of plants and trees to be defoliated, the scarcity of labor, the fruit season at its height, with seemingly everything against us, it certainly presented a herculean task. We will cheerfully admit that it was not an ideal time to attempt the work; but the white fly had by this time become well known to almost every resident of the city, and to a large majority of the children; many persons were visiting the city from the adjacent country, and would, unthinkingly (not being familiar with the danger attending such actions), capture mature specimens of the pest to exhibit to friends in other sections. This grave danger of having the pest spread over a great many sections of the State, in a very short time, made it all the more necessary to commence work immediately. In the face of all the arguments set forth by many persons, who insisted that the season was the wrong time to attack the pest, I feel safe in stating that should such a course have been followed, viz.: the let-alone-policy until the winter season arrived before commencing active work, the white fly would now have been practically all over California. Our first idea, then, was to reduce the danger of spread to a minimum in the shortest possible time, and later on, when the trees would be in shape to be handled and the season of the year more favorable, to give our time to efforts of complete eradication.

The campaign, as outlined then, consisted of the defoliation of all known host plants, and constant inspection covering the infested area, extending through the winter months. In case of any adults being found, or if anything should happen during the defoliation to delay the work sufficient for a new brood of flies to appear on any host plant—for in any and every undertaking as extensive as this one; one that so far is unparalleled in the horticultural annals of California; the unforeseen contingency must always be counted upon—then the outlined plan included reinspection of the new foliage as soon as it appeared. This was closely watched and allowed to remain long enough for any belated individual which might happen to escape and reach this tender growth, which is the ideal food for *Aleyrodes citri*. Judging from our experience, which covered many weeks among the pest, the flies would go immediately to this young foliage, deposit their eggs, and soon disappear; thus we again had the progeny of the outlaw flies trapped on the young growth, with the adult flies dead and their offspring anchored on the leaves. Men were then started to work stripping the defoliated trees of their new leaves and destroying the same. Constant inspection was carried on, each block was platted separately, and weekly summaries made of the same.

An inspection was recently made showing much completer work than the original plan had promised, our original idea being, primarily, to prevent the immediate spread. The presence of mature white flies has been reported several times, even recently, by persons who have not looked into the matter thoroughly before spreading the report that they were *Aleyrodes citri.* It must be remembered that in Marysville and the surrounding country, *Aleyrodes* species are extremely common. These are native, harmless species, which, in the adult stage, closely resemble the *Aleyrodes citri*, the insect we are trying so hard to eradicate. In one case in particular the adult flies were reported on an orange tree. The place was immediately inspected and several specimens of mature flies were found upon the foliage; however, diligent search failed to reveal the eggs, larvæ, or pupæ of any *Aleyrodes* whatever; yet the mature forms were there, and to a person not familiar with the work it was taken for granted that the work had been a failure. Upon looking carefully, taking into consideration the native forms, there was found upon the porch a wisteria vine that was heavily infested with *Aleyrodes acacia*, and the dense foliage full of mature or adult flies.. By shaking the vine they were disturbed and several specimens were carried, by a little breeze, directly on the orange tree. This is one case of many where reported adults have proven to be native species.

A long practical experience in combating many different forms of destructive insect pests over extensive horticultural areas in California "warns us" not to be so egotistical as to make the positive statement that the white fly has been eradicated in Marysville, but it is now certainly under control and in such shape that should it show up as is expected in a certain watched spot, it can be handled with comparatively little expense or trouble. During the winter and with the completion of our campaign satisfactory results will undoubtedly be recorded.

The horticultural laws of California are very stringent. First, they make it the duty of the State Commissioner of Horticulture to determine whether a pest is dangerous or not, and to prescribe the remedy that should be applied in each case. This notice must be sent to each County Horticultural Commission and instructions given them in detail. This notice is made a part of the county notice that has to be served on each party owning or having in his charge infested trees, and is accompanied by an order from the County Commissioners declaring the pest a public nuisance and ordering the same abated within the time given and in the manner stated. Thus we see that it is made the duty of the County Commissioners to enforce the State Commissioner's order. In Yuba County the Commissioners were duly served with the official notice, and they immediately started to enforce the order. Of the excellent manner in which they carried out their part of the program there can be no question. The duty of these gentlemen, which was to compel their neighbors to destroy their shade trees and to temporarily disfigure their yards, was not a pleasant one, and great credit is due each of them, especially the Marysville District Commissioner, who remained faithful to the discharge of his duty even in the face of incurring the personal enmity of his town-folks.

I beg your forbearance while I relate a few of the obstacles that obstructed and delayed the workings of the plan of campaign as originally outlined, and which obstacles served to make the direction of the work anything but a bed of roses.

Whatever prejudices may have existed at the beginning of the campaign, as of one section of the State toward another, this gathering to-day is convincing proof that all such engendered passions have been buried and that we are all now loyal California citizens striving for the general upbuilding of our State.

I express my own sentiments, and I hope yours also, when I say that no man is to-day a true lover of this glorious State who would endeavor to rekindle the fires of sectional strife from the dying embers of the unhappy beginning of the white-fly campaign; and any facts that are mentioned in this paper relating to the actions of the citizens of Marysville during that time are given only as history in connection with the work, for having met a majority of the citizens, in the routine work of the campaign, I can only speak of them all in the highest terms of praise, and I glory in their justifiable pride and defense of their city while dealing with a vexing question which they did not fully understand, and one that time would not permit of a campaign of education; so while referring to some of the circumstances that attended the work I wish it understood that no discourtesy is meant to any one and I shall not knowingly state anything which could, by any construction, wound the feelings of any resident of this city.

Upon the first intimation that drastic measures were to be employed against the invasion of the pest, almost simultaneously arose the story that the southern section of the State was endeavoring to wipe out its worthy antagonist—the northern section. Much credence was given the story, which became generally circulated. This was followed by the announcement that those in charge of the work were to receive a fixed price for each tree destroyed. These little stories caused a great deal of annoyance and tended to keep many people from proceeding with the work. However, the arguments of the cooler heads soon prevailed, and these citizens soon convinced those in doubt that the idea was ridiculous, and the prejudiced feeling toward the south gradually subsided; but the same story would crop out at intervals, and some good convincing talk was necessary to disprove it.

Then came the story that to defoliate a tree would kill it, for it must be known that very little budding had been done on the city lots, and the majority of the trees were of the seedling variety, ornamental only, no oranges being grown for commercial use; and naturally the owners of such trees did not recognize, as quickly as those who grow citrus fruits for profit, the great danger of allowing the dreaded pest to spread over the State.

At a very critical stage in the eradication work, when every energy was being expended to complete the work before another brood of flies would be due, opinions arose which varied widely as to the proper course to pursue, based on advice given by people unacquainted with the real facts of the case. The questions involved were of a legal nature, questioning the right of the authorities to proceed along the lines as indicated in the official order. Many owners insisted that the legal advice given them to resist the order was applicable to the present situation as well as to matters not involving horticulture. These few valiant defenders of the foliage of Marysville were joined with other leaders in a movement to prevent what they believed, at that time, was an attempt to destroy the verdant beauty of their home city by unconstitutional means. Injunctions were served on the Commissioners and the work stopped at a very critical time. Here again the law's delay caused more valuable time to be sacrificed. The matter was brought before the court, with the result that the order was upheld to the letter, and the work, already late, again proceeded.

The cause whereby the work was not completed within the specified time is directly traceable to influences exerted and advice given from sources not authoritatively interested and from an assumed advisory standpoint only, which resulted in the bulk of the voluntary work being delayed until the last minute, making it a physical impossibility to complete the same on time.

As enforced eradication can not be executed until after the expiration of preliminary service, the enforced eradication must then follow certain prescribed lines as indicated by our legal statutes. This important point seems not to have been considered by many persons who have severely criticised the failure to complete the work in the given time.

While we were not unconscious of the many pointed insinuations aimed at us, both orally and in print, the overpowering sense of our duty to so important a cause, and realizing the great interests at stake, outweighed any desire on our part at petty retaliation, and we refrained from replying to any attacks upon us, although the opportunities to do so were legion. Instead, we proceeded calmly and impartially with our work and, by so doing, I believe we not only won the respect of the citizens of the city but merited the confidence of the entire army of citrus growers throughout the State.

Another source of delay, which in the aggregate amounted to a great deal of time, was the obstinacy of the people in relation to the true view of the work—in some instances positively refusing to discuss the matter at all; in others, declaring the work was simply a graft and expressing themselves in no uncertain terms. Added to the anonymous letters we received, such pleasant little recreation as crying "Graft!" was indulged in; although I am happy to add this did not emanate from bona fide owners, but rather from that element, to be found in any city, which, not being financially interested, take great interest in all current issues.

Again, probably estimating the strength of the law by the size of its representative in this particular case, invitations to indulge in fistic exercise were frequently extended.

The State and County Horticultural Commissions came in for a great amount of undeserved criticism, because the work was not all finished in a minute. At the time the work was at its height, labor conditions were such that in a majority of cases the owners of infested properties were compelled to do the work themselves, it being almost impossible to engage help, and the work had to be done before going to their daily employment or business, and after business hours in the evening. Almost every available team was engaged in hauling fruit, which season was at its height, consequently the brush was not removed as fast as those in charge of the work would liked to have seen it done. The city authorities placed all their available teams on the work, employing additional teams when possible, for the amount of brush from the defoliated trees was beyond measure. The disposition of this brush was in itself an enormous task. Considering the fact that every possible effort was exerted by a majority of the citizens to comply with the law, great credit is due each and every individual, as well as the officers of the city and county, for the excellent spirit displayed and the great sacrifice they made in order to save the citrus industry of California.

When we take into consideration the fact that the people of this section have never been troubled with insect pests and have previously had no acquaintance with horticultural authorities or been compelled to eradicate any pests; that the subject was practically new to them; that they were unacquainted with the workings of or dangers from destructive insects, and could not understand why it was necessary to take such drastic measures to stay the spread of this pest; and a point that made it still more difficult was the fact that the pest had invaded the trees on the streets and homes where no value was placed on the product—only the beauty and shade which they afforded were considered in their worth; again, the county of Yuba having no commercial citrus orchards to protect, it must be admitted by all that it was a rather vexing condition which presented itself to the people when an order was issued to defoliate all citrus and other food plants of the pest.

Time would not allow for a campaign of education, which would have made the work easier, as the people would have then understood the danger that threatened our State, and there would have been no hesitancy in obeying the order. As it was, in each and every case where it was possible to personally meet and talk with owners, they were immediately satisfied and commenced the work.

There is another and unknown side of the question, with which the general public is not acquainted, in connection with the sacrifice made by the good people of Marysville. The main point that has held the attention of growers throughout the State, in regard to the trees in this city, is that they had no commercial value; yet I know many trees were closely associated with family history—trees planted and cared for by departed members of many families. In these cases, I know from conversation with the present owners, that no amount, in dollars and cents, could cover the loss of these trees, which were held almost as sacred, and to be compelled to force defoliation in such cases was, indeed, most unpleasant.

During the active part of the campaign, and quite naturally, congeniality was not the dominating spirit in the air. Could you have been in this city during the campaign of last summer, when it was as warm—well, as warm as it gets in southern California!—no one willing to work, labor scarce as hen's teeth, only a few hours before the time limit mentioned in the defoliation notice would expire, and the pleasure of having the county authorities coming in and doing the work for you, at your expense, and money tight. About this time, you, who had charge of the work, would happen along and find the owner up a tree, sweating, puffing, and sawing, the thorns of the seedling gently pricking his arms and body. Now, imagine yourself as this person, you who had planted that tree yourself, and for many years were wont to bask in its beautiful shade, and now to be compelled to defoliate it, and to do the work yourself; suddenly, you hear a ripping sound, and as you gaze below you find that your second best pair of trousers has encountered a thorn, and as a result a rent about three inches long appears; well, you straighten up to resume your work, your visage is set with hard, determined lines, and as you resume the upright pose you gently tear the sleeve out of your shirt. In the midst of this operation, while you are hot mentally, internally, and outwardly, into your yard comes the cause of all your trouble in the shape of one of the officers in charge of the work to see how you are progressing. Please, don't imagine, even for a single moment, that that man up a tree comes down smiling and asks you into the house to have a nice cool lemonade!

Looking back on the thousands of trees, plants, and shrubs that were literally swarming with white flies in the spring, and considering the great amount of territory covered, the obstacles met and overcome, the unfavorable season of the year in which the work was attempted, with all conditions seemingly against success, when we had to proceed very cautiously with the work, ever trying to rush it to completion in the specified time, and to have succeeded so far that to-day it is nearly impossible to find the pest here, I believe the work at Marysville so far has been attended with a fair degree of success and that the main object has been achieved, and that by spring the pest should be exterminated.

Bakersfield.—The white fly invasion at Bakersfield presented an entirely different case. There, we had but a single owner to deal with, Mr. William Tevis. The infestation occurred on his beautiful estate at Stockdale, which is situated about five miles from Bakersfield, and practically surrounded by pasture land, and the chances of the pest spreading quite small. Upon discovery of the pest, the place was immediately quarantined and all persons kept out. The owner was more than anxious to do everything in his power to assist in the eradication work and placed every convenience at the disposal of the authorities. Considerable experimenting was done at this place, as the conditions were ideal. With the coöperation of the southern commissioners a fumigation outfit was rushed to the scene of infestation and hydrocyanic acid gas was used, in different strengths, exposures, and doses. Trees that were necessary to be defoliated were first used for experimental purposes and the foliage burned, dropped or left in perfect condition. Different strengths were used on the insects and a plan outlined for the trees, fumigated and left standing, for trap purposes, which consisted of refumigation and inspection until final work during the winter months.

Repeated examinations at this point of infestation show excellent results and the white fly in the past tense; however, the inspection and final treatment of the trees will be carried on as a safeguard, just the same as if the pest could still be found.

Oroville.—The invasion of the white fly at Oroville presents about the same conditions as it did at Marysville, being scattered over the city trees. The varieties of these trees are principally seedling, with quite a percentage of Navels. Our experiments at Bakersfield have made possible the intelligent use of fumigation with hydrocyanic acid gas against this pest, and the option will be given the owners to fumigate or defoliate—outside the infested area. There will hardly be the trouble experienced at this point as previously encountered, for the Marysville campaign has been an education in this line and the anxiety of the residents to have the pest eradicated is very strong, as the commercial orchards are in close proximity to that part of the city where the infestation occurs. A plan of campaign consisting of defoliating the infested area and the remainder of the trees to be fumigated or defoliated to catch the spread of the pest, which in the early stages is very hard to detect—and at the same time to clean up the trees of yellow scale (*Chrysomphalus aurantii*, var. *citrinus*) before it reaches the commercial orchards. Preliminary work is now well started at this point—the active work to commence December 15th and to be finished by February 15th, which will allow for a thorough inspection and for more work if necessary before there is danger of the spring brood appearing. We believe, from past experience, that an intelligent, practical plan of campaign has been mapped out for this invasion, which promises successful results, and having taken into consideration that possibly something may arise, ample time has been allowed for the unforeseen. With our past experience as a guide, taken together with the favorable season of the year, everything points to a very successful campaign.

In conclusion, let us not count on the miraculous aid of chance in the complete eradication of this dreaded pest from our State, but every energy should be exerted. Ample provision should be forthcoming for carrying on the work as long as it is necessary. The most critical inspection of plants coming into any county should be made, and let us not forget that we still stand in danger of having this same pest sent direct to us into new sections from Florida and the Southern States. Let no stone remain unturned to erect a mighty barrier against this ever threatening danger—and this point is especially important for the northern counties—which will amply repay any expenditure and prevent a repetition of the hardships which you have just borne with so much fortitude. And now let us indulge in the more pleasing thought that your citrus industry is but in its infancy, that the population of your northern counties will increase in numbers and achieve much more than you have already accomplished, and that your people are intelligent enough to see and vigilant enough to guard against impending danger to your growing industry from whatever source it may come.

MR. JUDD. I want to supplement that paper to the extent of saying that it seems to me one of the wisest things that could be done by the State Horticultural Commissioner would be to publish that, or the essence of it, so far as it relates to the campaign in Marysville, and it should be sent to every city and town in the State of California troubled with insect pests. Every little town has in its gardens various kinds of foliage plants and trees, citrus or otherwise. My experience has been that you can not find one yard but that carries some insect pest and, as the paper says, the tree is dear to the heart of the person who planted it, and they smile at you when you say that the trees ought to be attended to. These little towns are the breeding grounds of the State of California for all kinds of insect pests. A man comes in with a load of hay or a load of wood and he takes it through some shrubbery to the barn or woodshed; he takes the wagon home and the insects have fallen from the tree to the wagon, and maybe he has at home a tree that is part shelter and part barn and part wagon house and he leaves the wagon there and that section of country is infested; and as long as the towns persist in making a breeding place of the yards to infest the whole State of California, just so long will we have it. That point can not be too markedly expressed. Every one in the State of California is interested in this fruit industry. Every one who lives in the town has as much interest as the person who lives in the country, and far more so, because just as soon as you wipe out the industry your town will shrivel up. Now, that paper should be well circulated. It would have this effect: it would stimulate the Horticultural Commissioner in his own neighborhood, of course. It would show the right side of the question to the people who always object to your coming into the yard and expressing dislike for the manner in which they are protecting the insects.

MR. FEMMONS. If it is in order for just a few remarks, I feel like trying to say something. In our mountain section, and I presume it is so all over California, we have a number of different species of native white fly. I have been watching their work, not in a scientific way, for years, and from that observation I think I can understand something of the difficulties that you have in fighting this pest here.

For instance, we have one species of the white fly that attacks our common chaparral bush; another, perhaps, of the manzanita. It is very prevalent on the California laurel. You take hold of a bush of the laurel, particularly, and of the other species where you will see them sticking to the leaves, and give it a little shake and the white fly will come out like a cloud. In one particular location that I know, it is very prevalent; along the road and the stage line to Yosemite the chaparral brush has been dying and is almost gone. It is a demonstration of what that particular insect will do, small and insignificant as it is, and when it gets into our orchards—that is, the species that attacks our citrus fruits—it is almost impossible, in my estimation, to eradicate it, at least in any reasonable time, and particularly under the labor trouble. But in that paper, if I caught the words aright, it appears to me that those trees in our yards about the town, wherever they are situated, that perhaps have been planted by some hand that has passed away, are the most difficult to handle. It hurts to see them mutilated, as I see one out there now, yet it is throwing out new life, it shows vitality in that tree—still, that sentiment is going to be one of the hardest to be combated. Those trees seem almost like the touch of a beloved hand or the sound of a voice that is still. You go into some yards where people have that sentiment, that heart, that soul connection with those trees, and you can scarcely bear to see them mutilated as those are. But necessity is behind it all, and, judging from our native species of *Aleyrodes* and the effect they have on the native shrubbery, that necessity stands face to face with our people of California and the pest must be eradicated if it is possible. (Applause.)

MR. MILLS. I have been very much struck with the remarks of the gentleman who has just sat down. He made a remark which is exactly true, that he has no hope of effectually eradicating the pests we have. I doubt very much if we will ever be able to eradicate the pests we have from the trees of our State. We have many pests in the south, we are fighting them, we are making a winning fight—that is, we are keeping them under subjection, in order that we may be able to make a living and a little more. You are interested with us. We admire immensely the self-sacrifice that has been made in this town and which will be made at Oroville. We in the south are willing to make the same. We have pests there you do not want here, the purple scale and the black scale and the red scale and others. You have got some of them, but not to the extent we have. While we are fighting to keep under the pests we have, we must fight to keep out the pests we have not. This pest here we are very fearful of in the south, for we have thirty millions of income that it could destroy, had we not money and energy and faith to combat it. You have started in splendidly. But there are other pests; the Morelos worm threatens us on the south. People coming from Mexico can bring it in from Nogales without any hindrance. There is the fruit fly, worse than the one we have, that is in foreign lands. Quarantine is the thing we want to put up to our legislators. I think we have the measly sum of about $7,000 for this work in this State, whereas our citrus industry gives us thirty millions of dollars, and the grower of citrus fruit is not the only one benefited thereby. It was well said here yesterday by the flowery orator, John P. Irish, that the blocks of the cities first originate in the blush of the fruit. It is true. We dig them out of the soil and give you the money to rear your magnificent blocks, even in this new building of San Francisco. The agriculturist, the horticulturist, is the man on whose shoulders you citizens in this State are dependent for your welfare. We are asking that you provide us quarantine. Shall we not get for the green fruit and the citrus, for the great interests of the truck farmer and the grain farmer—shall we not have sufficient money and sufficient men like this man who read the paper and this man who presides over us—shall we not have all of them to protect us from the pests we have and those we have not.

There is a paper—it is not on the program; I think it ought to be read at this time—written by a man who of all others knows well whereof he speaks, and I wish you would hear him. Mr. Cundiff of Riverside has prepared a paper on this question of quarantine, and inasmuch as we have the time I think it would be wise for us not only to hear it, but we should call upon the Legislature to give us, not only $7,000, but $700,000, if we need it, to protect those interests from which the life, the religious life, the family life, the social life, all the life comes. Shall we not go to the Legislature this coming year and demand—and I do not think we will have to shout very loud—to get $50,000 or $100,000 or $250,000 to protect all the orchards of this State from the incoming pests from every corner of the world? In the mountains this year I saw the beautiful spruces going down by acres, miles and miles of them beyond saving, but if we can save our orange groves and our lemon groves and deciduous groves and all our truck farms through the efforts of these men, rightly assisted, we shall live and prosper, but not otherwise. (Applause.)

THE CHAIRMAN. Mr. Ehrhorn has a paper that is technical, but it is touching a point that is of interest to all of us.

PRESENT STATUS OF PARASITISM.

By E. M. EHRHORN, of San Francisco.

In the course of the ages through which this world has passed, there has been a constant struggle for supremacy among animals and plants, a struggle for the survival of the fittest, and out of this contest there has grown a certain fixed ratio between all existing life. This ratio is especially marked in the animal kingdom, in the class Insecta, which predominates to such an extent as to represent four fifths of this kingdom, and, were it not for a counter check through insect parasitism, vegetation, which is now seriously damaged, might be wholly destroyed. The struggle for supremacy is continually going on in both the vegetable and the animal kingdoms, and plants are struggling among themselves, the lower forms generally trying to outdo the higher forms. Animals are constantly arrayed against one another in the struggle for existence, and the class Insecta, especially, takes a delight in attacking members of its own class.

We note, then, that there exists a wonderful law, which seems to guide all life, and we find that by this law all enemies of plant and animal life are constantly controlled. This is the ideal natural condition before man interferes and causes a break in Nature's chain of consequences by the planting of large areas of orchards, vineyards, grain fields, and so forth, or by the importation of pests from other countries. We thus find a complete disarrangement of the natural order, which generally ends in great loss and damage to our industries.

We are told that the losses caused by insect attacks on agricultural products exceed the entire expenditures of our national government, and that the value of these products, despite this fact, amounts to about five billions of dollars, the average loss caused by insects being estimated at five hundred million dollars. To all this must be added the annual expenditure employed in fighting insect pests by artificial means to enable us to save a portion of the crop. Huge as is this annual loss, it would undoubtedly be much greater if the pests were left unchecked. A great portion of the successful saving of crops can be attributed to the strides made in applied entomology within the last half century, including in this branch the ever-growing experiment in insect parasitism.

Insect parasitism has been known for a long time. Many a collector of butterflies has been greatly disappointed, after patiently waiting to rear some rare moth from his breeding cage, only to find a collection of small parasites clinging to the sides of the cage, while all that remained for him was the empty chrysalis with a few exit-holes from which had escaped the hiding foe.

It is within the last twenty years that insect parasitism has been taken up as an economic adjunct to agriculture. The outbreak of *Icerya purchasi*, the cottony cushion scale, in California, and the knowledge of the existence of its natural enemies in its native land, Australia, started one of the most interesting and most successful experiments of insect control by insect parasitism ever recorded in the world. No fruit-grower of California who had any interest in horticulture, in the days of the *Icerya* plague, need be reminded of the anxiety which then prevailed all over the State lest the terrible white scale should forever destroy our beautiful orange groves.

This is an instance where natural conditions had been changed by man. A prolific insect had been brought by a fancier into this country on some plant from a foreign country, where it had been kept in control by its natural enemies; but, unfortunately, these were left behind. The pest, not being checked, multiplied rapidly, and soon a great struggle began between it and plant life and great loss and expense were the result. To restore the balance of nature we had to introduce the enemy from its natural home; and under conditions as favorable as in its native land, we soon succeeded in establishing a check so complete that now we find the pest at rare intervals and in small colonies, invariably followed up by its ever persistent enemy, *Vedalia cardinalis.*

This remarkable epoch-making experiment in economic entomology aroused the scientific world, and all eyes were turned toward California, for it was she who, after spending hundreds of thousands of dollars, had conquered a terrible pest, which threatened to destroy her citrus industry, producing to-day over $30,000,000 annually.

Having succeeded with this remarkable experiment and finding ourselves interested in this work, we continued the search for enemies of our various other pests, since which time several expeditions have been undertaken in the endeavor to find, first the home of the pest and then the true parasite of it.

It is a well-known fact that all insects have certain enemies which prey upon them, either predaceous (those which live externally and generally devour the host), or parasitic (those which are generally found inclosed in the body of the insect or in its covering.) Of the first class we have a host of individuals in the various orders. Paramount among these are the ladybirds (Coccinellidæ), to which belongs the *Vedalia cardinalis,* and which are the important enemies of plant lice and scale insects. Among other orders we have the larvæ and adults of many beetles, the larvæ of the lace-wing flies, and those of the Diptera, the syrphus flies. All these attack other insects, each selecting the particular family it can master, the Carabid beetle anxious to devour the large cut-worm, the lace-wing and the syrphus flies ever ready to suck the juices of the tender plant lice. They all have their favorites and all are hearty eaters. Whenever a pest becomes abundant it at once means that some favorable condition for the propagation of its enemies is at hand. These shortly appear on the scene, and although at first few in number, soon deposit eggs, which quickly hatch into larvæ, some of which are very minute and are often overlooked; these begin to feed, molting at intervals, and we soon notice the very odd but striking forms of the pupæ resting on the leaves, the battlefield as it were, surrounded by the empty skins of the pest. In a short time there appears from the pupa the adult, which continues the good work as did the last generation.

The parasitic insects include the great orders of Hymenoptera and Diptera. The first contains probably the greatest number of true parasites and presents without question the most remarkable phases of insect parasitism. Roughly speaking there are about 30,000 Hymenoptera described. Probably this number could be greatly enlarged, and no doubt will be, as there are discovered every year many species which are new to science. We shall no doubt be able to multiply the present number by ten, and this will give a rough estimate of what we may expect in the parasitic group. It is in this order that we hope for great relief in insect parasitism.

Some of the smaller species of ichneumons and chalcid flies are very prolific, and among the records we can find instances where, from one host, a cabbage plusia, one of the cut-worms, over 2,500 individual parasites were reared. In our own State we find that the *Comys fusca,* the parasite of the apricot scale, has parasitized from 85 to 95 per cent of the scales in some of the infested orchards.

Many of the parasites have different habits; some attack the eggs of insects, some the larvæ, some the pupæ, and some species carry off the adults and store them in well-prepared nests, where, when sufficient food has been provided for the offspring, the egg is laid among the stored individuals. Probably the most interesting workers, and those which do not seem to mind the close observer, are the aphis parasites, the Braconids. It is a most wonderful study for any lover of nature to observe these little parasites make an attack on a plant louse. They are ever on the move and seem to be able to tell whether the aphis has been already attacked. When this is decided, the Braconid brings its abdomen under its thorax, takes aim at the aphis, and with a sudden, quick motion, thrusts its egg into the body of the host-to-be, and is then ready for another. Many of you have noticed the dead, light-brown, swollen bodies of plant lice on the leaves of the cabbage and other plants. These contain parasites and, if closely watched, one will soon notice a small hole in the body of the louse. This is the exit hole from which the parasite has escaped.

Some of our common caterpillars are attacked by ichneumons, and we find that after spinning the cocoon they remain unchanged instead of continuing their metamorphosis and there appear a number of smaller cocoons, which in time produce the adult ichneumon parasites.

Among the Diptera, the true flies, we have the tachnids, which are true internal parasites. The adult deposits its eggs on the caterpillar and the young maggot when hatched enters the body and begins to feed. The victim soon looks sickly and is hardly able to spin a cocoon. After completely devouring the contents of the host, the larvæ, for there are generally several, are full grown and work their way out of the body wall and fall to the ground, where they pupate and remain during the winter.

As stated above, the beginning of insect parasitism in California started in the year 1888, when, disheartened by enormous expenses and the great reduction of crops, the growers caused the search to be made for the natural enemy of the cottony cushion scale, which resulted so successfully and made *Vedalia* the shibboleth of insect parasitism. Unfortunately, this ladybird feeds only on the cottony cushion scale, and we had to search for other species to help reduce our other pests. We soon received, through the diligent search of our collector, many species of ladybirds, some of which proved a great help toward the reduction of our insect enemies. One species, in particular, which has done much to reduce the olive scale in several coast counties, is the black ladybird, *Rhizobius ventralis.* It increased with wonderful rapidity and the scale was greatly reduced. This species likes a cool, moist climate, and wherever introduced under such conditions, gives good results.

Great efforts have been made for the discovery of a parasite for the red scale, *Chrysomphalus aurantii.* This is by far the worst enemy of our citrus industry. Several species of ladybirds have been introduced to prey upon it, and one especially gave promise of becoming a great helper, but I know of few instances where it can be found, and as it did not take hold of the pest as was expected, it can not be counted for much. I refer here to the steel-blue ladybird, *Orcus chalybeus.*

Another species which does much good and is a general feeder, attacking the San José scale and many other armored scales, is the brown-necked scymnus, *Rhizobius lopantha.* This species has been in California for a long time and has a good record. It is ever on the hunt for scale insects and does excellent work on the purple scale, *Lepidosaphes beckii.* I may also mention with the above, *Rhizobius debilis,* which also is a general feeder, and is generally distributed over the State. Both insects are rather small ladybirds.

A species which gave great promise in the eradication of the black scale, on account of its good work in its native land, is a steel-blue species, with red spots, *Orcus australasiae.* Large colonies of this have been liberated in the State, and for a time we could find them in the olive orchards, but I have not seen or heard of any within the last few years and it has probably died out.

Probably the parasite whose work comes nearest to that of the *Vedalia cardinalis* is the *Scutellista cyanea,* the African parasite of the black scale. This parasite in the larval state feeds on the eggs of the scale, which are deposited under it. The small, white, maggot-like larvæ can be easily found in any orchard in the coast counties of our State when the scale contains the eggs. Unfortunately, this species does not thrive in the hotter valleys, and this is probably due to the fact that the scale brood is what is called an even brood, that is to say, all scale insects mature at the same time, that egg laying is uniform, and that these conditions leave no food for future generations of the parasite. We also find that in some seasons the work of this parasite is greatly reduced, and from general observations we have found that cold, wet, spring weather, which does not retard the scale, will, on the other hand, do much to retard the breeding of the *Scutellista,* but where favorable conditions exist, we find its work as near complete as could be hoped for.

A very small parasite, which is to a certain extent a general feeder, is *Aspidiotophagus citrinus,* the yellow scale parasite. This is probably an introduced species, but when and how it came to California has not been ascertained. It might have been introduced at the same time with its host on nursery stock. For a long time this insect had been at work without having been noticed, but finally its good work was discovered in some groves which had not been sprayed. In various sections of the State to-day this species can be found reducing the scale considerably. It also has been reared from the San José scale and other species, and can be counted on as a great help to the grower.

In this connection, I will say that very often parasites have apparently disappeared and all hope of ever seeing them again been given up. As an illustration, I might mention the little parasitic fly of the cottony cushion scale, *Lestophonus iceryae.* This species was recorded by Crawford, of Adelaide, South Australia, as one of the enemies of this scale, and several endeavors were made by him to send the same to us; in fact, this was the parasite which Mr. Koebele was sent after. At the time of the introduction of the *Vedalia* we also received this fly, but the wonderful work of the *Vedalia* so overshadowed it that it was overlooked. It can be found in many places in southern California to-day, but being of small size and its habits rather obscure, it has not been noticed, but its good work is apparent.

Another Australian ladybird which is predaceous on the cottony cushion scale, and is close kin to the *Vedalia,* is *Novius koebele.* This species was quite abundant at one time and seemed to attack the scale on broom and laburnum better than did the *Vedalia.* I am sorry to say that it has not been observed for several years, yet it might suddenly reappear; but as the cottony cushion scale is generally found in such limited numbers, the ladybird will have a hard time to multiply.

An imported species which is the enemy of several species of mealy bugs is *Cryptolaemus montrouzieri.* This species has been tried in various sections of the State, but has not been successful everywhere. In the most southern portions of the State it can be found at times in numbers and has been doing good work, yet it has not been as satisfactory nor has it done the work of eradication with us as it has in the Hawaiian Islands on the coffee. There, it is claimed, it has practically freed the coffee plantations from the mealy bug. In confinement, with plenty of food, it does fairly well, and there must be some cause which prevents its becoming more numerous.

We are fortunate in receiving one of the smallest of the ladybirds, *Scymnus vagans,* from Australia, and this species is well established in the State. It is a remarkable species, feeding on the red spider (*Briobia pratensis*), and also on other members of this family. It loves the dry, hot climate, and in this it resembles its host.

Some three years ago search was made for the enemy of the codling moth (*Carpocapsa pomonella*); the effort was successful, and we received from Europe a parasite which was reported as doing effective work. The parasite, *Calliephialtes messor*, belongs to the ichneumons. It is quite a large insect and, when present, can be readily detected in the orchard. Many colonies of this parasite have been liberated in all the apple- and pear-growing sections of the State. After the second season we received encouraging reports of its work, and the insect had been observed in several sections on the wing. The season just past, however, has given us but little encouragement, for in sections where we expected to find the best results and where every chance had been given the parasite and no spraying done, the percentage of wormy apples was greater than in the previous years; but I may add that the codling moth has been more abundant all over the State, and the whole matter is a very puzzling problem. We can partly account for this failure. Our method of marketing our crops is somewhat different from that used in the country where this parasite was found. Here in California we harvest our apples, worms and all, and take them at once to our packing-houses or ship them into our markets, whereas in the orchards of southern Europe, we understand, the bulk of the fruit is left under the trees long enough to give the worms a chance to leave it and remain in the orchard. One can go through any of our orchards, after the crop has been gathered, and a diligent search of half a day will result in the finding of a very small number of worms. They are not there. But just go to the packing-house or fruit-drier, and look in the cracks of the floor, the wall, the picking-boxes, everywhere, and you will find the worms snugly hidden away, patiently waiting for spring to come. In other words, we are probably preventing this parasite from multiplying in our orchards because we are taking its food out of the orchards. In confinement we can raise them by thousands, and we find that in our cages very few worms escape the parasite. Here, then, is a great problem, a new phase as it were in insect parasitism—a willing insect with a limited food supply under natural conditions. Who can suggest a remedy?

California is very fortunate in having a great number of native parasites, which do much toward the reduction of her orchard pests. One of the most successful parasites, and one which has caused national comment, is *Comys fusca*, the parasite of the apricot scale (*Eulecanium armeniacum*). The parasite attacks several of our native scale insects of the same genus, and from these it has spread to the orchards, where it found a palatable food in the apricot scale. So efficient is this insect that as high as 95 per cent of the scale insects are killed by its attack. It is a true internal parasite; that is to say, the female thrusts her egg, and only one, into the body of a scale, and the larva of it devours the body tissue, leaving the body wall as a protection for the pupa. When ready to emerge as an adult, it eats its way through the top of the scale and leaves a small round hole in the derm. This is always a sure indication that the parasite is present in the orchard. This species also attacks the frosted scale (*Eulecanium pruinosum*).

Another species which does equally good on the soft orange scale, the small larvæ of the apricot scale, and the cottony maple scale, is *Coccophagus lecanii.* This is a very useful species, and has been used to great advantage where sudden outbreaks of some of the above species have occurred. It is readily transported in the host on branches and is very prolific, reducing the scale insects rapidly, the percentage often equaling that of the *Comys fusca.*

Another native species is *Tomocera californica,* one of our best parasites of the black scale. This species, like the *Scutellista,* is an egg parasite and its larva is readily found under the host among the delicate pink eggs, rapidly devouring them. It is rather unfortunate that this species is only two-brooded, and unaided it can not keep the pest entirely reduced; but, nevertheless, it is a very great help to the grower.

Attacking some of our armored scale insects, such as the San José scale (*Aspidiotus perniciosus*), the greedy scale (*A. rapax*), the red scale (*Chrysomphalus aurantii*), and others, we are fortunate in having several minute species, probably native, and all belong to the Aphelinidæ. Among these, *Aphelinus fuscipennis, A. diaspidis,* and *A. mytilaspidis* are worth mentioning, as these three species are at times so prolific that some of the commoner scales are nearly, if not quite, exterminated. Especially is this the case when climatic conditions have been unusually favorable to the parasites.

A species which does much in reducing the soft orange scale (*Coccus hesperidum*), and also some of the half-grown Lecaniums, is *Encyrtus flavus,* one of our common parasites and found in nearly every locality in the State.

A very efficient parasite of the cabbage butterfly is *Pteromalus puparum,* which is also widely distributed over the entire State. So prolific is this insect that in some sections cabbage-growing is not molested by the attack of the cabbage-worm. This parasite is found in many sections of the United States, where it is also known for its efficient work on this and other pests. It attacks the chrysalis, and as many as seventy-five individual parasites have been reared from one chrysalis.

We have several small Braconids which assist in keeping down the numerous species of plant lice, so destructive to our various crops. These, together with some of our aphis-eating ladybirds, have saved a good portion of the southern melon crop this season. They were established there in large quantities and the result was very noticeable.

Of our native ladybirds I may mention the following, which have done much in reducing many of our commoner scale insects and plant lice:

Every grower knows, or should know, the twice-stabbed ladybird

(*Chilocorus bivulnerus*). This little black friend, with its two bright red spots, is a conspicuous object in the early part of February on the scale-infested limbs of orchard trees, and later in the season the peculiar clustering of the spiny-looking pupæ on the under side of branches has often alarmed the grower, who thought he had discovered some terrible new pest, only to be consoled by the report of the entomologist that they are the very best friends he has. Without question, this ladybird has done wonders in reducing the armored scales of the deciduous orchards, the San José scale, the greedy scale, the pear diaspis, and the rose scale all being eagerly sought by it and all soon reduced below the danger limit by its untiring attack.

Closely resembling the twice-stabbed ladybird is a larger species, *Exochomus pilatei,* generally known as Pilate's ladybird, which also has red spots. This species feeds on the young of the black scale and is very abundant in the olive orchards of the coast counties.

Among the aphis-eating ladybirds we have four very efficient species, the blood red ladybird (*Coccinella sanguinea*), the California ladybird (*C. californica*), the convergent ladybird (*Hippodamia convergens*), and the ambiguous ladybird (*H. ambigua*). All these species are, strictly speaking, aphis-feeders, and have done much in reducing sudden outbreaks of these pests by being transported to sections where they were destructive. They are ever busy, and on account of their bright color can easily be detected. I may mention that the *Hippodamia convergens* has the habit of hibernating near the watercourses in our mountain ranges and at this season of the year can be gathered by the bushel, as they delight in clustering like swarms of bees. Much good can be accomplished by collecting them in quantity and keeping them in a cool, dry place in tight boxes, with enough ventilation to prevent smothering during the winter. They can be liberated in spring when the first aphids make their appearance. This method has been tried in some of the big seed farms in the Santa Clara Valley, and in one season saved a large acreage of radish seed on which the aphids had started their work. The other species also cluster and hibernate in dried leaves under protected places and other material, but they are not usually found in such large colonies as *Hippodamia convergens.*

Another ladybird is the enemy of the cypress mealy bug (*Pseudococcus ryani*). This is *Hyperaspis lateralis.* It is so abundant at times that the pupæ, which are snow-white, give the tree a striking appearance. The species is a wonderful worker, and I think might be successfully used on the mealy bugs of our citrus groves. At least, it would be worth a trial.

Many of our native scale insects are severely attacked by chalcid flies. In the cedar forests we have a mealy bug which infests the red cedar and which becomes quite abundant at times and then suddenly disappears like magic. From this species I have reared two very efficient parasites, and they also might be induced to take hold of our orchard species.

Here we have a new phase of insect parasitism before us. As I have stated above, *Comys fusca,* parasitic on three of our native Lecaniums, took hold of the brown apricot scale, an imported pest, showing that some species of parasites already in our State might, through transporting, be made to attack some of the injurious pests of our orchards.

In the Eastern States there are many species of parasitic and predaceous insects which would be worthy of trial. This is especially true of the aphis-eating ladybirds, of which we can never have too many species. A complete record could be kept of localities where certain parasites are known to exist and supplies of these could be collected and distributed where they were most needed. One of the most promising features of insect parasitism to-day is this very phase of the work, the transportation of parasites from one locality to another. From our wild mustard, which is attacked by a common aphis, which in turn is attacked by a Braconid species, we have been able to gather large quantities of aphis-infested material from which millions of these Braconids were reared. These were taken to the melon fields and liberated, where there was plenty of work awaiting them. The growers claim that this work has saved their crop, which they valued at $100,000. The same kind of work can be carried on with other parasites. Very often our native shrubbery has a severe outbreak of scale or plant lice, and usually this is followed by a strong attack of parasites. Here again, material could be gathered and parasites reared and distributed where most needed. These same Braconids have saved the grain fields from destruction by the grain aphis (*Toxoptera graninum*), and I may mention in this connection that in the Western States, this last season, the grain crop was saved by the good work of these little fellows.

As an illustration of the work of some of our native parasites, I might mention the oak-moth caterpillar (*Phryganidia californica*). Those of you who live in the valley, where the live oak grows, especially in the bay counties, have observed the terrible destruction of the oaks by this pest. Fortunately for the oaks, this attack does not occur every year, and investigation has shown that the reason for this condition is that three distinct parasites, *Pimpla conquisitor, Chalcis ovata,* and *Hemiteles ashmeadii,* as well as a true bug, a Pentatomid, are keeping the pest in check. From a lot of pupæ of this species which I gathered in Santa Clara Valley, I reared 45 per cent of *Chalcis ovata,* besides a number of the other species. Yet, in off seasons, the prevalence of the pest would warrant the establishment of more parasites or the rearing and careful distribution of those mentioned above.

About fourteen species of *Hemiteles* are recorded in the United States as parasitic on some moth or butterfly. We can readily see that even here in our own country there are chances for investigation in the new phase of insect parasitism.

A very effective genus of this order is *Apanteles,* and there are no less than thirty-nine species recorded as being parasitic on Lepidoptera. If we had a few of these *Apanteles* species to aid our parasites, we would doubtless get some relief from the attacks of such pests as the oak-moth caterpillar.

Roughly speaking, there are about fifteen hundred species of ladybirds in the world, and by far the majority are enemies of scale insects and plant lice. Probably two hundred species belong to our country, leaving a great army of fighters to draw on, and it should be our policy to procure as many of these as we can, for all would aid in reducing our foes.

Having mentioned the parasites we have and which are doing much toward keeping our pests below the danger limit, I may mention some of our pests for which we have no efficient parasites as yet.

The vine-hopper (*Typhlocyba comes*) has caused much loss at times to the raisin men of our State, and only by clean culture or through climatic conditions have we been able to make profits. The right parasite would give great relief to the grape industry and would cause great rejoicing among the growers.

The peach-root borer (*Sanninoidea opalescens*), which is only found in a few counties of our State, is supposed to be a native insect, but in the orchards we have not yet found any parasites attacking it. This species was first found in the Sierras, and its natural food plant is probably our wild plum or cherry, and if we should find it in its native food we would no doubt find its parasite.

The cherry slug (*Eriocampoides limacina*) is a very serious pest of the pear and cherry, and should be easily kept in check by parasites, as the slug, or larva, is always exposed on the upper side of the leaf, and is therefore very accessible to an attack. A very effective parasite is known to exist in New Zealand and it would not take much to get it here.

The pear thrips (*Euthrips pyri*) is another very serious pest of the deciduous orchards and a very hard insect to combat on account of its hiding habits. It has been in the State but a few years; where it came from nobody knows, but from its habits there is a possible chance that it was brought from France with the Myrobolan seedlings. Much loss has been experienced by the prune-growers of the Santa Clara Valley, where it first made its appearance. An efficient parasite would mean much for the future welfare of the industry.

Mealy Bugs: Under this head may be included the two species generally found in the State and which have of late caused much anxiety among the citrus growers. As stated on a previous page, we have not found a reliable parasite for these pests, but we have one in view in the Hawaiian Islands which belongs to the true flies and is about the size of our *Scutellista.*

Two other scale insects, which so far are without reliable parasites, are the purple scale and the red scale of the orange. The last sendings which were received by the State Commissioner were carefully propagated and were distributed under the most favorable conditions with an unlimited food supply, and yet, after nearly a year's waiting, we are unable to find much progress in the work of reduction. Scattering widely, as these parasites do, it may be a year yet before their presence is made manifest; we must not wait too long, however, but continue our search for other parasites, until we find the one which, with all the others, will be able to keep these two pests below the danger line.

The black peach aphis is an introduced Eastern pest, and in some sections has done considerable damage to the peach orchards. We don't know of any parasite which will keep this pest in check. We might be able to find some ladybird which will take hold of it.

The Hessian fly (*Cecidomyia destructor*) at times causes great damage to the growing grain of California, and only for the burning of the stubble and for the practice of the rotation of crops it would considerably shorten the output. Several years ago the Division of Entomology, U. S. Department of Agriculture, imported a parasite from England, *Entedon epigonus.* It might be possible to procure this same insect and liberate it in some of the infested valleys.

At times our tent caterpillars and canker-worms become unusually abundant and do great damage. As there are so many species of parasites which attack this class of insects we should endeavor to introduce those which might help to decrease them.

Tussock moth (*Hemerocampa vetusta*) abounds in some of the fruit sections of our State and does much damage, especially in the apple orchards. We have a few parasites, especially an egg parasite, *Telenomus californicus*, which helps to reduce its numbers; but there are several parasites which attack the Eastern species, *H. leucostigma,* and these would be an additional help toward keeping our species below the danger limit.

We can hardly expect that all imported parasites will take hold in our State, and if we succeed in getting one good parasite out of every ten, it will pay us to keep up the search. I understand that the cost of going after the *Vedalia* amounts to about $1,500, and if we consider for a moment the enormous value of the citrus industry and what this and the deciduous fruit industry have done to build up California, I think you will agree with me that if we had spent $150,000 we would yet be much ahead of the game. Since the advent of the *Vedalia* in 1888, this State has spent about $50,000 in the search for parasites of our various pests. In my estimation it is a very paltry sum for the industry which we represent; but as long as the farmer and fruit-grower, who really are the interested parties, will not take hold of these vital questions, we shall have to continue our search in a small way.

If the grower who pays taxes for every tree and vine he plants will only realize that it is he who is helping to build up the State, and that it is he who is bringing the revenue to his county and indirectly to the State treasury, by converting barren wastes into groves of luscious fruits, it ought to dawn upon him that he is entitled to some consideration at least, and I think if he will make his demands known, especially through coöperative movements, whether by the formation of farmers' clubs, protective leagues, granges, fruit-growers' associations and the like, or by other means, these important matters will be brought to a focus. I believe the day will soon be at hand when the farmer and fruit-grower can get all necessary things vital to the upbuilding of the fruit industry, including the search for and propagation of parasites on a much larger scale than we have to-day.

Mr. A. N. Judd in the chair.

MR. MILLS. I move you that this paper which Mr. Ehrhorn has just read be referred to the Committee on Resolutions, with instructions to present a resolution this evening to a fuller house, touching the necessity of appropriations for securing parasites.

The motion was duly seconded and carried.

THE CHAIRMAN. We will now listen to Mr. Cundiff's paper.

MR. CUNDIFF. Mr. Chairman, Ladies and Gentlemen: I regret very much that the party to whom this subject was originally assigned is not able to be with you and was not able to prepare the paper, because I am quite sure that he could have done greater justice to it than I; but at the last moment, almost, before leaving I was requested to present something on the quarantine aspect of our fruit interests, and I hope to be able to get it before the meeting in a very brief way.

QUARANTINE LAWS AND THEIR RELATION TO OUR HORTICULTURAL INTERESTS.

By R. P. CUNDIFF, of Riverside.

The enactment of laws for the protection of our horticultural interests against insect pests and plant diseases had its inception in California. The first legislation of this kind was enacted by our State Legislature in 1881. Prior to this time, little attention had been given to the enemies of fruit culture, partly from the fact that horticulture in our State was practically in its infancy, but mainly due to a lack of scientific knowledge of the enemies of horticulture. As a result, it is not surprising that California should have introduced some very injurious pests.

The first horticultural laws enacted in this State were mainly designed to prevent the introduction of insect pests, plant diseases, etc., on nursery stock and fruits coming into the port of San Francisco. In 1883 the law was amended by providing for a State Board of Horticulture, consisting of nine members, who were appointed by the Governor. This board served without compensation, except a per diem during their attendance at the annual or semi-annual meetings. In 1889 the law was again amended, making it mandatory upon County Boards of Supervisors, upon a petition signed by a certain number of owners of orchards, to appoint a County Board of Horticulture, consisting of three members. The law was again amended in 1903, creating the office of State Commissioner of Horticulture.

Thus it will be seen that our State, through its Legislature, has always shown a friendly interest in what is to-day our leading industry. Every change in the original law of 1881 has been in the nature of an improvement and has shown a commendable desire upon the part of our lawmakers to give every needed encouragement and protection to our fruit interests.

Unfortunately, a number of serious insect pests had gained entrance and had become firmly established before any preventive legislation was enacted. Such destructive scale pests as the red, cottony cushion, San José, and purple, as well as a number of other injurious insects and plant diseases, had become quite firmly established throughout some of the fruit-growing sections of our State before any quarantine laws were in operation. Had the importance of these preventive measures been properly understood by our horticulturists and the necessary quarantine restrictions enacted ten or fifteen years prior to the law of 1881, there is little doubt that the introduction of many of the fruit pests that are costing large sums of money to combat would have been prevented.

But for the strict quarantine regulations maintained at San Francisco and other ports of entry of our State, it would certainly be but a short time before many other injurious pests would gain admission. Our ever increasing commercial relations with Oriental and tropical countries, where insect life is abundant and destructive, would soon add greatly to the burdens of our fruit-growers and farmers, by the introduction of other insect pests and plant diseases.

The estimated damage to agricultural and horticultural products, timber, etc., in the United States, by injurious insects and plant diseases, for the year 1904, according to the report of the U. S. Department of Agriculture, reached the enormous total of over six hundred million dollars—a sum nearly equal to the entire expense of running the Federal Government for the same year.

The injurious insects affecting agriculture, timber, etc., in the United States, already number more than six hundred species, and new ones are continually being imported from other countries.

Is it not time that we should demand, through our representatives in Congress, a Federal quarantine law, to protect our country from this unrestricted importation of destructive enemies to our agricultural interests? It is estimated by competent entomologists that at least eighty per cent of the injurious insects of our country were imported, leaving but twenty per cent as native insects. If a national quarantine law had been enacted and properly enforced fifty years ago, it is probable that few of these injurious pests would have been introduced into our country.

It may be assumed by some that we already have all of the worst pests established in the United States. This can easily be proved to be a mistake. The eminent entomologist, T. D. A. Cockrell, in referring to injurious insects not yet reported in the United States, names seventeen varieties of scale insects affecting the citrus, eight affecting the apple, pear, and plum, seven affecting the grapevine, five the mulberry, seven the olive, three the cotton plant, and six the sugar cane. The above list is composed of scale insects and classed as extremely destructive. Professor Cockrell states that any of these pests are liable to be introduced into the United States at any time, unless a very effective system of quarantine is maintained. In addition to this list of scale insects, liable to be introduced at any time, can be added the Morelos orange maggot of Mexico, the melon maggot of the Hawaiian Islands, the Mediterranean fruit flies from Australia, as well as many other injurious insects and plant diseases.

What would it have been worth to the great pear districts of the San Joaquin and Sacramento valleys if the pear blight could have been kept out? This disease was undoubtedly introduced in shipments of nursery stock from some of the Eastern States.

Should the disease known as peach yellows become established in our State, the same sad fate would befall our peach orchards. During the summer of 1890 the writer made a trip through what had been the greatest peach-producing district of the United States, the State of Maryland. A few years before, the yellows had made its appearance in that district and the dead stumps covering hundreds of acres of what had once been the most productive and profitable peach section were the only sad sentinels left of this once famous peach district.

During our thirteen years of service on the horticultural commission of our county we have come to know and thoroughly appreciate the great value of a rigid enforcement of quarantine regulations for the protection of our fruit interests. The pests we keep out can do us no harm. The old adage, "an ounce of prevention is worth a pound of cure," can be applied with a tenfold greater meaning to protecting our fruit interests. No insect pest, once thoroughly established, can ever be eradicated by any artificial methods such as fumigation, spraying, etc. We are, however, compelled to resort to these expensive methods to prevent loss of fruit and destruction of trees.

Where we have been fortunate in securing nature's checks in the way of predaceous insects and internal parasites our burdens have been considerably lessened.

The State quarantine office maintained at San Francisco, under the supervision of the State Commissioner of Horticulture, is doing a great work in the way of preventing the further introduction of dangerous insect pests and plant diseases. While we thoroughly appreciate this most valuable work of the State Commissioner, we realize that it is only through a thorough and complete coöperation with the County Boards of Horticulture that the greatest benefits can be derived.

It is certainly an injustice to hold the State Commissioner responsible for the introduction and spread of fruit pests over our State, unless he is provided with the proper authority to compel the necessary precautions to be observed by the county horticultural officials. We believe the State Commissioner should exercise a general supervision over the appointments of county horticultural officials. We are all aware of the fact that quite a number of fruit-growing counties of the State have neglected or refused to appoint horticultural commissions. Other counties through their Supervisors have appointed to these positions men who were utterly devoid of any experience or other qualifications for the work, but merely as political or personal rewards. Again, other counties have appointed efficient men, but have curtailed their expenditures to such an extent that it was impossible for them to do effective work. These abuses should be promptly remedied. A very general sentiment appears to exist among the growers to have the present horticultural law amended to provide for a County Commissioner of Horticulture instead of a board of three, as at present exists. We believe that such a change would be of great benefit and should result in a greatly increased efficiency over the present system. By limiting the commission to one man we believe some of the present political features would be eliminated. Especially would this be true if the law should compel the applicant to secure from the State Commissioner a certificate as to his fitness for the position before receiving the appointment from his county. Such a law should insure the appointment of competent men. The law should also provide that in case such commissioner proved to be incompetent or careless in the discharge of his duties he should be removed, upon the request, in writing, from the State Commissioner, presented at any meeting of the Board of Supervisors of his county. The appointment should be made for a term of four years, subject to the present provisions of removal for cause. The compensation should be changed from a per diem to a monthly salary. The salary should be regulated by the extent or importance of the horticultural interests of each county and incorporated in the county government act of any county appointing such commissioner. The commissioner should have authority to appoint such assistants as the demands of his department required.

We are convinced that such a change in our horticultural law would secure a much more efficient service than is possible under the present system.

Our horticultural interests far exceed those of any other state in the Union, and surely an industry producing an annual income of more than $60,000,000 should be entitled to the greatest possible protection.

MR. MILLS. I move you that this paper be referred to a committee composed of the chairman, Mr. S. A. Pease of San Bernardino, and Mr. Cundiff, to draft a resolution along the lines therein set forth, the committee to hand the resolution to the Committee on Resolutions, to be presented to-night.

The motion was duly seconded and carried.

THE CHAIRMAN. The next paper on the program is a composite one and has been contributed by the different Inspectors of Los Angeles County. Each of these men is an expert in the matter he handles, and all have had a wide experience in fighting scale and other pests, and I have no doubt that this will prove one of the most valuable of the papers presented this morning. Mr. Secretary, will you please read the paper?

ORCHARD PESTS, AND THEIR TREATMENT.

By the Los Angeles Inspectors.

RED AND YELLOW SCALES.

All citrus fruit trees are subject to red scale infection. Lemon and grapefruit, however, seem to be the ones most preferred by this scale insect, and the lemon tree or orchard is usually the center of the red scale infection of a district. We have no parasitic insects that in any degree control this scale, and for this reason are obliged to depend upon spraying or fumigation for control or eradication. In parasitical experience spraying has been proven a failure. The result of continued spraying for successive years has been a gradual increase and spread of the red scale infection.

The hydrocyanic acid gas treatment has been the most successful.

The dosage for red scale is usually from one third to one half more than for black scale, the tents to be kept on the trees one hour. Where thorough work is contemplated for the eradication of the scale, the dosage should be double that for black scale and the tents should remain on the trees one hour and a quarter, using three and one half parts of water to one of cyanide. All low-hanging limbs touching the ground should be removed and all drop fruit on the ground should be destroyed, as near the ground the gas is not so effective.

The red scale is always in condition for treatment, but the treatment is usually timed to include the black scale. With ordinary dosage thousands of the scale in all stages will be destroyed on a tree, but for reasons we can not explain an occasional scale escapes the treatment and furnishes the basis for future infection. On account of this result the double dosage and extended time of covering are recommended for thorough work.

Yellow Scale.—Yellow scale very much resembles the red species, but differs in color and habit. The red scale infests the fruit, foliage, and wood, even to the old wood of the tree. The yellow scale infests the fruit and foliage only; specimens of this scale are not commonly found on the wood. The yellow scale largely infests the seedling orange tree, and we find there the heaviest infestation. Another fact that seems to emphasize the correctness of the belief that the yellow scale is a distinct species from the red scale is the fact that the Golden chalcid fly and other parasitic insects keep the yellow scale under fair control, in most cases treatment not being especially required for this scale, but occasionally treatment is required when the parasite enemies temporarily fail to hold it in check. In such cases the same treatment is to be recommended as for red scale.

The yellow scale seems to be fully as hard a scale to destroy by spraying or gasing as the red.

C. A. DAY.

LIFE AND HABITS OF PURPLE SCALE.

The life of this scale varies from 75 days in summer to 120 days in winter.

The female scale begins to deposit eggs at the age of 40 days. The number varies from 25 to 27 eggs. Then her life is ended. The period between the time the eggs are deposited and time of hatching is controlled by weather conditions and may be from 35 to 70 days.

Continued warm weather hastens their growing life and shortens the time of incubation of eggs. Cold weather has a reverse effect, not so much in growing life as in time of egg incubation.

This scale produces four broods during the year, the hatching of which is governed to such an extent by the weather conditions that it would be difficult to determine within 15 or 20 days of the time hatches take place. The general hatches occur from April 15 to May 15, June 15 to July 15, August 15 to September 15. These times vary as the weather varies.

The habits of this scale confine it strictly to citrus trees. They prefer the most sheltered part of the tree, or the side that gets the least sun.

The injurious effect on the trees is very marked. The feeding of the scale on the leaves and branches has a poisonous effect, causing the badly infested branches to die, especially after the colony has become very numerous, as it surely will if not checked.

While this scale is slow to breed as compared with some, a large percentage of them mature. There are but few known parasites that prey upon them. This scale thrives and flourishes best near the coast. Heat and a dry atmosphere, like the summer weather in the San Joaquin Valley, soon destroy them.

From numerous experiments conducted by the Horticultural Commission and Inspectors of Los Angeles County, made within the last eighteen months, we find it is possible to destroy the purple scale in all stages by fumigation with heavy doses of hydrocyanic acid gas, and as this scale is confined to citrus trees only, it is possible to make a complete extermination of them.

WM. WOOD.

QUARANTINE.

The inadequacy of the present law, in regard to a proper protection against the introduction of pests dangerous to our fruit and plant interests, can not be more forcibly illustrated than by calling attention to the various points in our State that have recently been ravaged by the white fly (*Aleyrodes citri*).

The failure on the part of the authorities to provide effective quarantine in these as well as other portions of the State has made it possible for the introduction and spread of this most dangerous of insect plagues.

The inefficiency of the postal laws governing the transmission of plants and trees through the mail is the most serious drawback to proper control with which we have to contend; the rules laid down for the sending of immoral matter, letters with fraudulent intent, or for blackmailing purposes are exceedingly effective. This would seem to establish the fact that when the moral or material welfare of the people is threatened the law is sufficiently elastic to govern in the premises. However that may be, under the present conditions an inexperienced or careless nurseryman from any part of the United States may send the most dangerous of scale or other infested plants and trees to any point with impunity, where they by diffusion could work ruin to many of the great industries of the State, despite the Boards of Horticulture or local laws.

Los Angeles County, through the persistency of its Horticultural Board, has been enabled to enlist the coöperation of the railroads and express companies in the work of excluding injurious insects and plant diseases, and by systematic and continued insistence has obtained control of every shipment of freight or express matter appertaining to plants or trees that comes into the county, and every such consignment before it is allowed to be delivered undergoes a thorough and intelligent examination by competent and experienced inspectors, thus insuring absolute freedom from plant disease. Our city to a great extent is a gateway to possible infections, and more particularly so from the fact that of recent years there has been a great influx of wealthy people who are creating fine gardens and filling them with rare and costly plants from every quarter of the globe, making the closest scrutiny a necessity because of the greater extent of territory from which infectious plants are brought.

It is claimed that the postal laws are sufficient to cover the point aimed at, namely, making it the duty of all postmasters to inform the County Board of Horticulture, or its inspectors, of the arrival of mail containing plants or trees, and holding the same until they have been inspected; but at best the law on the subject is ambiguous, and only by questionable procedure can it be construed so as to meet the requirements. An amendment to the quarantine laws should be submitted making it imperative that postmasters should notify the horticultural representatives of the arrival of mail from a quarantined locality before its delivery to the consignee. The attention of our representatives in Congress should be called to the matter and their active coöperation enlisted.

That the subject of quarantine is of paramount importance has been demonstrated in Los Angeles County beyond a reasonable doubt. For three years the officers of the Board of Horticulture have been destroying plants from Florida, Louisiana, and other dangerously infested localities, all of which were found to be more or less infested. Many of these consignments were of considerable value, one of them estimated to be worth $100; but the Board insisted on their destruction, and they went up in smoke. To this rigid adherence to the rules is ascribed our present immunity from the white fly.

E. J. NILES.

CITY INSPECTORS.

In the assignment of topics given to the various members of the Los Angeles County horticultural force, the woes of the Los Angeles city inspector was allotted to me, and if the trials and tribulations of a number of years' experience are to be considered, and that qualification alone, the task has been placed properly.

We have it arranged with the three railroad transportation companies, also with both electric roads and Wells, Fargo & Co., not to deliver to any consignee plants or trees without a release from the Horticultural Commissioner, and either before or at once after said release they are carefully examined for any possible insect pest or disease.

If these plants or trees show to have been sent from a section under the ban of our quarantine regulations, the plants are sent at once to the office of the Horticultural Commission, where summary action is taken, the same being as a rule perfect incineration in the court-house furnace. If the shipment consists of trees from any objectionable portion of the State or from other states, they are closely examined and treated according as scale or disease may manifest itself—sometimes by fire, sometimes by fumigation.

The chief source of dangerous importation of dreaded insect pests is by means of United States mail service. This latter source of conveyance may baffle our most diligent and careful attention, from the inborn perversity of some person, or the want of a full appreciation by the importer of the probable loss and injury to our fruit interest, by even one small lot of plants from a Florida nursery infested with the dreaded white fly. Thus far, I believe, only one lot of plants by mail from Florida has gotten away from us, and that one has been under constant surveillance during three years. All the others, six or more, were destroyed. There have been a number by express, but these have always been carefully inspected. Every lot and parcel of trees and plants are inspected on arrival in the city, also reinspected before they can be shipped away again. This course is always followed between any two of our inspectors if in different portions of the county. With all this watchfulness it can readily be understood that we are always fearful that something will escape our scrutiny.

The lover of the human race can not very well understand how any person can deliberately be the agent to work such trouble, loss, and injury as an infestation of the Florida white fly would cause our orchardists if a colony should once become thoroughly established, still we have continual proof that at least one nurseryman in Florida has sent scale-infested plants to this section, and if their present attitude is any evidence of their future intentions will continue to do so, and over the State, so long as they can find some one in California to patronize them.

To give additional weight to the city inspector's troubles, we have about 1,500 fruit and vegetable wagons, with fruit stands scattered at many points over an area of from ten to sixteen miles. If one of those should be found with scale-infested fruit the question at once arises, where are the inspector's eyes. To fully understand what is expected and required from him, let me also state that we have about forty nurseries and salesyards, with at least twenty of them controlled by Japanese, who are decidedly opposed to any effective means to clean their premises of scale pests. With these conditions existing, a certificate stating a shipment of plants is believed to be clean, and a lonesome mealy bug in the cavities of the top of a dracena crawls up into view, a specimen of red scale on the under side of a camphor tree overlooked, the development of some eulecanium hidden under a fern leaf is made manifest in transit or afterwards, a howl at once goes up against his unfortunate head by both customer and inspector at point of destination.

A. T. Garey.

ERADICATION OF THE MEALY BUG IN THE CITRUS ORCHARD.

During the last ten to fifteen years the mealy bug has steadily gained in numbers and extent of territory in the citrus groves, and especially in the Navel oranges. While the spread is slow, it seems sure, as all the ordinary means used to check its progress have signally failed. There are many sprays that will kill both the mealy bugs and their eggs, but all sprays that use water for the greater part of the mixture do not readily penetrate the mass of cottony fuzz of the old ones and the eggs therefore derive almost no benefit from spraying except with sprays of pure alcohol or oil. The alcohol is too expensive except for small plants, and the oil is too severe on the trees. Fumigation as done by the common method, even when an extra heavy dose is given, only serves to check them for a few weeks; the gas fails to penetrate into the larger masses of eggs, and the result is that in about three weeks the mealy bugs are quite numerous again.

The method here described is the method of many experiments, and is the best practice and only one that has completely eradicated the mealy bug from the citrus orchard so far as is now known.

The best practice is to fumigate with a large dose, usually double or a little more than the ordinary, say from a pound to a pound and a half to an ordinary Navel orange tree, using about four times to four and a half of water, and leaving the tent, which must be a good one, on all night. If the mealy bug has not formed any large masses, this will generally give complete killing, provided the ground is free of weeds.

The next best time is to fumigate just before picking the fruit, which should be picked the next day, and all, even those poor oranges on the ground, removed or treated with coal oil or distillate; this has given very good results where carefully done.

Perhaps the least desirable but equally successful method is to fumigate all night with heavy dosage and slow firing as in the first method, and the next day treating the large masses of bugs and eggs by hand with either coal oil or alcohol from a small machine oil can, holding the Navels up to secure complete killing, repeating on the trees where there is return of the trouble.

Any and all of these methods have been completely successful, there being no return of the mealy bug after two years where the orchards are free of weeds. But if there is much growth of weeds under and about the trees there is but little hope of complete success.

All of these methods are too slow, and require constant watching for some months afterwards, and are rarely successful except where the number of trees are few, or the owner of the orchard is willing to give much time and attention to the job. The results are that in most of the orchards where they have gained a foothold they are slowly spreading, and unless we can secure some parasite for the mealy bug which will keep it completely down, the time is not far distant when a large number of the citrus orchards will be completely infested with them. There are many parasites which work on the mealy bug in the orchards, and at times very nearly exterminate them, but none of them, so far as known, keep them down for more than a few months, or possibly a year, the insects always returning and generally to the very same trees.

C. B. BLAINE.

NURSERY STOCK.

The raising of citrus nursery stock in this county is one of the most important industries, and the inspection of nursery stock is one of the duties to which the Commissioners and Inspectors devote a large part of their time during the planting season, the interest of the citrus industry of the future depending largely on their knowledge and careful inspection.

The method used in this county mostly, by the nurserymen under the supervision of Commissioners and Inspectors, we believe to be very successful.

The nurserymen, during the season that black scale are in condition to kill, now almost universally use fumigation in the nursery bed. Then during the shipping season dig their trees and place in lath houses in lots of five hundred to six hundred, fumigating the second time for black scale.

If any other than black scale is found, the same method is gone through, with increased amount of cyanide to do the proper work, and, if found necessary, the trees are defoliated.

In placing citrus stock in lath houses, if any red spider is found we find that the best way to treat trees is to defoliate them and hand scrub with whale-oil soap or resin wash.

CHARLES NORTHCRAFT.

CONTROL OF SCALE PESTS IN SUBDIVISIONS.

My article is necessarily very brief, simply in relation to control of scale pests in subdivisions.

With the great demand for building lots in desirable locations, a large number of lemon groves in Hollywood, my district, have been purchased for subdivision, and as a result of neglect to properly treat the trees thereon, they in time have become badly infested with red scale. To eradicate this pest, and thereby protect adjacent orchards, a universal system of notices issued by the Horticultural Commission and served by the Inspector upon each individual owner has been adopted, with the result of a thorough fumigation over the valley, and a complete clean-up. To date, about twenty thousand lemon trees have been fumigated under forcible procedure. This has required eight hundred notices.

L. M. MAYET.

FUMIGATION WITH HYDROCYANIC ACID GAS.

Fumigation of citrus trees and nursery stocks with hydrocyanic acid gas as a means of insect control has now reached a degree of efficiency, when conducted by competent and careful men, as to surpass all other artificial means to this end, at least in the southern part of the State, where almost constant warfare has been pursued against black scale infestations. Until recent years results obtained by this method of treatment were so variable (owing to the want of accurate knowledge of the process) as to invite the trial of many other methods in competition. The most popular of these was the application, by means of high-power spraying machines, of distillate mixtures. It was claimed for this latter process that it was much cheaper than fumigation, and that it would by the single treatment destroy not only the scale pests, but also the citrus mites, whereas the latter were but slightly affected by the fumigation. So popular for a time did this spraying process become that fumigators were put practically out of the business, especially as they attempted to compete in prices with the sprayers by reducing the amount of chemicals used in fumigation, thus bringing the latter process in still greater disrepute. The better practitioners, however, by increasing their dosage and perfecting each detail of the work, soon demonstrated the fact that one perfect treatment by fumigation was not only cheaper but more effectual than two treatments by the spray methods, while the citrus mites, where they did occur rarely in threatening numbers, could be effectually controlled for two cents or three cents per tree by the sulphuring process. It also became apparent that actual damage to trees and fruit by the application of the distillate sprays was reaching into the hundreds of thousands if not millions of dollars, and that just the opposite effect was produced upon tree and fruit by fumigation. The latter process is now in almost universal use throughout the orchards of the south and betterment of fruit and trees has been most marked.

Fumigation, however, is still far from an exact science and results are not so uniform as they should be, depending largely upon the degree of intelligence and reliability of the operators.

A new significance has been given to the use of cyanide fumigation for insect control, by a practice originating with the Los Angeles County Commissioners of Horticulture and used extensively since that time (November, 1904) for the extermination of the more resistant scales, like the purple and the red scales. Up to that date these two pests had been fought with all sorts of applications for a period of at least sixteen years, without a single instance of entire eradication, so that the saying passed into a proverb that "once red scale always red scale," and the purple scale, though not so well known, came to be considered in the same class. It had become the common practice to treat these scales by repeated fumigations, at intervals of about two months, with the dosage commonly used for black scale, proceeding upon the theory that the successive broods of young while yet in their tender stages could thus be killed and finally total eradication take place. This method proved to be exceedingly expensive, prohibiting all profit from the infested grove, and continued the nuisance indefinitely. Any one familiar with these scales knows that they have no well-defined periods of breeding, at least none which involve the whole mass of the infestation, but that these masses consist of all sizes and conditions of scale, some portions of which will be an egg-forming stage at almost any given time. In the case of the purple scale these eggs are not killed by ordinary cyanide dosage, but hatch out later to reinfest the tree, while in the case of the *Aspidiotus* scales (which do not produce their young from eggs, properly speaking) there are at any given time mature specimens in any considerable infestation which have passed the stage when this light dosage will kill them, and these will reproduce their successors after the treatment of the tree. With this view of the subject in mind, it was conceived that any process of treatment for these resistant pests which offered any hopes of their eradication must be effectual in destroying, at one time, the entire infestation, including the eggs, in the case of the Lecaniums.

Increased dosage and lengthened exposure by the cyanide process have proven the easy solution of the problem, and it only remains for the fumigators to become proficient in the use of this heavy dosage to bring it into general use, nor is this proficiency difficult to acquire. The universal belief that the limit of safety had been reached (or nearly so) in the so-called full or killing dosage used for black scale, and that any material increase of the chemicals must destroy or greatly injure tree or fruit, has been proven to be erroneous, as double this amount of chemicals has been repeatedly used upon a commercial scale during every month in the year, without injury to tree or fruit (except in a few instances where some of the fruit in its young stage was injured), and for experimental purposes as much as two hundred per cent has been added to the strength of the first named formula, with no injury to tree or fruit. Doubling the old formula, however, seems to be perfectly effectual for entire eradication of purple scale and red scale, and some tests made have seemed to indicate that slightly less cyanide was effectual upon the red scale. So far as demonstrated in the work of the Los Angeles Commission, one and one half to two hours' exposure to the gas is necessary. A slight addition is made to the proportion of water used to dilute the acid and retard too rapid generation of the gas, but it should not exceed three and one half parts of water to one of acid. This, with many other phenomena presented by the practice of this method in the district where it originated, together with the added importance given to the whole subject of insect control by the very exhaustive investigations made by Professor Powell of the Department of Agriculture at Washington, in which he clearly proves that only clean fruit is profitable, moved the then Secretary of the Los Angeles Horticultural Commission to try to bring about a scientific study of the whole process of cyanide fumigation on the part of the Department of Agriculture at Washington. This movement was taken up by the Los Angeles County Commission, and, with the hearty coöperation of the commissions of other counties and of many large citrus associations, an appropriation of $5,000 was secured from Congress for the purpose, and Prof. C. L. Marlatt, assisted by Professor Woglum, has already inaugurated the work in Los Angeles County, and the whole subject will be fully exploited, covering such points as life of eggs, periods of light and heavy doses, its generation, killing effect, pressure of gas, different proportions of water used, margin between efficiency and danger to tree and plant, external conditions, light, heat, moisture, etc., quality of materials, physiological effects upon tree and fruit, and many other important features not known to commercial fumigators. It must be understood that treatment requiring such excessive amounts of chemicals should not be undertaken when natural conditions are not favorable, such as periods of excessive moisture, or during daytime. Both cyanide and acid must be of good quality, the former not too finely powdered, unless two or more generating pots are used to each tree, and every detail of the process must be carefully handled, but with such care that there need not be the least injury to the tree, even when three times the amount of cyanide used for black scale treatment is used. And needless to say, no scale pest has survived such treatment.

One of the accidental discoveries made in the use of this double dosage late in the season (from January 15th to the middle of the bloom period) was that excessive crops of high-grade fruit followed upon each of the scattered groups treated, while in many cases the untreated trees adjoining these groups bore that year extremely light crops, and this occurred in so many orchards as to seem to prove that the excessive crops were due to the stimulus given to the trees by the fumigation during the critical fruit-setting period.

The time now seems ripe for a general supervision of all jobs of fumigation done in each county by the Horticultural Board of such county, whether the work is done by private contractors or otherwise, and to this end all Horticultural Inspectors, as well as Commissioners, should make themselves familiar with all the details of the process, and especially with the scheduling of the trees, so that they may regulate the amount of dosage used, and thus safeguard the interests of the fruit-growers in whose service they are employed. The orchardists should be prevented from inviting poor work by exacting too low a price from the contractor, and on the other hand, any unscrupulous or ignorant fumigator should be prohibited by the Commissioners from using too small an amount of chemicals, or too short a period of exposure to the treatment to insure the best of killing results. I believe this regulation of a practice which costs the fruit-growers hundreds of thousands of dollars per year to be well within the province of our Horticultural Commission, and that ample authority is vested in such Board by our present laws.

C. E. Bemis.

A recess was here taken until 7:30 o'clock P. M.

EVENING SESSION—THIRD DAY.

Thursday, December 5, 1907.

Owing to delay in the return of the excursionists, the meeting was not called to order until 8 o'clock P. M.

Commissioner Jeffrey in the chair.

THE CHAIRMAN. While we are waiting on the audience to assemble—and we can not proceed very well until they get settled down—I will ask Mr. Filcher to make a five-minute talk on the Alaska-Yukon Exposition. Mr. Filcher is too well known in California to need an introduction from any one.

ADDRESS ON THE ALASKA-YUKON EXPOSITION.

By J. A. FILCHER, of Sacramento.

Mr. Chairman and Ladies and Gentlemen: I believe my name is on the program for a short affliction to-morrow. Being pretty busy, I just arrived in Marysville this evening, and I want to thank the President for the opportunity to say a few words to you on the subject of his suggestion, because I had it in my mind when I got up to-morrow to tell you. It would be more fitting, I suppose, that I should talk to you about the State Fair or the Exposition than about peaches.

The Governor has seen fit in his wisdom to name me as his representative at the Alaska-Yukon Pacific Exposition, which is to be held in Seattle, Washington, beginning the first of June, 1909. You may think the appointment is early, but it is not. Experience has shown that it will require a little time to get the people acquainted with what is expected of them, and it requires one year's good work to assemble a creditable representative exhibit of California's resources. You will all, as Californians, agree with me that it is incumbent on us, whenever we attempt to make an exhibit, to make a good one. I remember it was said in regard to Portland that the fair, being of secondary character and importance and neighboring, it was not necessary for California to spend much, but that it would be sufficient for the purpose to make a little exhibit. I remember I replied to that, that California had a reputation to maintain and that it were better for California not to attempt any exhibit at all than to make a poor one. That idea we maintained and we did make at Portland a good exhibit. It is probably not becoming for me to say it, but I will say that we were far ahead of any State exhibit at that exposition, and, surprising to me, we received more direct and indirect benefit from that exhibit than perhaps from any exposition we have ever exhibited in, and I think I am competent to judge. It has been my misfortune, I guess I ought to say, to represent California at eight expositions—six in this country and two in Europe—and I have been particular in noticing the results of those exhibits. Before the Portland exposition there was in the Northwest what amounted to almost a deep-seated antipathy to California. Whether or not it was prompted by jealousy I do not know, but we saw it and felt it in the air when we got there and we read of it in the papers. I remember a terrible tirade coming out in the *Oregonian*, soon after our arrival in Portland, against some manufacturer who was buying crude oil in California and allowing Oregon slab-wood to rot in the yard—simply to show how jealous they were of sending any money here. At a banquet early in the session Governor Chamberlain of Oregon made a speech and all his references were to the great Northwest. I met him soon afterwards and he asked me what I thought of his speech. I told him it was a good speech from an Oregon standpoint, but it demonstrated that he was a much smaller man than I thought he was. Of course, I said this in a very good-natured manner, and he said to me, "How is that, Mr. Filcher?" I said, "In all your references you said 'the Northwest' and 'the great Northwest.' I should think, as Governor of an exposition State, that you would be broad enough, on an occasion of this kind, to say 'the great West.' California is in this area, and yet by inference we were never referred to." He tapped me on the shoulder and said, "I stand corrected," and promised never to say it again, and I don't think he ever did. At a function soon after that it was my fortune to have a chance to talk to some of the Oregonians and I referred to this undercurrent of jealousy or suspicion, and I told them that for a while I didn't know the cause of it until finally an old gentleman came to us one day and said, "Here, my friend, are you from California?" I said, "Yes, sir." "Well," he said, "I want to ask you a question. Is it a fact that you Californians are going to take Portland back with you when you go and attach it to Golden Gate Park as a rose garden?" I said, "Why, my dear sir, no. We are going to help Portland expand and plant a few more roses." "Is that really so?" "Why, of course it is. We don't need Portland; we have got roses enough of our own." He said, "You are not going to take Mount Hood with you?" "Of course not. We have got Mount Whitney and Mount Shasta, and we don't need it. Instead of taking it we are going to help you roll a few stones upon it and make it grander and higher and more attractive than it is now." "Well," he says, "by jolly! that is the way to talk."

But to come to the point. We did work, and we found generous coöperation, to try and infuse a more friendly feeling and to expand the idea and cement the thought that we are part of a great commonwealth, the great important factor of the trans-Rocky Mountain country, the country on the continent and in the world that offers more for exploitation to-day than any other place on the globe, and we can be one people for one purpose, and we think we had a good deal to do in establishing that idea and confirming it, for following that exposition there was a better feeling engendered. The Oregonians and the Washingtonians began to come here in greater numbers than ever before, to spend their winters, and Californians have gone into the Oregon mountains and rivers to spend their summers. Our trade has increased one hundred per cent, as shown by figures and statistics. We are going right after you in the effort to duplicate this work and to increase it at Seattle in 1909, and when we come we want you to help us with the best products you have got.

The Secretary at this point read the following telegram:

LOS ANGELES, CAL., December 5, 1907.

Citrus Fruit-Growers' Convention in Session, Marysville, Cal.

The California State Realty Federation wishes your coöperation toward inducing the use of the best quality of fruit locally at a lower retail price, especially by the leading hotels and restaurants, where present charges arouse criticism and discourage consumption by tourists.

HERBERT BURDETTE,
Executive Secretary,

REPORT OF SPECIAL COMMITTEE ON RESOLUTIONS.

MR. JUDD. Mr. President, the committee appointed to-day to draft resolutions covering some legislative matters that were mentioned in the various papers, reports that the resolutions are ready, and I will read them:

Resolution Favoring a Quarterly Convention.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of the Fruit-Growers' Convention:

WHEREAS, The vast area and diversity of the fruit industry of California have developed problems regarding each variety that it is impossible to properly consider at any one convention; and

WHEREAS, Each variety has its own peculiar interests, and in the production of each are engaged many who would be pleased to have devoted at least one week to their particular subjects; and

WHEREAS, Our present system of an annual convention has become unable to give full attention to any one branch of our great industry; and

WHEREAS, A manifest economy of time and distance could be had by members if a quarterly convention could be had, dividing the industries with the territory, to the end that less papers, less subjects, and more and adequate time could be had to solve the special problems pertaining to each industry; therefore, be it

Resolved, That we request the President, in his requests for more liberal support from the State, to take this subject into consideration, in order to crystallize the energies of each department to the betterment of the whole.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Favoring Increased Appropriation for Insectary Purposes.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, The efficiency of parasites in the destruction of pernicious insects is well known as being of great value to the fruit industry of California; and

WHEREAS, At present there are insufficient funds for the proper support of the State Insectary and for introducing from the home of these pernicious scales and insects their natural parasites, as well as for the propagation and distribution of the same; therefore, be it

Resolved, That we, the fruit-growers in convention assembled, earnestly request that sufficient funds be set aside for such purposes, the same to be at the disposal of the State Horticultural Commission.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Favoring National Horticultural Quarantine.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, The national laws on importation of insect pests for the proper guarding of the fruit interests of this great nation, which in California alone are worth over sixty million dollars ($60,000,000), are inadequate; and,

WHEREAS, A thorough coöperation of Government quarantine officers on the Atlantic coast with the California Horticultural Commission is desired, to the end that the Pacific Coast may be further protected; therefore, be it

Resolved, That a copy of these resolutions be sent to each representative from California, in the Senate and House of Congress.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Requesting the State Commissioner to Draft a New Horticultural Law.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, The present law regarding the fruit industry of California has, owing to the greater demands and necessities of the industry and owing to the enormous increase of the territory as well as acreage, become complex and often inoperative; and

WHEREAS, Amendments, simplifying these laws, to the end that greater efficiency as well as an increase in power should be had; therefore, be it

Resolved, That the President of this Convention be requested to draft such bills as seem to him best to bring about the desired results; and be it further

Resolved, That the President appoint a Legislative Committee, whose duty shall be to attend, and vigorously urge, before the various legislative committees the relief asked for.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Asking for More Effective Horticultural Quarantine.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, There are insufficient funds at the disposal of the Horticultural Commission of California to properly quarantine the State on the north, south, and east against the importation, by accident or otherwise, of the many injurious pests that mean destruction to our greatest industry to the value of an annual output of sixty million dollars ($60,000,000), if not prevented; and

WHEREAS, Prevention means great economy to the taxpayers of California; therefore, be it

Resolved by the Fruit-Growers of California, in Convention assembled, That sufficient money be appropriated to give the adequate relief by employing additional quarantine officers to strenuously and efficiently guard all our borders.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

Resolution Favoring Increased Appropriation for the Horticultural Commission.

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

WHEREAS, Recognizing the inability, owing to the lack of proper funds, of the State Horticultural Commissioner to make his office the head of the fruit industry of this State; and

WHEREAS, Among his prescribed duties he is ex officio member of all County Horticultural Commissions of this State, to the end that his office should be the help and guide to the Commissioners; and

WHEREAS, Frequent meetings with these Commissions would greatly enhance the value of his office and the service by keeping the various Commissioners in touch with the best and most rapid method of protection to our industry; therefore, be it

Resolved, That we, the fruit-growers of California, in convention assembled, most earnestly request that the Legislature of California make a large increase in the annual appropriation for the State Horticultural Commission, to the end that an added efficiency may be had.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
R. P. CUNDIFF.

MR. JUDD. I move that these resolutions be referred to the Committee on Resolutions, to report to-morrow morning.

The motion was duly seconded and carried.

REPORT OF COMMITTEE ON THE PRESIDENT'S ADDRESS.

Mr. Judd, as Chairman of the Committee on the President's Address, then read the report of the committee, as follows:

MARYSVILLE, CAL., December 5, 1907.

To the President and Members of California Fruit-Growers' Convention:

GENTLEMEN: We, your committee appointed to consider and report on the annual address of the President of this organization, respectfully report as follows:

We find the President to be in hearty accord with the broad policies of his illustrious predecessor, whom he so generously eulogizes, thereby voicing the sentiments of the fruit-growing world.

We approve his hearty coöperation with the State University, making the office of the Horticultural Commission a medium to applaud its success as well as to favor its policies.

We note with the highest commendation his recommendations for more liberal appropriations by our Legislature to advance the greatest interest of California by strengthening the quarantine service. We are happy to note that our President is in sympathy with all the previously expressed reforms of former conventions in the matter of reduced rates, quicker and better car service, as well as adequate labor supply.

He pays a compliment that becomes no less a tribute to our retiring President, when he expresses his loyalty and faith in the natural as well as the artificial methods of pest control.

In calling special attention to these specific points in the address of President Jeffrey, we desire to commend the entire document as timely, progressive, patriotic, and valuable, and worthy of the thoughtful consideration of all our people. We further indorse our worthy President's suggestions advocating amendments to present laws, which would fully protect us from incoming pests, and the passage of new laws to put the Commission in an independent position, giving it compulsory power to the extent that adequate protection may be had by all fruit-growers of the State.

Respectfully submitted.

A. N. JUDD.
S. A. PEASE.
E. BOOTH.

MR. JUDD. I move the adoption of the report of the committee.

The motion was duly seconded.

MR. JUDD. Owing to the delicacy of the President, I will put the motion.

The motion was unanimously carried.

PROFESSOR WICKSON submitted a proposed resolution, which was read by the Secretary, as follows:

Resolution of Regard for Hon. Ellwood Cooper.

Resolved, That this the Thirty-third Convention of California Fruit-growers desires to place upon record its appreciation of the eminent services of Mr. Ellwood Cooper, who for more than a quarter of a century has labored devotedly for the advancement of California horticulture, and whose name is closely connected with all phases of effort for commercial and cultural promotion and protection which have prevailed during that period. These services assure Mr. Cooper an enduring and honorable place in the history of California and entitle him to look forward to such reward as a recognition of his public worth and disinterested labors.

Resolved, That the Convention rejoices in the fact that Mr. Cooper retires from the public service full not only of honors but of physical and mental health, which encourage the hope that his effective participation in our horticultural affairs may be continued for many years.

THE CHAIRMAN. What is your desire—to have that referred?

PROFESSOR WICKSON. The regular course.

THE CHAIRMAN. I believe I will just take the liberty of asking for a vote on that resolution right now. Will you make a motion to have that resolution adopted?

MR. BERWICK. I move to have it adopted.

The motion was duly seconded.

THE CHAIRMAN. I hope every one in the house will vote on this.

The motion was unanimously carried.

THE CHAIRMAN. Now, if there is nothing else to come in, we will proceed at once with Mr. Mills's lecture. I will say that after Mr. Mills's lecture is over he will be delighted to have you take part in this discussion. I take pleasure in introducing Mr. James Mills, Superintendent of the Arlington Heights Ranch, Riverside, one of our best known residents and a man you all ought to know.

THE VALUE OF COVER CROPS IN PRESERVING THE LIFE OF THE SOIL.

By JAMES MILLS, of Riverside.

I hope that you will give me a sympathetic hearing. I have a large subject. I do not feel capable of dealing with it in the manner in which it ought to be dealt with. It is a subject all of you ought to be studying. You could give days, weeks, months, years to it and not exhaust it. It is a subject which we must know more about if we are going to do our duty by ourselves, our fellows and posterity. It is a subject that will enable us, if we thoroughly understand it, to keep our soils in a real state of fertility, in first-class physical condition, in condition to do work for us more and more from year to year, and to be left in condition after we are done with it to do more work for those who succeed us than it did for us when we received it.

I am not very well to-night; yet I am not sick. If my voice gives out on me it is because I have got a cold. My subject is not a written one; I am going to speak, and whenever I feel that you are uneasy I can break it off short, and I will.

The Romans, two thousand years ago, used the cover crop to keep their soil fertile. They did not know just what effect it had on the soil, or, rather, they did not know just what brought that effect about which was apparent to them. They knew that after the growth of a cover crop, a crop of legumes, other crops succeeding them were better than where they were not used.

The Egyptians, for thousands of years, also have used these cover crops. The berseem has been used throughout centuries. No doubt Joseph, when he was premier of Egypt, saw the berseem used year after year and followed with the corn and the cotton and the sugar-cane; and those soils have been kept in very good physical condition, a splendid condition of fertility, by the use of these leguminous crops as well as by the overflow of the great Nile River.

The ordinary layman is not aware that the growth of our crops and the existence of agriculture and horticulture, and, therefore, the existence of life, animal life, on the planet, are dependent upon life in the soil, the existence there of micro-organisms, bacteria—bacteria which, in size, reach from 1-2,500 to 1-25,000 of an inch, and that from 30,000 to 1,500,000 of these are found in a gramme of agricultural soil—15.4 grains of soil. In places, in densely populated cities, where cleanliness is not observed, as in some of the Italian cities, we will find in the same extent, the same bit of soil, the gramme, from thirty millions to one billion of these micro-organisms.

Bacteria affect all conditions of life. They multiply enormously.

One of these little micro-organisms will multiply in one day to from fifteen million to sixteen million five hundred thousand; in two days to two hundred and eighty-one billion five hundred thousand; and in three days one of these little micro-organisms will multiply to forty-seven quadrillions. They can not multiply to that extent, it is true, because before they have multiplied so greatly they will begin to destroy themselves by the excreta which they throw off, thus poisoning the soil in which they live. I mention this, however, that you may realize and appreciate the tremendous forces with which we are dealing when we are dealing with these micro-organisms in the soil, the infinite power which is exerted on the soil and on the history, practically, of civilization by these tiny, infinitesimal micro-organisms with which we deal in the soil. They are, I might say, the life of the soil. Without them we can not grow crops. It is, therefore, well for us to remember that the first thing we must do with the soil is to make it a fit habitation for these micro-organisms which labor with us and for us for the upbuilding of agricultural and horticultural industries and, therefore, for the upbuilding of the civilizations which we are building and which have been builded before us.

We know that bacteria have to deal with the making of our butter. Bacteria make your milk sour. They give a better flavor to your butter; they give a better aroma to your butter. The Federal department to-day is actually growing bacteria stronger, more vigorous, more capable of doing the work that these little micro-organisms have to do in the soil and have to do in the arts and in the manufactures, and is distributing them to those who want them in their business for the inoculation of the soil and for the manufacture of butter. You know that all diseases—typhoid, tuberculosis, anthrax, lockjaw, and kindred ailments—are brought about by bacterial action. Bacteria are everywhere exerting an enormous influence upon the conditions that surround man. We sit down to our dinners and we eat the crude food that is presented to us; I mean crude in that we can not digest it; it can not enter into and become part of the blood and the fluids of the body until it has been softened, until it has been digested—that is, converted into forms of matter which will make blood and the fluids of the body, that it may be carried into the system to build the tissue and to sustain this organism with which man does his work. That is true also in the soil, that nothing can become valuable to plant life but through the activities of these micro-organisms. If it be true that no mineral fertilizer, inert in the soil or put in the soil itself, no phosphoric acid, no potash, nor anything you may use as a fertilizer, can possibly be of any benefit without the action of bacteria, then surely it devolves upon you as the part of wisdom to study these things, to study the conditions of the soil that will best develop them and make them healthy organisms to grow crops for you, for without them you can not grow any crops.

The soil with which we have to deal, where does it come from? You go up into the mountains—possibly you have gone up into the Yosemite and traveled from the old Tioga road to Tuolumne Meadows; possibly you have climbed to the top of Lisle; possibly you have gone down the great cañon of the Tuolumne River to Hetch Hetchy Cañon, and everywhere you saw death. Everywhere you saw decomposition taking place. Everywhere you saw the tree that has grown for two hundred—for a thousand years—the great sequoias in those forests of the sequoia. You see some of the giants down and decomposition taking place, bacterial action taking place there to prepare them again for the growth of plants in the soil. Death! Decomposition! The tree, the vegetable matter and the animal matter that would there have life are decomposing. The detritus from the mountainside is being decomposed, disintegrating by weathering, disintegrating by cold, by water, by ice, and these together, the decaying vegetable matter and the animal matter, with the detritus, are carried in the floods of springtime from the mountains out into the valleys and there laid down. These mountains which we have traveled through were once upon a time a mile higher, piercing the clouds even a mile higher than now they do pierce those clouds, and they have been weathered off and carried down, and now in southern California and in central California and here in these beautiful, fertile valleys, we are growing our crops on the earth, on the rock that once was on top of the mountains, and in the valleys, and in the decayed vegetable matter that is incorporated in them.

Then, soil is but the detritus from the mountainside and vegetable matter and animal matter in process of decay, called humus—earth and humus. When we deal with this soil, cultivate and irrigate and grow our crops of corn and wheat, and oats and barley, and lemons and oranges, and all the deciduous crops, we are taking from the soil this humus, which is the life of the soil. The more we cultivate with our cultivators—here in California we do not allow the grass to grow in our orchards; we keep plowing them. Intense cultivation is our method, and the finer we cultivate it the quicker is torn out the life of the soil. Now, when the humus is exhausted from the soil we have again the very detritus that came from the mountainside. It is not soil; it is but detritus; it is but rock; it is but mineral matter; without the humus that gave it its life, which in its decomposition gave off organic acids and acted as a storehouse of oxygen, leaves you a sterile soil. Now, if that be the case, and it is the case, then the part of wisdom for us is to keep up the supply of humus in the soil because of the beneficial effect that it has on that soil; for without humus we have no soil, without soil we have no crops, without crops we have no farmers, and without farmers we have nothing.

It was in 1891 that Winogradski and Warren simultaneously, the one in England and the other on the Continent, discovered this little micro-organism, discovered just what its mission was, discovered that the God of the Universe had placed in the soil a wonderful little creature whose mission it was to take back the nitrogen from the atmosphere and store it up in the soil that we might continue the processes forever and forever of the growing of crops and the feeding of animals, the one interdependent on the other. It was, I say, only in 1891 that they found this. Liebig and other great scientists wrote years ago that the time was near when the nitrate supplies of the earth would be exhausted; that because of the tremendous evils that follow our methods of cultivation the earth would be wasted, the nitrogen of the earth would be washed out and lost, and that all of the sources of nitrates in Chile and elsewhere would be exhausted and man would die because fertilizers could not be found anywhere to continue the growth of plants on which he lived; and it was when they found this little micro-organism that they appreciated the fact that Nature did not leave out a link in the cycle of life. I say the mission of these little bacteria is just this. Plant life decays, plant life is growing; animal life lives upon it, animal life dies, decomposition comes in. Bacteria, through their activity, decompose them. The nitrogen that is in the plant, the nitrogen that is in the animal, goes off again into the atmosphere; and right there comes in the bacteria, working in the leguminous plants and independent of them, also, and lays hold of the free nitrogen, carries it back into the soil, there again to begin the cycle that it went through for millions and millions of years—eons upon eons of time. God, in his great wisdom and power, has not left us helpless, then, but has provided us a means to get that which we need for the life of the soil.

This humus has a great mission to perform. It is physical life—it gives physical life to the soil. You and I can not do our work properly, can not do it well, can not do it happily, unless we are physically strong. No matter how powerful the intellect of man may be, if that powerful intellect is in a tiny, sickly body it is unable to do the great work which the Creator intended it should do; and therefore it becomes the duty of man everywhere to preserve this tabernacle of his soul that it may enable him to do the work given him by God, for himself and his fellows on the earth. It is true also of the soil; it must be kept physically well.

We, in this building and in our homes, need fresh air. We open the windows and the doors that the air may freely circulate and that we may have the oxygen to breathe into our lungs. It would be very bad for us if we closed down the windows and closed the doors and breathed again and again the noxious gases that we gave off through the hours of the day from the lungs. Thus, we want the air to circulate. It is true also of the soil. The soil wants aëration, it wants to be kept open so that the air may circulate in it. The roots need to breathe, the plants need to breathe; the bacteria give them the oxygen to live upon. The soil needs ventilation—that the noxious gases, poisoning the roots and poisoning the soil if it has not opportunity to get away, must have that opportunity to escape. Ventilation! And, therefore, in the soil we must work to keep up that condition of aëration and ventilation. Humus, mixed with the earth in sufficient quantities, brings about that condition. It also enables the soil to contain more water. It gives it a greater absorptive power for water.

You know, as I know, that the growth of one ton of solid matter, be it whatever crop it may be, cereal or fruit, requires from three hundred to five hundred tons of water, which must be pumped up by the root system and root pressure and surface tension from the subsoils of the earth. Now, when we increase more and more the holding power of the soil for water we have done a mighty good thing for ourselves. Take, for instance, one hundred pounds of sand. It will absorb twenty-five pounds of water, and it will hold it for about four hours. Take one hundred pounds of humus soil and it will absorb one hundred and ninety-five pounds of water and hold it for weeks. Is it not, then, the part of wisdom that we so cultivate our soils, so work our soils, as to increase constantly from year to year the amount of humus, in order that we may get a better aëration and better ventilation and a greater holding power of water?

I want to tell you an incident that happened on a certain soil down south. There was a twenty-acre tract of orange grove that took an immense amount of water. There we allow one inch to five acres for the irrigation during the year. This twenty acres took ten times the water that was allotted to it, and could not have been held in cultivation if it belonged to an individual who had only the water that was belonging to that orchard—two inches of water, four to twenty, one to five. Samples of the soil were taken for eight feet down, every six inches of the way. They were taken to the laboratory and put under the microscope, and behold what was found! Piles of building stone! You see on the side of the road for the foundation of a new building piles of stone with jagged edges and spaces through which a cat may run. Just so was that soil, not to that extent, but under the microscope seeming like that. There was nothing but gravel. That was the trouble. The humus had been worked out and had not been replaced. Barnyard manure was put in the soil, covered under. Cover crops were sown, one a summer crop of cow peas, the other a crop of Canadian peas, and the next year this happened: They were ordered not to irrigate that soil.

There had been a splendid rain in the winter. The rain went down along the root system, percolated deeply into the soil and filled the subsoil. Every month after June there was dug a hole ten feet deep, twelve feet long, and eighteen inches wide, and into that the man went and examined the soil, finding considerable moisture in the subsoil, and, coming out, the hole was filled. You have got your root system; go after the water; it is there; the function of your roots is to get water—get it; and the water was held off until October, not an irrigation, constant cultivation, however, so that no loss of water would take place by evaporation, but that every drop of water would go through the hair roots and up into the trunk and through the tree to the leaf, there leaving the solutions of fertilizer to be manufactured into starches and sugar and then sent back to the tree to grow its fruit; and I have to say to you that not one single leaf wilted on that twenty acres that year, and only one irrigation during the summer time was given to that twenty acres for two years; and other pieces, like situated, like treated, were tested the same way. A scientific gentleman was told that, and he thought it impossible, but he took the trouble to go there and investigate the conditions down thirteen feet in the soil, testing it and taking it to the laboratory and estimating the quantity of water in that soil subject to the root system of the tree, and his decision was, yes, you can do it; yes, you can increase the absorptive and holding power of your soil by filling it with humus, so that in an occasion of distress you may be able to save your orchard without irrigation through a season.

The power of absorbing water is eight times greater in a humus soil than in a soil without humus. To get the best out of your soil you must have friability, tilth—I thought there was an Englishman here who might have heard that word and raised his eyes to find out what was the matter. We call it pulverization, we call it friability, fineness of soil. Take a cubic inch of soil. It presents but six sides to the hair roots of the plant. But divide it up into as fine particles as you can by proper cultivation and you will find that there are three million sides to the cubic inch which can be touched by the hair roots of the plant and the fertilizer taken from it that was in the soil moisture. Take a cubic foot of soil and, if I mistake not, I have seen somewhere that when it is divided into that fineness which you can get by proper manipulation of the soil it will present to the root system sixteen acres of surface. Think of it, that when you take that soil and divide it it will spread over sixteen acres! I don't think I am exaggerating. I tried to lay my hand on the authority this afternoon. There are some here who know and they can contradict me if it is not true.

Observe then. You go into a field. It has been plowed when it is a little wet; there are lumps the size of your hat, the size of marbles and on up to six inches or more in diameter. You know that you can not get the fertilizer elements in that. There are vast quantities of fertilizer inert in the soil that must be gotten by the friability of the soil. There are forty thousand pounds and more of potash in the first six feet of California soils, and I have no doubt there are from six thousand to eight thousand pounds of phosphoric acid in an acre; that there are over one hundred and forty thousand pounds of lime; not so much humus, not so much hydrogen. But you have got to pulverize your soil into the very finest condition of pulverization if you expect to get out of it the result. You go on one man's soil and say, "How beautifully it pulverizes under the plow and the cultivator," and you go on another's soil and you see it in jagged lumps. You see in one field a large crop; in the other, a small crop. One man has great barns overflowing; the other has barns with the clapboards rattling in every breeze that blows from the four corners of heaven. You see his fences with moss on them because he has never been able to attend to them since the days of long ago. The one is the successful farmer, because he is getting out of the soil that which is in it for him; and the other is not getting it, because he has not properly worked the soil.

The temperature of the soil is affected by the humus, also. You take one soil and it is a dark color. The lady wears a light hat in the summer time that her head may not be too hot; she wears a white dress that she may not be too warm. In the winter time the man wears a black hat and a black suit because he is warmer. The heat of the sun is absorbed by the black. It is true of the soil. Heat is required in the soil. The humus will take action, the bacteria will be active with warmth in the soil. Everything becomes valuable through the action of bacteria, did I say? Bacteria will not be active under 47 degrees of temperature and they reach their greatest activity at about 97 degrees; therefore, we must see to it that we keep our soils warm. A dark soil is warm. Humus makes the soil dark. You may know, then, from the color of your soil whether you have a humus soil or a soil wanting in humus. A soil that is black will be several degrees warmer than one that is light.

Have you ever been in southern California or in northern California? Have you ever walked along the fence after a cold night when the frost kept you awake all night long for fear of the freezing of your fruit? Have you seen on one side of the fence, a week afterwards, conditions which warranted you in saying, "They have not been hurt; the leaves are in fine condition; the fruit is all right?" Across the road everything gives the appearance of frost. The one is frozen, the other is not. The one soil was degrees warmer than the other and the result was that it was warm enough to make the difference. That is true. You can keep your soil so warm that it will on some nights be the very thing that saves your crop. Your root system that may be near the surface and the feeding roots, in the early spring when the tree is preparing for the greatest burden it has to bear in its life, the budding and the setting of the crop, depend upon the bacteria, and the bacteria can not be without warmth, and the warm soil will give more fertilizer to the tree, more crop to the tree, because it is warm, than the soil that was cold.

Again, lots of humus in your soil will keep your soil from washing. I forget the gentleman who read a paper a couple of days ago and who said the surface of his soil, because of great rains, was washed off and carried down. It is true. In some orchards you will see the soil all percolating down and running off into the roads and the gutters. In another tract you will find the very opposite. Why? There was no humus in one, there was lots in the other. The one was a humus soil, the other was not a humus soil. Now, these conditions are brought about by humus, this humus which is the life of the soil. By washing it out you get a sterile soil.

We heard here the other day from Mr. Crandall about the very best citizens that America has, the descendants of the men who years ago crossed the Allegheny Mountains to settle the lands that were west of them, and they moved from Ohio to Nebraska and Iowa, they have gone to Dakota and Minnesota, they have gone to Illinois; but to-day the soils that used to give them thirty and forty bushels of grain are giving them eight and ten; they are exhausted. And what are they doing? They are going up into the great northern country which Mr. Crandall has traveled over and which I walked over in 1881 for two thousand miles—a land richer by far than anything under the sun, richer than the black lands of Russia, land that will give them from forty to sixty bushels of grain to the acre. They exhausted the soils that they took years ago and they go off to take new soil. What was their duty to posterity? Their duty was to keep alive the soil, to keep fertile the soil, and by giving it humus that is what they would have done.

You know that we have about ninety millions of people in this country to-day; that we will have one hundred and twenty-five millions of people in thirteen years, according to a report of the Census Bureau; that we will have two hundred millions of people in 1950, and three hundred and twenty-five millions of people in 1990; and these three hundred and twenty-five millions of people must live off of the soil that to-day is keeping measurably prosperous ninety millions of people. We are not the owners of this soil; the Almighty did not give it to us as our own. We have the title deeds to-day, but to-morrow we are dead and gone from the land to which no one ever returneth, and it goes to another, and it is your duty and mine so to conduct ourselves in the management of these soils that we will leave them richer than we got them. Not that it will cost us money to do it. Be assured that the men who are down at Berkeley, in Michigan and Dakota and Minnesota and Iowa and throughout all the states are endeavoring to teach us this principle of the handling of our soils, that if we keep them physically well by proper manipulation and put back the humus that we take out, we will get greater returns from year to year. For every dollar we expend in restoring the fertility of the soil we are repaid two.

Go down South to the slave states. When they had the slaves it was easier to go out and clear another hundred acres than it was to restore the fertility of the one hundred acres which the cotton and the tobacco and the corn had exhausted, and so they went on clearing acre after acre and leaving behind them drifting sand. They are re-establishing that to-day by growing cover crops of cow peas. They are doing the same in Illinois and all over the continent—re-establishing the conditions that were in the soil when they were laid down by Nature, by the growing of cover crops. Take a cover crop, then, and let us grow it. We will take a cover crop or barnyard manure to restore the humus. Go out and buy barnyard manure, buy what you can, but we find that we can not get enough of it to restore the soil. And if you could get it, we find that it costs from $300 to $700 for a ten-acre orchard to get barnyard manure to the extent of ten cubic feet to the tree. Now, if we all demanded that, and did not use the cover crop, we would not be able to pay for it, even if we could get it. But we find that by growing the Canadian, the Russian blue, the cow pea of the South, and all the other several varieties of cover crops, we not only get it at a nominal cost, but we restore the aëration and ventilation of the soil and give to the soil the organic acids that are necessary to make available the mineral fertilizers that are there for our use.

Take the cow pea or the red clover, they ramify the soil from every direction. I have followed a cow pea three feet into the soil. Why do you plow? That the air may get into the soil. Why do you plow in the orchard? That you may break the soil. Did you ever have a plow that went three feet into the soil? Did you ever have a plow that would lay up humus three feet deep, or with which, if sufficient air gets into it, will make humus? The cover crop will do it for you. The stubborn soil that is now trying your very soul because you have not sown the cover crop will be as friable as the onion bed which you used to weed on your knees on holidays and blame your mother because you could not be with the other boys playing baseball. Your cultivator will move through it easily; your horses will not sweat as much; they will grow fat on half the feed they would require when plowing and cultivating in a dead soil, that closes up as soon as you go over it; but with the humus brought about by the cover crop your soil will be so friable and so free and so light that your cultivator will move easily and you will get a dust mulch to hold the water down that you can not get in a soil devoid of humus.

This humus, let me again say with all the force that I can, is the life of the soil, and without it all life is gone and you can not live with the soil that has lost its humus. Have you ever seen a man plowing a field when it is wet? He says, "I have got to do this, because to-morrow I have got another field to plow." What was he doing? Making adobe bricks! He could make them quicker than any Mexican that ever puddled them with his feet. He made his soil dead, and it will take him years to restore the evil that he did in that one hour. The humus, the bacteria, died in the hardened soil, because it could not get air, and the soil became dead; and if you could take a crusher or if you could take a miner's mill and pulverize all that soil, at a million dollars cost on a great big acreage, you might reach it in a little shorter time than otherwise you would, but it would take a long time to get it, nevertheless. Therefore, remember that you can not plow a soil when it is wet. Remember that you must use the humus. Remember that you can get that humus cheaply through the cover crop. It will cost you about $35 to put a cover crop on ten acres. The root system ramifies the whole soil.

I will read you in a minute the two experiments which I made by analyzing these plants in the laboratory, to show you how much mineral fertilizer was got out of ten acres of soil and how much nitrogen. The cover crop is to get first the nitrogen. There are three million—am I right?—pounds of free nitrogen at your command from every acre of your orchard field. By the growth of the cover crop the little bacteria in the soil will go through the hair roots and you will soon see tubercles growing. The little bacteria are taking in the nitrogen and giving a portion of it to the plant in exchange for starch, and if you analyze that you will find an enormous amount of nitrogen has been gotten from the atmosphere for nothing.

What do you pay for nitrogen? $60 for nitrate of soda, with only 16 to 18 per cent available in the ton. 320 pounds of available nitrate for $60. But I can prove through the laboratory that I got over 2,000 pounds of nitrogen from the atmosphere for the $35 that I expended and put into the cover crop. In growing a cover crop you are growing it to get the nitrogen, so that the mineral already in the soil may be available. Therefore, do not feed your soil with nitrates before the planting of the cover crop; do not feed nitrates; feed them phosphates, feed them potashes, and they will grow better and gather more nitrogen for your use.

There are 40,000 pounds of potash and 7,000 or 8,000 pounds of phosphoric acid and about two per cent of phosphorus available to the acre and about thirty-nine per cent of the phosphoric acid. Yet, nevertheless, you have no right to exhaust that store. It is to do for all time, and more of that inert material will become available by your using somewhat of the commercial fertilizer that will cost you from $20 to $35 per ton. You will get more nitrogen. Your crop, because of the prodigality of your soil, will be better; your bank account will be greater, your wife's smiles will be brighter, your children will be clothed better, the conditions surrounding your home will be immensely improved, you can send your children to the best schools in the land and give them the opportunities that others get, if you will rightly operate the soil that you have got in your power to operate. Yes, I say that you can become rich on ten acres of soil in California. I say you can? I have seen it done. I have seen a man in fifteen years become worth $75,000 with a start of just $400 after the payment for his land, planting his orchard, growing it, buying others with the profit and being worth to-day $75,000 and off his orchard getting $15,000 net income this year. But he was an ideal farmer. He did everything that the soil required, and he became rich.

Let me just now, in closing, tell you about these analyses. I had eight varieties of cover crops a couple of years ago, to endeavor to find out which was the better. I found that I got from one of these varieties 68,350 pounds of green material to the acre for the vines and 12,705 pounds for the root system; and from another, 68,000 for the vine and about the same for the root, and all running the same, from about 60,000 to 68,000 and 70,000 pounds. Now, out of some of these varieties I got 101 pounds of available phosphoric acid to the acre—measurably available, more fully available than in its inert state in the mineral matter of the soil; and of potash, 317 pounds, which after the decaying of the cover crop when it was plowed under, would become more readily available than before; and of nitrogen, 276 pounds. And so with another: phosphoric acid, 91 pounds; potash, 241 pounds; nitrogen, 284 pounds. Of the *Vicia sativa*, 131 pounds of phosphoric acid; 364 pounds of potash, and 244 pounds of nitrogen to the acre. That is, 1,300 pounds of phosphoric acid for ten acres, which are our units, as it were, and 3,640 pounds of potash, and 2,440 pounds of nitrogen. Now, these are demonstrations of our own. Our chemist may not have been perfect, but I have compared them with works of Snyder and King and Hilgard and others, and I don't think we are very far off—in fact, I know we are not very far off, if at all.

Now, let us look at that. I said that we got the amounts that I have stated. Compare them for a moment. You buy, say, ten pounds of complete fertilizer for every tree in your orchard. There are a hundred trees to the acre, a thousand trees to the ten acres. Ten pounds to the tree would be five tons of commercial fertilizer. Five tons would be $40 a ton. That fertilizer would contain 4 per cent of available nitrogen, 8 per cent of phosphoric acid, and 1.22 per cent of potash. If you want any more potash in a complete fertilizer you will have to pay larger sums. If you want 5 per cent they will put it in for you and you will pay for it at the rate of at least six or seven cents a pound, the actual potash. Four per cent of nitrogen is 80 pounds to the acre, 80 pounds to the ton; 400 pounds of nitrogen to ten acres, five tons, as compared to over 2,400 pounds from the cover crop. Of the phosphoric acid, 8 per cent is 160 pounds to the ton, or 800 pounds to the five tons. I think I said that from one variety of cover crop we had 3,600 pounds of phosphoric acid to ten acres, as against 800 pounds from a commercial fertilizer—four and one-half times as much—not all available, but available enough. You do not need to use as much phosphoric acid; you must use some. You can easily get it by analyzing your crop; you can easily get it by going to the authorities and asking them how much comes from a crop of rye or potatoes or corn or cotton, and you ought to put back a little more for waste, but it won't be much, and you get these through the cover crop, to a great extent; but the nitrogen is what you are after. It has been said, and said truly, and I think the professors here will corroborate me when I say that the scientists will say to you that for the growth of crops you can get enough nitrogen from the growing of cover crops, the bacteria taking it from the air and laying it up in the crop that you grow, and that you will not need to buy after your soil fertility has been restored, if you have exhausted it, in commercial fertilizer. In fact, it is true that if they had not found how to manufacture it from the atmosphere, you would have to get along without it, because the available sources in Chile and elsewhere would be used up at our present rate of use of it.

Now, I think I should close. There is a summary here that I will have printed in the bulletin, if it is thought wise to print what I have said, summing up just what I have said, and I will close. I have talked an hour; I wish I might have a couple; but I wish that you would think of this, that you would go to the authorities—get Hilgard, get King, get Bailey, get Snyder, get Voorhees—study them. The lawyer, when he is asked to give an opinion, goes to his library and he will tell you what your legal rights are. But the farmer, when he is up against a problem, stumbles along like his forefathers and wonders what is the matter. The matter is he is not "up to snuff"; he is not up to his business; he has not read. Don't you know, ladies, don't you know, gentlemen, that you need more brain power to farm right than any physician or minister or lawyer needs to be a good physician, or good minister, or good lawyer? (Applause.) Wake up! Get your library. What are these men writing for us for? What are we paying them for? What are Stubenrauch and Waite and others experimenting for, but for you and for me? For $25 we can get the result of labors that have extended over a hundred years and we can put it on our shelves and with a little work, like Elijah did a while ago, we can eat it and get it inside of us, and you will be better farmers a hundredfold, because you have got the result of labors of wise men for many years preceding you. But you go along year after year, just like the Egyptian farmer, with his old plow that he used in Joseph's time. I mean this theoretically—you don't study. Go and get your library, and when this matter confronts you take down your books and delve and dig, and there is not a problem that confronts you that you will not solve without writing to the university. You have no right to write to them, because they have put all in print, and you can get it in thousands of bulletins and you can get it in the splendid scientific works that have been given us in the last century.

Solomon said, "In all your getting, get wisdom." I say to you farmers, "In all your getting, get humus in your soil." (Great applause.)

THE CHAIRMAN. This matter which has been so splendidly presented by Mr. Mills is now open to discussion.

MR. JUDD. I would like to ask Mr. Mills one question. Does preserving the leaves—say, for instance, that you have low heads, that you prune your orchard low, so that the leaves do not blow away from under the trees and they lie there and decompose and make a mulch, wouldn't that furnish humus enough ordinarily on good soil without the extra cultivation?

MR. MILLS. No. It will furnish it in the mountains, where the dense foliage covers all the hillside and all the valley, and where the plant life grows in the rainy season. There you find humus in great quantities that is swept down to the valleys for use. But the leaves of trees in our orchards, no. You would hardly know that they had been there.

MR. BRINK. I would like to ask Mr. Mills if alfillaria and burr clover are good.

MR. MILLS. Yes; burr clover is one of the very best. I had twenty-one tons of seed to use this year. It is one of the richest, and it is the natural cover crop, and those of you who have deciduous crops perhaps can let it go to seed, and then it will reseed itself.

MR. BERWICK. Mr. Mills, I wish to ask you if that thirty-five tons per acre, I think you mentioned, more or less, of vicias, was it—does that include the root system?

MR. MILLS. The top. I think I said there were twelve thousand pounds in the root system, and I got that by taking ten feet square and digging a trench around it and taking a power sprayer and spraying every bit of the root system and weighing that green, then weighing it dry.

MR. BERWICK. Of course, you know the vicias are used very largely as actual feed in England. Would it be better to cut those vicias and feed them to cattle?

MR. MILLS. If your conditions are such, the cutting and harvesting of them and feeding cattle is the more preferable way, because you can feed and fatten cattle and not lose over 10 or 15 per cent of the value of the vines, and you can get the humus deeper down than you can by applying it in the shape of barnyard manure.

MR. BERWICK. I understand there were thirty-five tons of green feed per acre at one cutting.

MR. MILLS. Yes. That crop grew ten and a half feet long in the vine.

DR. SHERMAN. Can you grow the burr clover without irrigating?

MR. MILLS. Not with us. I should think that here the burr clover would grow splendidly, and yet last year it did do splendidly for us without irrigation, because we had continued rains. This year we had October rains and none since.

DR. SHERMAN. It is still alive, but not growing?

MR. MILLS. Yes; and we can not afford to let it go beyond at least February now, because last year the moth came and laid its eggs and the cut-worm came and they got our oranges.

DR. SHERMAN. If they had let it go to seed and the ground got so hard they could not plow it.

MR. MILLS. That is true. My irrigation cost me a very great deal this spring. The cultivation and irrigation of the lands went from $2.49 to $3.70 over my estimates, because I had to use ten men where otherwise I would have used two for irrigation. I had to flood the ground. But I never had my soil in better physical condition, better fineness, and I never had such a big crop of lemons. We have fifty carloads more lemons on our trees this year than we had last year.

MR. CRANDALL. I would like to ask Mr. Mills if much of the humus and these necessary elements in the soil are not lost to our orchardists each year by too early turning under of the cover crops that naturally grow on the soil? It has been my observation in the Santa Clara Valley that that is the case.

MR. MILLS. When do they turn them under?

MR. CRANDALL. Just as soon as the rains come so that the ground is softened sufficiently, whether it is in January, or February, or March.

MR. MILLS. Now, it is hard for me to answer that, because I don't know just the conditions. I will answer it from our own standpoint. This year we put in our cover crops beginning on the 15th of September.

We will commence plowing about the middle of January and finish before the first of March. The cover crop ought to be turned under before it goes to seed. You ought to have your cover crops in, your soil well disintegrated and in a perfect condition of tilth, warm, so that it will absorb the winter sun, so that the bacteria will be active, so that in the blossom time your trees will get all of the food that it is possible for them to get and all of the moisture; whereas, if you leave the cover crop there to absorb the moisture your tree will not get that which it needs in that particular period of its existence, the most important period of its existence, the setting of the crop and holding of the same.

MR. CRANDALL. How can that be overcome, when you have no means of irrigation excepting by periodical storms and the rains do not come early enough in the fall to start this vegetable growth—until, perhaps, after the first of the year?

MR. MILLS. Then, truly, you have a condition which we have not got. If you can not start your cover crops until the first of January, if your conditions are not like ours, then I would wait until the summer time and I would put in, if I could get irrigation water, the cow pea and grow them, as I have repeatedly, in the orchards.

MR. CRANDALL. I believe you will find that in the greater portion of the State the water is periodical, and we can only get it when it comes and it doesn't come just when we want it.

MR. MILLS. That is, you irrigate in heads?

MR. CRANDALL. Shut off in September and do not get it until February.

MR. MILLS. We shut it off in September, but if we need it in October we turn it on.

MR. CRANDALL. But the rains do not come early. It is only the later rains that we get in the greater portion of California that I have visited, except in some of the more favorable valleys.

MR. MILLS. Then I could not possibly tell you what I would do under those conditions. It is for you to solve that question. This is true, that here in the north—I see in the papers that the very condition of which I have been speaking has already come. A man from Sonoma, writing to the *Rural Press,* stated that his crops were decreasing, that his soil was becoming worked out, and that he believed he was losing his humus, and asked for some information about the growth of cover crops. If you have not got sufficient rains to grow them, I don't know what I would do. I believe if you would use the burr clover before your water is turned off, completely saturate your soil and thoroughly cultivate it in order to hold an immense amount of water in the soil, plant upon that immediately your cover crop, so it will make a growth of six or eight or ten inches before the soil becomes dry—that is the way we do it. We saturate our soil, then we cultivate it thoroughly and put in our crop.

MR. PEASE. I would like to ask one question that applies in the south. What, in your opinion, is the effect on the coming crop of very late plowing-in of the cover crop, say plowing-in as late as April?

MR. MILLS. I will say no effect. Now, I will explain myself. Last year it was a mighty big effect. It cost us tens of thousands of dollars, for the reason that the cutworm moth laid eggs on the cover crop. They hatched, and we got myriads of the cutworms, and they devoured our ripe crop in large quantities and devoured our young fruit. Plowing under in April I have found to do no injury, if I could keep my soil moist enough and warm enough. I do not plow my cover crops; I turn them under. A cover crop does the work of plowing. It goes deep down and plows your soil deeper than any plow made. I do not cut my soil more than five or six inches, and then I use my discs and disintegrate the soil and make a mulch of it, and it is a mulch that gives me power to hold water, and my root system in its digging down, eighteen inches, or two feet, or three feet, allows the water to percolate deep into the soil, and as the water spreads through the spaces between the grains of the soil, the air follows deeper down and I get a finer aëration. I need the air, I need the oxygen to set it afire, as it were, to start fermentation and to give me that which I need in the organic acids of the soil. I do not think I have suffered any loss, yet I say that this year our cover crops will be turned under by the first of March, because we will avoid any loss from the cutworm, and if there is any difference it will not be a detriment, because my soil will be warmer, my cultivator will make more fertilizer available. This is true, that a cultivation of a budded crop is as good as a fair application of nitrate of soda. It pays to cultivate and cultivate and cultivate. The finer you cultivate up and down through your orchards, the better your conditions, the better your crop.

MR. PEASE. The reason I asked that question is because we have parties down there who have said that owing to the fact that they plowed their orchard late in April they had come to the conclusion that the trees would inevitably drop their fruit. What was the trouble with them, was it because the ground was allowed to get too dry?

MR. MILLS. If any man will plow an orange orchard or any other orchard in the month of April, eight inches deep, he will certainly greatly injure it. He has cut off the feeding roots that are near the surface. It is warm there and naturally all the feeders come up into the warmer soil and get most of their food there, and if he goes in and wickedly cuts eight inches of soil at that period he will lose, and he ought to lose.

MRS. RANSOM. I would like to ask Mr. Mills if this burr clover that comes up without being sowed is the one?

MR. MILLS. Yes.

MRS. RANSOM. That comes up without our planting it. We use it for grazing purposes. The cattle do not eat it in its green state, because it is sour. Didn't you state that the burr clover grew some feet high?

MR. MILLS. No; that is the Canadian pea. Burr clover hugs the ground.

MR. BERWICK. Mr. Chairman, I feel rather at sea. I think we have been taught in previous years, by those who were supposed to know, that we should not encourage roots within eight inches of the surface, at least we should have the roots go to a lower level than that; that we should, as far as possible, cultivate a full depth of eight inches and have that soil loose and fairly free from roots. Mr. Mills now suggests the contrary practice. In my practice I have plowed as late as April and had excellent results, plowing-under burr clover that was very hard to tackle, and had no bad results from plowing eight inches deep. My practice was in Carmel Valley.

MR. MILLS. I don't want it to be understood that I do not cultivate deep. If you will show me a dozen farmers in California who cultivate soil eight inches deep I will give you a new hat. I do cultivate deeper than any man in California, I think, and I try to get down eight inches during the hot summer months. I put four large mules, running from 1,400 to 1,500 pounds, on to an eight-foot cultivator, and I put it in the ground to the beam. The tooth is kept always new and the point is nine inches below the bottom of the beam of the cultivator. Of course, in its progress through the orchard it piles up the mulch in front of it and it does not get nine inches in the ground; it gets as near eight inches as possible; but I never think of plowing eight inches deep in the cold months of the year. Think of it, January, February, December! You have got your overcoat on. Sometimes you have got an overcoat on your tree. Sometimes you have got a fire in your orchard. Your soil is cold and the feeding roots are coming to the surface to get what they can of the available fertilizer made available by activities near the surface. The sun's rays are absorbed during the day, given off at night. There the warmth is, there the fertilizer is available, and we have found it injurious to plow our orchard deep at that time. But when May, June, July, and August come, then with all the power of our might we cultivate, and if a four-horse team can't do it two days hand-running they are put by to rest and another is put on. It must be cultivated, because we have got to keep the water in the soil to make available the fertilizer that is in the soil, that the root system may get the moisture and the fertilizer in solution up to the leaf, and the solution manufactured into starches and sugars and carried back to feed the tree. And I say again, Mr. Berwick, that you are wise in part of the year cultivating as deep as horse flesh can cultivate, at least eight inches, not deeper, and I find this, that it is mighty hard for me to reach even eight inches. If you went into my orchards where I said I put it in eight inches and took out your rule and put it down you would very likely say, "How is it, Mr. Mills?" It is pretty hard to get men to sweat their horses. You have got to be there all the time. Therefore, don't misunderstand me. I cultivate deep at the proper season; I do not at the improper season, as I understand it.

MR. BERWICK. Then you encourage a temporary root system to supply a temporary need, and destroy that system later on?

MR. MILLS. If a man faints with heart trouble you will apply quickly the strongest possible stimulants to revive the action of the heart, and after it is revived you will apply that thing which will give him constant returning strength. I say again, that when the atmosphere is cold and the soil is warm only on the surface, warm enough to encourage activities, fertilizer becoming available, then I do not try to destroy the activities that are there working for my benefit through the tree. Now, I may be wrong. Am I wrong?

PROFESSOR WICKSON. I think you are right for an evergreen tree.

MR. ROEDING. I would like to know from Mr. Mills what cover crop he used prior to using the clover?

MR. MILLS. In our locality I find that the vicia has given me the best result. I find that the *Vicia sativa* has given me the best results of any of the vicias, and I would encourage in every possible way the growth of the seed up here in the north, so that we may get it at a reasonable price.

MR. ROEDING. Your soil is of a heavy nature.

MR. MILLS. The great majority of our soil is rather light. It grows magnificently.

MR. ROEDING. How many pounds do you seed to the acre?

MR. MILLS. Fifty pounds this year.

MR. ROEDING. What is the method of seeding?

MR. MILLS. The regular seed drill.

MR. ROEDING. In seeding with the drill do you arrange the seed in such a way that you can get furrows through the rows so you can irrigate?

MR. MILLS. I hang my furrowers to the axle of my drill. The drill works through the orchard, drops the seed in the soil five inches deep, then the furrowers come right along and make the furrow.

MR. ROEDING. The plow is attached to the drill?

MR. MILLS. Attached to the drill so that I do not need to do again at great expense when I might do it all in one turn.

MR. ROEDING. Then, if the ground should become dry after you have planted the seed, you irrigate?

MR. MILLS. We irrigate through those furrows. We irrigate the soil first, cultivate it as moist as we can, drill in our seed, at the same time furrowing it out; the seed then germinates and grows six, eight, ten inches at times before we have to irrigate. Last year we did not have to irrigate. The rains came in beautiful showers and the cover crops matured for us without irrigation. This year we had to turn on the water just ten days ago.

MR. ROEDING. Have you ever been troubled with gum diseases from the fact that the ground was closely covered with the cover crops?

MR. MILLS. No; we can not get the cover crops anywhere near the trunks of the trees. The trees are ten and twelve years old, and the cover crop is put in, of course, on the outside of the branches of the trees both ways, so that we will cover every foot of the orchard that is available for the cover crop. We have, however, some gum disease—I am happy to say very little; I am happy to say that we are able to control it; that on thousands of acres it would be hard to find fifty trees. However, you will find it, Mr. Roeding, down south in tremendous quantities. I know orchards in which there is not a tree that is free from the gum disease, because the orchards really need drainage. If they were mine I would put drains in, tiles, and draw off the water.

MR. ROEDING. It is a fact that a light soil will not be as much liable to gum disease as a heavy soil?

MR. MILLS. I am quite sure you are right.

DR. SHERMAN. Did you ever inoculate the vicia as you do the cow pea?

MR. MILLS. No. The species of bacteria in our soils that are natural and that inoculate the burr clover are the same that work on the vicias—all varieties of vicias. The species that work on the cow pea are not in our soils, and we have had to inoculate for them.

DR. SHERMAN. I had it in two places last year and did well in one and not in the other.

MR. MILLS. The cow pea?

DR. SHERMAN. No, the vicia.

MR. MILLS. If your soil is devoid of humus you will have very few bacteria in it. Go to another orchard where you grew successfully a crop and take a few sacks of soil and spread it over your orchard. Throw it over another soil before putting in your cover crop and you are inoculated. The first year I inoculated the soil and I inoculated the seed with bacterial matter that I got from the Department of Agriculture at Washington, and I got good results from it.

MR. BERWICK. I want to ask you if you don't think a well-drained soil is a warmer soil than one not so well drained, and whether the plowing would not have the effect of draining the top soil?

MR. MILLS. A soil that has too much water in it is in a very bad condition for fertility, for the air can not go where water is. If your soil is in that condition and there is no drainage from below, then a plowing of that soil will be very beneficial, because the sun will drain your soil, the winds of heaven will whistle through it and take out the moisture; yet, if it takes the moisture from your surface soil it will take out that which gives you the best conditions in the soil. Still, if you can not get the best drainage because you have conditions of hard-pan, and you can not get rid of your moisture, then plowing will do good; but I never had any soil that didn't give me sub-drainage. My great trouble is to get water enough in the soil.

MR. BERWICK. But we loosen our soils in California to retain moisture, and in loosening our soils in the spring I maintain we retain the moisture rather than lose it.

MR. MILLS. If you will plow your soil, disc it well, follow it up with the cultivator and the harrow and keep it well pulverized and get a dust mulch, and every time the rain comes again cultivate and harrow, you will hold a large percentage of the moisture; it doesn't get away. But I don't plow, for the reason that my cover crop does my plowing, as I see it. I plow for aëration. My cover crop aërates the soil. As it decays the channels open up and the water goes down deep and the water fills the soil. Therefore, I get more moisture, because I have a better percolation of the soil. I hold it, because I have more humus. I hold it and have better conditions with the air following the moisture after it has equalized itself in the soil. If, however, there is more water than there should be in the soil, it is up to you or any other intelligent farmer to treat his soil in that way which will bring about the best results with that particular soil.

MR. O'BRIEN. If I want to sow cow peas next year, how shall I determine whether my soil contains the bacteria?

MR. MILLS. If you have not grown cow peas before, you may know that you have not the bacteria.

MR. O'BRIEN. How shall I put that in the soil?

MR. MILLS. You will send to Washington and ask them for that special bacteria. They will send them to you with minute instructions how to inoculate your seed and your soil. Follow those instructions carefully, and you will take your seed in due time and drill it in the soil and you will find that they have increased in the soil and that the bacteria begin to work on the nodules on the root, and next year you will have better and better conditions. That is, however, a summer crop, not a winter crop, easily frozen. It must be planted early in the summer, say April or May, and then plowed down in the fall.

(At this time, on motion of Mr. King, duly seconded and carried, the Convention adjourned until to-morrow morning at 9:30 o'clock, but the members to immediately come together again in special session.)

IN SPECIAL SESSION.

THURSDAY EVENING, December 5, 1907.

MR. GERALDSON. I thank you for the courtesy you have accorded me and hope you won't be disappointed. I feel that, coming after the scholarly effort of Mr. Mills, my paper will appear crude, but you can class it as the effort of the man with the hoe as against the scientist and the student. I know I am going to shock you to some extent.

OVERWORKING THE SOIL.

BY GERALD GERALDSON, OF NEWCASTLE.

I can now just imagine how the good professors, and the sturdy, conventional old wheel-horses of good husbandry will "swat" me when they get a chance. But the truth must be told, and apparently I am elected by fate to tell it and to take the consequences—first lots of "*swats,*" but finally vindication, full and glorious, "for truth crushed to earth will rise again"—and time will certainly demonstrate that my views are sound and that it has been my good fortune to stumble onto the true solution of our troubles in the way of soil destruction, and which the accepted authorities have missed altogether.

It is the mechanic who actually builds and operates the engine who improves it. It is the man who actually follows the plow and who comes in actual contact with mother earth who most accurately sees and feels her needs. The same intimacy that you can develop with your trees and flowers, you can also develop with mother earth herself.

To say that soil becomes exhausted after thirty or forty years of cultivation must be a mistake. If it were true, the race would speedily starve. Nature must have a way of finally overcoming the damage which man, in his misguided enthusiasm, does during his stay upon a given piece of land.

If we climb up Time's ladder a little way, so that we can look out over a period of say one hundred years, we will see that she finally forces him *to quit cultivating,* and to give the soil a rest, as has occurred in many places in the East and is even now occurring to some extent in California.

If a man works constantly night and day, within five or six days at the outside he will be compelled to rest. If, as often occurs in the mines, a man works seven days in the week, month after month, he, too, will finally be compelled to stop and rest. But if a man works six days in a week, sleeps six nights, and recreates on the seventh by whatever means bests suits his wish, he will ordinarily live to a good old age in health and vigor, and will accomplish vastly more work in the long run than either of the other fellows, other things being equal.

Now, when I take a piece of land and cultivate it every year, I am making it work night and day, and the result will be just the same as in the case of the man; namely, utter prostration when the limit has been reached.

But you ask, How can you handle an orchard or a vineyard in any other way? This brings us to the kernel of the matter.

The most superficial study will show you that soil anywhere simply consists of little particles of rock mixed with decomposed vegetable matter, or *humus*. Now, in the beginning there was nothing but rock, so how did the humus get there? If you will watch closely you will see that nature put it there, through centuries, by adding *dry matured* wood, leaves, twigs, and grass to the little particles of rock.

When the good husbandman plows-under green grass, he is only giving the man working night and day a drink, because green grass is nearly all water. When he hauls a load of stable manure, he is only giving him something to eat, and mighty little at that. . And when he puts on chemical fertilizers, he, in my opinion, is only giving the man a drink of whisky, because he is getting sleepy—the results are only temporary. The last condition of that soil is worse than the first.

It has never occurred to him that the poor fellow might need a rest and that it might be highly economical and advantageous in every way to give it to him—and to give it to him regularly.

But you ask, How can you give an orchard or vineyard a rest without ruining it? Simply this way: We will call the space between two rows of trees or vines a "middle." Just *plow alternate middles on alternate years*. That is the whole thing in a nut shell. In other words, *plow half of your land each year*, not all of it, and do it this way, *alternate middles on alternate years*. Keep it up for four years and watch the results.

The first and second years you will call yourself a fool and a lunatic and numerous other things, and your neighbors will quite agree with you. The longer you have been following in the good old way the more nearly your soil will resemble Portland cement, on account of lack of humus, and the harder will be the strain on your trees and your nerves. The strain you can overcome very largely.

The third year, however, you will begin to see results, and the fourth year, unless your soil is very badly off, the battle will be won, when you will begin to get an ever-increasing crop of natural grass—or artificial, if you wish—which you will plow-under next spring in a dry, matured condition, in which it will be worth about ten times as much as it would have been were it plowed under green, and you will find yourself on a self-sustaining basis, when you can get crops of fruit indefinitely, and where your soil will get better and better instead of worse and worse, provided, of course, that you continue to cultivate in exactly this way.

I lay stress on this way because it always provides loose, cultivated ground on one side of your tree and also provides frequent firebreaks, which will be very necessary when the grass gets well started, as it will about the third year.

The mere fact of the soil being unplowed for a year is a benefit to it, as it turns over next year with a mellow, granular appearance, more and more resembling its virgin state as our system continues; but this is a mere detail.

We are now told that plants, in growing, secrete in the soil substances which in time prevent their further growth and development. In forests we find many species, large and small, growing indefinitely in health and vigor without any sign of starvation or soil exhaustion. The secret of this, I believe, is that one species feeds on the excretions of the other; and I believe that grass and weeds growing in an orchard or vineyard feed on the excretions from the trees and vines, just as surely as they in their turn provide the only adequate supply of that absolutely indispensable *humus* on which the trees and vines must live, if they live at all.

At all events, we have reached in our experiments a result which points very strongly in this direction.

Six years ago our sole aim and object in life was to destroy every "weed," so called, and every evidence of a weed, in our orchard. We plowed, and then plowed again, and then cultivated about four or five times, until the surface of the ground was almost as fine as Portland cement—and baked about as hard, when it got a little water on it. The first time we irrigated the water would soak out about two feet from the ditch. The second time, about eight inches; and the third time, it would be running out of the end of a row thirty trees long in about thirty minutes, and would not soak six inches away from the ditch in twenty-four hours. By next spring, when we plowed, we would have about two inches of *green* grass to plow under. At that time we were compelled to irrigate trees on "old" land every seven or eight days, and even then we could not keep them from showing need of more water. We found it almost impossible to get the fruit on trees on such ground up to size, and trees with any considerable crop of fruit made almost no growth.

Now, after five years of the system of plowing alternate middles on alternate years, what is the condition of affairs? The physical condition of the soil is altogether changed. It is as "mellow" as any ordinary piece of new land. We irrigate about once every month. The quality of our fruit on "old" land, thus handled, is as good as any we ever produced on new land, and even with heavy crops our trees make a vigorous growth and give every evidence of health and vigor.

In laying off the land for plowing, we so arrange, as far as possible, that these unplowed middles will lie crosswise to the flow of the water caused by the winter rains, because, while the second object of this system is to put more humus in the soil, the first object is to prevent the washing away of that which we already have.

Now, when we plowed last spring I feel confident that we plowed under an amount of natural grasses, including burr clover, easily equal to fifty two-horse loads of stable manure to the acre.

Our experience has proved beyond question that the covering of dry grass which we have on the unplowed middles through the summer, and the good physical condition of the soil amply offset the supposed increase of evaporation due to its unplowed condition. This must be so on account of the less irrigation required to get better results than ever. As we get uniformly good results with all kinds of fruit we grow, I feel confident that a careful, scientific study of the matter will show that this system will enable nature to replace not only the nitrogen required, but all other chemicals necessary.

(The special session was thereupon duly adjourned.)

PROCEEDINGS OF THE FOURTH DAY.

FRIDAY, December 6, 1907.

The Convention was called to order by Chairman Jeffrey at 9:30 o'clock A. M.

THE CHAIRMAN. Is there any business you wish to dispose of before taking up the program?

MR JUDD. Mr. Chairman, with your permission, I would like to present a couple of resolutions so they can be acted upon at the same time.

Reads resolutions, as follows:

Resolutions Favoring Forest Reserves.

WHEREAS, The agricultural and horticultural interests of this nation are the foundation of its national life and prosperity; and

WHEREAS, The prosperity of vast areas of our agricultural and horticultural lands are dependent wholly upon the waters that have their rise in the mountains; and

WHEREAS, The denuding of the mountains in this and other states threatens the turning of vast areas into desert that are now rich and productive; therefore, be it

Resolved, That we, the fruit-growers of California, in convention assembled, do most heartily indorse the enlightened and far-seeing policy of President Roosevelt and U. S. Forester Pinchot in their efforts to conserve the forest reserves which conserve the water which conserve the agricultural areas: and be it further

Resolved, That copies of these resolutions be forwarded by the Secretary of this Convention to President Theodore Roosevelt and U. S. Forester Pinchot.

Resolutions of Thanks.

WHEREAS, The Thirty-third Fruit-Growers' Convention is now nearing its limit, and it has been one of the most enjoyable and successful meetings in the history of our association; and

WHEREAS, We owe much of its success and enjoyment to the good efforts of the people of Marysville and Yuba City; therefore, be it

Resolved, That we tender a vote of thanks to the Committee of Arrangements who have taken charge of the details of the work connected therewith, for the able manner in which that work has been done, for the excursion provided for us over the electric roads, and for the care they have displayed in looking after every detail for our comfort while among them.

Resolved, That a vote of thanks be tendered to the Women's Civic Improvement Club of Marysville and Women's Improvement Club of Yuba City, and their associates, for the very brilliant and enjoyable entertainment provided for us on Tuesday evening, and that this also include all who took part on that occasion.

Resolved, That we tender a vote of thanks to Rev. W. S. Wilson and the Trustees of the Presbyterian Church for the use of that edifice in which to hold our meetings, and also for the care taken by them for our comfort during the time of our sessions.

Resolved, That a vote of thanks be tendered the local press for the work done by it in promoting our Convention by many notices for several months past, and for the able and accurate reports made during the holding of our sessions.

Resolved, That we express our appreciation of the courtesy extended by Mr. Eben Boalt of Palermo in presenting each delegate with samples of fine Navel oranges from his grove.

THE CHAIRMAN. There is another resolution to be referred to the Committee on Resolutions.

The Secretary then read the following resolution:

Resolution Favoring the Alaska-Yukon Pacific Exposition.

Resolved, That it is the sense of this Convention that the fruit-growers of the State, representing one of California's leading and significant industries, should coöperate generously with the Governor and his representatives in the effort to make a strong and effective showing of their interests at the forthcoming Alaska-Yukon Pacific Exposition, to be held at Seattle, Washington, in 1909.

THE CHAIRMAN. If there is no objection, that will be referred along with the others.

In the absence of Mr. Messenger, Secretary Isaac read the following paper on the "Commercial Value of Ornamental Trees":

COMMERCIAL VALUE OF ORNAMENTAL TREES.

By C. B. MESSENGER, of Los Angeles.

Some time since, when one of the largest tourist hotels near Los Angeles was being constructed, it became desirable to make certain changes in the plans. After the architect's changes had been accepted and the contract let, it was found, on making measurements, that one of the many fine, large live oaks must be sacrificed. This was contrary to the wish of the owner, and he demanded that still other changes in plans be made so as to save the old oak. This the contractor refused to do, as it would cost a large sum. Instructions were finally given, however, that the changes should be made so as to save the tree, providing the additional cost to the owner should not exceed $5,000. Five thousand dollars may then be taken as that one man's estimate of the value of that oak tree in that particular location.

Again, upon the occasion of widening a street in Los Angeles, it became necessary to destroy a beautiful "pokeweed"—Phytolacca. The owner refused to have it destroyed unless he be compensated for the loss of the tree, which to him was of great value. The matter was referred to arbitrators, and after consideration of the facts he was allowed the sum of $500 for his tree.

Other instances might be given where a price has been placed upon a tree or a number of them, or where large sums have been spent in securing and moving to a certain location trees which appealed to the fancy of the owner. But the above two instances may be sufficient to cause us to ask, Can any such value be placed upon trees?

Let us grant that the first instance of the $5,000 valuation is extreme, and while it may obtain again, it is highly improbable. But the second instance surely is not, for after careful consideration fair men made such award as compensation for its destruction.

But aside from the financial value—the calculated, hard and fast value of so many pounds and ounces for so many dollars and cents—let us look at another value, still greater. Let us go back to the old days when the "wood lot" was common, when a whole community gathered on the bank of the river under the great sycamores, walnuts, maples, and beeches and enjoyed a day of unadulterated happiness. Such a grove brought many a stray dollar to a community.

It is not possible to compute the amount of gold poured into Switzerland's lap because of her wonderful mountains. Neither is it possible to compute the gold poured into California because of the fame of her giant sequoias. The lumber man looks with measuring stick in hand, and begrudges the waste of such a vast quantity of lumber as one of those trees contain. But should the greed of immediate possession overcome the more far-sighted and enlightened policy of protecting our great heritage, it will be a sorry day indeed for California and result in the loss of millions—millions, not of sentiment nor in simple pride that one can stand and boast that "*We* have the largest trees on earth!" but millions of hard dollars.

"But why reduce the consideration of those noble friends of ours to such a sordid basis? Is not our love for the Sequoia of the Sierras, or the oak of the hills, or the sycamore of the valleys and cañons, sufficient to protect them?"

Too often it is not. Within a stone's throw of my home, I can look down on hundreds of fine sycamores lining either side of Arroyo Seco; yet often I can hear the ax claiming the gnarled old giants for a few more cords of stovewood for the owner too ignorant to appreciate the great patrimony he is sacrificing. And as to the love of the trees saving them, there would be fewer of them to-day if that were the only consideration.

Let me illustrate: A few years since the temperance, or so-called prohibition, sentiment began to be agitated in many southern California towns. Year after year a campaign more or less hysterical, with "Ten Nights in a Bar Room" scenes and strong appeals to sentiment and sympathy, was waged, with indifferent success on one side, then on the other.

But, presto! It was discovered that the town without the saloon was securing a class of people which all towns wish to secure to help upbuild and make them move in step to the twentieth century swing. That moment the appeals to sentiment and sympathy ceased, and a cold-blooded consideration of wiping out anything inimical to the best financial interests of the town began to win favor and win votes, and the suddenness with which saloon changed to no-saloon towns surprised all.

"What is there in it?" is the question which springs to the lips of every American.

Now then, what is there in it for California if she will protect her few trees and, more, if she will plant for the future? To the more observing the answer is plain. To all it is plainer than it was a few years ago. But possibly we may get an idea from a few minutes' discussion.

The cities recognize the drawing power and the absolute necessity of trees in their parks. The beauty spots have a drawing power for all. The farmer's son visits the city and becomes fascinated with its life and the value put upon things beautiful. It appeals to him. The farm home too often has a barren waste about it. There are other features which draw the boy from the farm, but if farm communities join in creating beautiful surroundings, in fostering a spirit of rivalry between each other and in vieing in producing more attractive roadways and home grounds, I believe a great factor will be added in keeping the boy at home.

"Is that a commercial factor to the farmer?" Ask the orchard or vineyard owner who, for want of help, has been compelled to contract with the wily Jap to secure the gathering of his crops.

Again: Imagine an Easterner, a tourist homeseeker, looking over the State—from a car window, as usual—going north through the San Joaquin Valley. He strikes Bakersfield on a warm summer morning about eight o'clock. Nearly all day he rides in that one valley. Here and there occasionally an orchard, but scarcely a large tree visible from the car window. The mountains to the right show in the dim distance an occasional cap of snow. To the left the Coast Range is so low on the horizon as to be almost invisible. The great expanse is in many places almost as unbroken as the surface of the sea.

The appearance of a eucalyptus grove or a solitary tree wins his eye almost as quickly as a passing ship in midocean. He is ignorant, perhaps, of the great wealth-producing power in that section of the raisin, the peach, alfalfa, or the dairy, or that over against the hills are productive orange groves. Before these facts can be impressed upon him, he becomes unconsciously prejudiced against the section through which he is passing, and one who would have been a strong factor in the upbuilding of California may go home to influence others against our State.

California, with its brown fields—brown the greater part of the year at least—demands more attention as to the breaking up of the landscape, especially in the larger valleys, with trees so far as possible.

If each home-maker would realize this, and instead of planting fruit trees clear to the foundation of his house, with vineyard perhaps in his front yard, and in their stead plant here and there a large growing forest tree, which, as a rule, is far less subject to pests and diseases than the fruit tree, he would surely add greatly to the natural beauty of his neighborhood and by that means attract to it a class of people believing as he does in having things beautiful surrounding them. All of which creates a greater demand in others for that same property. This, in turn, begets greater care in orchards and vineyards, which in turn brings greater wealth. Like begets like, so that greater care and attention to ornamentals brings its further demand of better care to the producing part of the ranch.

What to plant, how to plant, where to plant, are important questions, but not within the realm of this talk. Only permit a hint. Don't strain after strange or unknown or expensive trees simply because they are such. The eucalypts have proven themselves wonderfully adapted to our State. On my own place I have planted an occasional sequoia, live oak, maple, or other slower-growing tree. But the masses and general effects are made of eucalypts, peppers, and acacias, My children's children may point up to the sequoia which I have planted, but while it is growing a few inches, or at best a very few feet, in my lifetime, the common eucalyptus will grow to be a monarch.

Don't let the idea prevail that the common things with which we are familiar about us may not possess great beauty.

If wealth permits the introduction of strange or new trees; let such service to the State be encouraged. But this appeal is for the lowliest of us to plant some trees in the home croft—trees which will add to the attractiveness of our State, to our own comfort at noonday—

"And the night shall be filled with music,
And the cares that infest the day
Shall fold their tents, like the Arabs,
And as silently steal away."

THE CHAIRMAN. We will now have the paper of Mr. J. H. Reed of Riverside, on the "Importance of the Careful Handling of Fruit."

IMPORTANCE OF THE CAREFUL HANDLING OF FRUIT.

By J. H. REED, of Riverside.

My subject, as it appears on the program, seemingly covers fruit handling in general. While I believe the needs for the best preservation of fruits after leaving the trees are largely alike to deciduous and citrus, I would not presume for a moment to discuss the former here at the north. I know too well the worldwide reputation the fruit-growers of central and northern California have justly earned for not only producing fine fruit, but also for wisely handling it. Last year I visited many of the Middle and Eastern States. Wherever I went, at every fruit store and every fruit stand, was the prominent placard, "California Fruits." Near by a bushel basket full of Michigan peaches would be a little carton of California fruits, both labeled at the same price. I was proud of California deciduous fruit-growers; in fact, was almost inclined to lie a little and insist that I was a northern California fruit-grower myself and had a hand in producing the splendid display before us.

Of orange-growing up here I only know that we at the south hear so much of your success that we begin to look to our laurels. If in the little story I have to offer of a matter that is proving of exceeding importance in the handling of our oranges at the south, there may be anything of value to you northern growers, I shall be pleased.

I shall not go into a general discussion, but by a brief object lesson strive to enforce the importance of careful handling, and of knowing how.

Our southern California orange industry, during its brief career, covering, as it does, but about half an ordinary lifetime, in which it has grown from practically nothing to an annual producer of some $25,000,000 or $30,000,000 in value, in the main has developed gradually. But there have been a few errors of special growth, because of important newly discovered methods in culture or marketing, quickly put into practice.

Though some of us at times have been somewhat impatient at the tardiness with which improved methods have been accepted in general practice, probably there has been no agricultural industry that has developed with more rapid and substantial progress than our California orange-growing. Men who came to California in middle life, taking part in the commencement of the industry, and in all its varied progress since, are yet actively engaged in the business.

With its financial prosperity, its attractive features as an occupation, and the esthetic effects of its orchards, giving a distinct characteristic to the country, it has attracted to it intelligent men who have put wealth and enterprise into the development of the new and interesting industry with such success that it is now the acknowledged basis of the phenomenal prosperity of southern California. While, for the most part, the development and progress of the industry have been gradual and continuous, it at times has received special impetus from important discoveries which materially increased its prosperity and promise of its permanency. Of these the introduction of the seedless orange was the most important, at once bringing our California fruit to favorable attention, and securing for it a permanent, growing market.

The early organizations of coöperative methods of marketing, by which now over half the entire product is marketed through a single agency, marked a distinct era in the industry. It materially modified methods even of packing firms that do not affiliate directly with the coöperative exchange, placing the marketing generally on a more substantial basis than ever before.

While from lack of exact knowledge, which comes only from scientific investigation, we are yet plodding along with guesswork largely in fertilization, the recently introduced cover crop is proving the most important step yet gained in producing economical plant food and soil health for our orchards, and will mark another new era as distinct in orchard methods as coöperative marketing has in marketing methods. And it should be mentioned in this connection that the general and rapid introduction of this tremendously important factor in fertilization is largely due to the intelligent and persistent advocacy of one man, Mr. James Mills, of Riverside. Had Mr. Mills rendered it no other service, this alone would have the entire citrus industry of California his debtor.

But of all these special advanced methods in orange culture and marketing, which have meant so much to the success of the industry, none effected so quick and radical changes, with the promise of so far-reaching, as well as immediate important results to the industry, as the investigations of the Washington Department of Agriculture during the past three years into causes and prevention of decay of oranges in storage and transit are now doing.

Up to three years ago, the effort of progressive orange-growers was the economical production of good fruit. But little attention was paid to handling. When the fruit was ready for marketing, it was, as a rule, roughly gathered. Men, paid a small price per box, were set to picking. The work must be hurried to make reasonable wages. Little attention was paid as to how the fruit was parted from the tree. The fruit was often dumped from bushel sacks into the boxes, hauled on springless wagons at a trot over rough roads, exposed to the hot sun and dust, to the packing-house, where after rough handling of boxes it was put over grading machinery, usually of a character that treated the fruit as harshly as did the human handlers, then packed in heated cars at the high temperature at which it came from the field, and started across the continent on its ten days' to two weeks' trip. It is true there were orchardists who handled the fruit more carefully than this description would indicate, but they were not the rule. At the packing-house, ordinarily, identity of their fruit was lost to growers. The vast actual shrinkage from decay, often of from five to sometimes forty per cent, when the fruit was opened at its destination, was seldom known to them, or if quoted it was little heeded.

This enormous loss to the industry which had been sustained during all these years had been little realized by the majority of the producers, and those who had given the matter attention, for the most part looked upon it as a sort of necessary evil—a loss unpreventable. But some who had calculated the tremendous total loss to the industry, if continued from year to year, and especially when marketing conditions became less favorable, as sooner or later they necessarily must be, by reason of increased competition and the largely increased product as indicated by the rapidly increasing orchard acreage here at the north as well as with us at the south, led a few men to cast about to see if something could not be done toward at least lessening this enormous leakage from growers' profits, amounting to several millions annually.

The Department at Washington was finally appealed to. After much solicitation Dr. Wm. A. Taylor, pomologist in charge of field investigations of the Bureau of Plant Industry, came over to look into the merits of the request. He recognized the trouble as one of sufficient importance to justify immediate investigation by the Department. Mr. G. Harold Powell, special expert on life of fruits, who had rendered invaluable service to the great winter apple industry of the country by his investigation into effect of cold storage and intelligent handling, was sent to the Coast to look into the orange-decay trouble. It would be too long a story to go into the particulars of his three years' investigation, and I can but summarize his methods and results.

Mr. Powell was unacquainted with citrus fruit handling, but his training as an expert investigator, and his study of the life of other fruits after being parted from the tree, put him quickly on the track of conditions that he thought might have to do with causing decay. These leadings he followed up most carefully, repeating every test over and over, under various conditions, till he was absolutely sure of his conclusions.

He found that the delicate exterior structure of the orange was easily injured. He demonstrated by repeated experiments that damaged fruit was more or less subject to decay, according to the degree of heat and moisture to which it is subjected. He also demonstrated, beyond a question, that uninjured fruit under fairly favorable conditions is practically immune from decay. Then came the question, Have we been allowing our fruit to become injured in the handling? To this inquiry Mr. Powell addressed himself with the same keen, systematic persistence as he had to finding the law of fruit decay. He went into the orchards and scrutinized the work of picking and other orchard handling. He kept this up week after week in various orchards in many different orange-growing sections, and then reported the astounding fact that a large percentage of our oranges was habitually more or less damaged in the handling. Careful growers could not credit this till it was shown to their own eyes.

On close examination from ten to forty per cent of the fruit was shown to be damaged by the clippers, by punctures from long stems, by gravel in the boxes, etc. This condition was found in all the orange-producing sections. In some orchards more, in some less, but there were no entire exceptions.

It was a matter of no little humiliation to some of us who had prided ourselves in knowing something about oranges and their careful handling. But there was no gainsaying the facts. Mr. Powell would take the doubter to his own orchard and have him examine the work of the pickers for himself, calling attention to the damages which had heretofore escaped him. Most of them slight, it is true, but sufficient to leave the fruit vulnerable to the deadly fungi. To be absolutely sure of this, Mr. Powell would select, from the same lot of fruit, enough of the damaged to fill several boxes, and of the apparently undamaged to fill other boxes, place them for two weeks subject to the same conditions of heat and moisture as they might be subject to in a close car. On examination, every fruit in the boxes damaged would be found in some state of decay. In the case of the uninjured, there might be here and there a decayed fruit, but in every instance on close examination the decay would be found centered around a mechanically damaged point so obscure that it was overlooked when put in. The balance of the fruit would be found as sound as when put in the box.

Growers who carefully watched this investigation were amazed to see how quickly and easily Mr. Powell demonstrated these simple facts of such tremendous importance to our industry.

Here, then, was the key to a cause sufficient in itself to account for an annual loss of from five to twenty-five per cent of the value of all the fruit we sent to the markets, which had largely escaped our attention. The matter was now up to the grower. Was it practicable to gather and deliver this fruit undamaged? As to this, opinions differed. Many were doubtful whether the old methods and practices could be materially modified in any large way. Some of our more enterprising growers, who packed their own fruit and had followed the experiments and demonstrations closely, took this matter up seriously, and insisted on careful methods from the orchard to the packing-house. On careful tests it was quickly found that radical improvement was being made by such. From orchards where an average of ten to thirty and more per cent of damaged fruit had been found, the injured was reduced to two or three per cent, and in some cases to less than one per cent. A remarkable change. These more careful methods cost something. Piece work in picking was changed to day work, and the persistently careless dismissed. The expense of picking and handling to those who succeeded in practically eliminating injured fruits was materially increased, some reporting it to be doubled, but a cent or two a box was but a slight fraction of the gain.

Mr. Powell now turned his attention to the effect of cleansing, sorting and packing machinery at the packing-houses. That injury to the delicate fruit was done here, he was satisfied, but to demonstrate how serious, and how it was to be remedied, was a far more difficult problem. A bruise from impact as the fruit passed through complex extended machinery was more difficult to detect, and the effect of the brush and of washing on the delicate surface oil cells difficult to determine. Here is where the value of the trained expert came in. For two years Mr. Powell with his trained scientists followed up these matters, till practical results were clearly demonstrated. This importance can be best estimated by the fact that radical changes were at once made in many packing-houses.

In the meantime the effects of the high temperature in the cars when the fruit was loaded was given careful attention. In a cool dry atmosphere even an injured fruit will carry a long time before showing signs of decay, and an uninjured indefinitely. The effect of loading fruit already at a high temperature from warm packing-houses into uncooled cars was carefully watched, compared with fruit that was delivered without being heated and kept as cool as practicable till loaded in the car, and again with fruit artificially cooled down to 35 or 40 degrees before loading, was carefully tested with marked and significant results. These experiments were carried on with the greatest care and repeated until there was no possible question of the reduced amount of decay when the fruit was started on its long journey at a low temperature. For two seasons, scores of test cars were sent on under these varying conditions as to temperature when started, often with an expert attending the train, carefully noting the temperature at frequent points, till it reached its destination.

In making these tests the transportation companies granted every facility desired, sometimes at very considerable expense to themselves, to make them as decisive as possible. This work went on till the law controlling the effect of temperature of fruit at its starting on its carrying ability was determined, and it was found to be a matter of very great importance. It was clearly demonstrated that precooled fruit opened at the other end with much less decay than that without precooling, and that fruit handled with special care to keep it from being heated, even without being artificially cooled, had material advantage over that allowed to become heated before being loaded.

While this matter of conditions in transportation resulting in least decay in the fruit on its arrival may be quite out of the control of the grower, it is of vital interest to him. Even if he sells his crop on the trees, the dealer can and will pay more for it if he has assurance, from its being carefully handled, that it will reach the market in sound condition. But it is to growers who have an interest in their fruit till it is sold, that this careful handling more directly appeals.

As to the actual value of this careful handling to the grower, it is difficult to definitely determine. It has been estimated by those who are in position to judge best in the matter, that the aggregate saving to orange-growers during last season, because of the more careful handling induced by these investigations, exceeded $1,000,000. A more definite notion may be had from actual individual experience.

Mr. L. V. W. Brown is one of our large Riverside growers who packs his own fruit. He was deeply impressed with the value of careful handling as suggested by the result of Mr. Powell's investigations, and during last season rigidly insisted on his fruit being handled with the greatest care. Mr. Brown tells me that he estimates his net increased receipts from his product of last season, because of this special care, at from 50 cents to $1.50 per box.

The National Orange Company also of Riverside (The Chases) were among the first to give careful attention to Mr. Powell's investigations. They quickly recognized the practical value of their results, and at once had both packing-house and orchard handling regulated accordingly, at a considerably increased expense over that of old methods. But in spite of this increased expense, they estimate the net gain from it as much as that claimed by Mr. Brown. They found that their carefully handled fruit, even after warm weather commenced, was carrying fully as well without icing as the ordinarily handled fruit with icing, and icing their fruit was not commenced till six weeks after that of most shippers. The margin of saving on two or three cars per day on this alone was very considerable.

Many other cases where equally large gains were made could be cited. These cases, of course, simply indicate the *possibilities* of adding to the orange-grower's profit through the results of careful handling.

Of course, the advantage in utilizing the new methods is considerable with the large grower packing his own fruit, or firms having entire control over all the fruit they pack from the time of picking. But after following these investigations from the first, as well as the application of their results in a practical way, by many houses giving them careful test, I am satisfied that at least 50 cents per packed box may be saved to the *small* grower by this careful handling, where so coöperatively associated as to have it rigidly carried out; that is, a net gain of $500 to the grower of every one thousand packed boxes. I firmly believe that this increase of net profit, 50 cents per box, to California orange-growers is entirely practicable; but to be quite safe in our estimates, place the gain at 25 cents per box, one fourth the amount that has actually been secured over old methods, and we see how tremendously important these investigations may be made to our California industry.

Supposing the associations making up the California Citrus Fruit Exchange, which will probably pack four million boxes or more this season, should all carry out these reforms in handling, as many of them are preparing to do, here would be $1,000,000 added to the net profits to be distributed to their patrons. The same advantage may be secured to the patrons of independent packers.

It is sometimes claimed that agriculture is the slowest of all occupations to avail itself of demonstrated advanced methods. This certainly has not been entirely true of our California fruit-growers, and I think it remarkable how quickly and vigorously the demonstrated value of careful handling of our orange crops is being appreciated and utilized.

Much of this fruit will be gathered this season and henceforth by careful picking forces working immediately under trained supervisors. It will be delivered to the packing-houses in the most careful manner, and there handled by men and machinery best adapted to secure it from any injury. Already many packing-houses have been and are being entirely refitted to secure the object suggested by the investigation, even at the cost of laying aside expensive machinery and appliances and putting in new. The fruit will be shipped as quickly as possible after being picked, and, where possible, cooled before shipping. Where this approved method of handling is not used, the grower will continue to lose a possible margin of income equal to a fair profit in itself.

I recognize fully the importance of our orange-growers applying themselves most diligently to the solving of our marketing problem, to the improving of our orchard methods, to the more general and intelligent use of cover crops, and other means of bringing the soil into the best condition, to the rigorously shutting out of new insect pests and finding better means of freeing our orchards from those already preying upon them. I recognize, too, that there are other things than careful handling that have to do with the keeping qualities of our fruit, but I do not think there is any one thing to which we growers can address ourselves with so large and immediately profitable results, just at this time, as that of securing the careful handling of our fruit.

THE CHAIRMAN. Does any one wish to discuss the paper just read or ask any questions regarding it?

MRS. GAGE. Mr. Chairman, I would like to ask if there is any one in this Convention who knows anything in regard to the experiment of packing fruit in the paper package? I understand that the great burden laid upon our fruit-packers by the high price of material is going to be circumvented by a paper package, and I understand it has been tried in the Southland.

MR. REED. Several different kinds of packages have been introduced. I am of the opinion that there will be improved packages for carrying our oranges. We have now being manufactured a board box that promises well, but I can not say that any other packages but the ordinary packages have been successful.

MR. KING. In my limited experience in the citrus fruit country and so far as my observation goes, after reading very much about the conserving of the fruit after it is grown, I have seen a great deal of discussion as to the methods in the packing-house and about the handling in the orchard. It seems to me that one of the most fruitful sources of injury to your fruit is the picking shears used in all the orchards—certainly in northern and central California. The only shears that I have seen have two very sharp points. They are so sharp that they will injure the picker if he is not careful. I think ninety per cent of all the oranges clipped from the trees are not in sight of the picker. I do not think that he attempts to look at it as he puts his shears on the stem to cut it off. I believe it would be a wise thing for this Convention to discuss and suggest to manufacturers that a better shears than are now provided can be had, and I do not think you would have to go a very long way to get an improvement and thereby save a very large percentage of the injuries which you have in your picking.

DR. SHERMAN. Mr. President, I would say that this seems a little new and strange to me, if they have not orange shears up here. All through southern and central California they are to be found, and they are a little shears with a round end. They are about six inches long and they are kept in all the hardware stores in central California.

THE CHAIRMAN. I will say to Mr. King that in the south he can find half a dozen or perhaps more different varieties of shears for preventing injury to the orange. I have three in my old desk in Los Angeles. Three different patents were presented to me to show the farmers, and there are at least six different patents. I would like to ask if any one can answer Mrs. Gage's question.

MR. MILLS. I will answer it in a measure, but I wanted to ask a question first. Do I understand that you do not use clippers in picking your oranges in northern California?

MR. KING. Yes, we do. They cut them off, but the shears are so sharp at the point that they puncture the oranges.

MRS. RANSOM. We have some improved shears.

MR. MILLS. You have as beautiful oranges up here as are grown any place and there is big money in them. The box question is a very serious one. It confronts all of the growers in the south, confronts them now, because of the syndicate doubling the price of boxes in a year or so. The association that most of us belong to down there had contracts with the syndicate ahead of time and we were able to get our boxes for 10 cents each less than the independent growers last year. This year these coöperators have resolved to set aside a certain sum of money taken from each box of fruit, to be put into a fund to purchase for themselves the forest trees and to cut them and put up mills and manufacture their own lumber, if those who own and control our great forests continue to raise the price on us.

A gentleman by the name of Ruggles, I think, at Redlands, is experimenting now with a leather or papier maché box—both of them. We believe that he has the solution of the difficulty and that he will be able to give us boxes that are better than the board boxes—that come folded and can be opened up like the paper sack in the store when you go to buy ten pounds of sugar, and can be shipped and refolded and shipped again or resold. We find that there is a great possibility that we can sell those boxes in the East for almost what they cost us, after the fruit has been sold, and that it will largely affect the cost of the packing of the fruit. That solution is here. You need fear none of those things. The American intellect will solve everything, and we will make them out of sunbeams if it is necessary.

MR. CRANDALL. Mr. Chairman, would a resolution be in order now?

THE CHAIRMAN. A resolution for the Committee on Resolutions would be in order. You may read it.

Mr. Crandall read the following resolution:

Resolution in Favor of Woman Suffrage.

Inasmuch as our women horticulturists and agriculturists, many of whom are pre-eminently successful, have to bear their full proportion of the expenses of government without voice in the passage of laws or selection of governing bodies and public officials;

AND WHEREAS, The average of intelligence, ability, and patriotism is as high among women as among men; be it

Resolved, That the fruit-growers of California, in annual convention assembled, hereby register their sentiments in favor of the right of suffrage for women on equality with men, and urge the early extension of that right to the women of our State.

THE CHAIRMAN. We will now have the report of the Committee on the Governor's Address.

The Secretary read the report as follows:

Report of Committee on Governor's Address.

Your Committee appointed to report on the Governor's address to this Thirty-third Convention of California Fruit-Growers much appreciate his expressions of interest in the well-being of California's greatest industry.

His timely reference to the importance of better, quicker, and cheaper transportation induces us to hope that he may cast his influence in favor of a modern parcels post, found so efficient in other countries.

We commend the broad and liberal views taken by our Governor in his promise of support for any needful appropriations. We believe, if judiciously and wisely conducted, the State Farm at Davisville, will be a potent factor in inducing better farm practice. At the same time, in the best interests of the agriculture of the future, we express a hope that, apart from expenses undertaken on behalf of research and experimentation and the salaries of the professors, the actual farming operations may show some margin of profit, thus encouraging the youth of our country to follow methods of economy and thrift.

EDWARD BERWICK.
F. W. CRANDALL.
R. P. CUNDIFF.

MR. BERWICK. I move the adoption of the report.

The motion was duly seconded, and on vote adopted.

THE CHAIRMAN. We will now hear Mr. J. A. Filcher on "The National Farmers' Congress and its Work."

THE NATIONAL FARMERS' CONGRESS AND ITS WORK.

By J. A. FILCHER, of Sacramento.

Mr. Chairman, Ladies and Gentlemen: I have felt extremely diffident in regard to taking up your time, as I feel that the subject assigned to me is somewhat foreign to your immediate interests. It might possibly be interesting to sit a little while and listen to something about the Farmers' National Congress and its work, but you are directly and intensely interested in the State of California Fruit-Growers' Convention and its work. It has been with me, on previous occasions, a theme to discuss foreign markets for California produce, and on that subject I have felt conceited enough to believe that I could suggest some ideas of interest, and while I shall speak off-hand to-day in the few minutes I shall occupy your time, I am going, after briefly indicating something about the Farmers' Congress, to switch off onto the general education of a farmer.

The Farmers' National Congress which I had the honor of attending a year ago at Rock Island, Illinois, in my judgment is one of the most thoroughly representative bodies that assembles in America. Until identified with it, I had no idea that we had on this continent a body which met annually so completely representative as the Farmers' National Congress. Its accredited delegates number about one thousand on an average, and they impress me as thoroughly representative men from several states of the Union; and being largely of a voluntary character, in their representation they necessarily include men of public impulse, energy, and enterprise. They are appointed, to be sure, by the Governors or by representative bodies of the different states, but it is only those of self-sacrificing disposition or of public energy who may feel able to attend. This Congress, which usually holds its session about one week—and which, by the way, wants an excuse to come to California—takes up all the subjects—I was going to say of interest to the farmers—of public interest to the people of America. If you will allow me, I will enumerate briefly the subjects acted upon favorably at the Congress a year ago, and the first subject considered was the teaching of agriculture, horticulture, and domestic science in the schools of America. I obtained a great deal of inspiration from the discussion of this subject in that Congress and awoke sensibly for the first time to the fact that, as a people, particularly in California, we are deficient in this particular branch. The opening, the dedication, of the State Farm is a new and wonderful stride on our part in the direction of overcoming these defects, and I believe through that we will eventually recover much of the ground which we have heretofore lost, compared with our sister states.

They took up and discussed and have favorably considered the parcels post and the postal savings bank. They believe in and have determined in favor of not only a fine but imprisonment for managers of corporations who violate the laws of their country, taking the ground that an ordinary fine on a large trust or corporation is inadequate punishment, and that the only way to create terror of the law among those people is to throw the offenders into prison. They believe in and have favored the initiative and referendum in politics, and I believe, ladies and gentlemen, after listening to the discussion, as I have, among those people who have given thought to it, that it has many features of merit, and I am impressed more particularly with the merit of the referendum in the city of Sacramento, where I live. They have adopted, in the charter of that city, the privilege of referring questions to the people which may be refused or defeated by their elective officials. Not long ago the city trustees refused a franchise for certain rights of way for the Western Pacific through that city. The matter was referred, under the law, under the referendum, to the people of Sacramento City, and they voted twenty-four to one in favor of what their trustees had denied; and where twenty-four people to one desire a thing it is evident that they ought to have it, and it is evident also that their elective officers were not in sympathy with the desires and demands of their constituents; and hence those constituents in this case were saved to themselves by the referendum.

They also believe in and have favored liberal reciprocity treaties looking to the enlarged consumption of the products of the American farmer in foreign countries; and I believe a policy of that character, which might with consistency be advocated by the fruit-growers in convention in the State of California, looking to modifications of our tariffs on farm and orchard products, marketed one country with another, would lead to a great increase in the consumption of our products. And while on this subject I want to say that the world is hungry for what you produce, and I want to repeat what I have said before, that if the horticulturists or agriculturists or fruit-growers of California were organized into one corporate body they could spend, and be justified in spending, perhaps $100,000 a year out of their aggregate income to exploit the markets for their products, and they would make money by the operation. Corporations organized to place some single article of food product on the market, whether it be a breakfast food or a baby food, spend a large portion of their income in advertising and exploiting the merits of that product. Why, in the jungles of Africa and the prairies of Siberia you will find on every rock "Mellen's Food," and Mellen's Food was started in a hole in the wall in Boston with $500, and to-day it represents a capital of fifty millions. If a corporation could do that with Mellen's Food, what could you do with California's luscious fruits?

I took a few of these fruits to Germany and showed them to the people there, and the importers and dealers came and asked, "How can we get some of that fruit?" I didn't have to go to them and make appointments and beg for an audience, but men with millions at their back came and sought an audience with me, begged me to dine with them, that they might impress me with their substantiality, reliability, and efficiency in handling these goods if they could by any means obtain an agency for them. It is an old story, but you know it. I had to send to Liverpool for samples to cook and give away, and I had to send for more to be put in a store to be sold at my account, so I could say on a card they could be had in Germany; and from nothing we made a business that amounted, in probably one year, to seven hundred carloads; and no less an authority than Philo Hersey, President of the Fruit Exchange of Santa Clara Valley, remarked in a State Fruit-Growers' Convention that the amount of our dried fruit in that year, 1897, was excessive and the price threatened to slump below the profit line, but that this unexpected demand from across the sea stiffened the prices and made the crop profitable, and, as he expressed it, it probably increased the price one cent a pound. If it did, it meant $1,500,000. If it stiffened the price one mill a pound it meant increased receipts of $150,000, and all at the expense of $6,000. That was in one small portion of Germany. The historian, Von Stephanie, begged me to take those samples into Austria. He said, "You can get a great trade there." The Russians said, "Why do you come to Germany? Come to us." The Englishman said, "We are your best customers; why don't you bring them to our country and show our people what splendid things you have got? We would buy all you have." When I came home and reported these facts to the State Fruit-Growers' Convention in California they were impressed by it. They believed that that work ought to be continued, and Mr. H. Weinstock rose in his seat and said, "This work ought to be continued and we ought to raise the money right here to do it with, and to start a subscription I will give $500." They appointed a committee, with Mr. Russ Stephens as chairman, consisting of one member from each county in the State, to raise $10,000, and they were getting along swimmingly with the work when the "Maine" blew up.

MR. STEPHENS. I will state that we had over $8,000.

MR. FILCHER. Some day it ought to be taken up and revived. The market is there and the world is there, and I want to tell you nobody ever had too keen a demand for the things he is producing. That will bring our Eastern patrons up to a sense of the fact that we don't have to depend upon them, and then they will come here and beg you to sell them your goods.

The Farmers' National Congress objects to free seed distribution, and by a resolution of my own they took the ground that the money expended in the purchase and free distribution of seeds to the farmers of America would be better used in maintaining or increasing the exploiters in foreign countries for such articles as might be adapted to our country, and the idea was suggested by them.

In my perambulations I have found certain things that I thought would be good for California. I was fortunate in making the acquaintance in France of Mr. Bourson, secretary of the national fruit association of that country, and if there is any country in the world that believes they are *the* fruit country, it is France. They are not willing to concede to us the prestige to which we are entitled. They know what they do themselves and they believe they are the only country that is worth considering. Mr. Bourson is a very important officer and his acquaintance was a great favor to me. The gardens of that country are surrounded by high walls built of stone or concrete with a lot of broken bottles on the top to keep the boys from climbing over, and big iron gates, locked, and it would have been almost impossible for me to obtain an insight into that without the sesame or passport which Mr. Bourson carried. I was able to visit the grape sections, the wine sections, the olive sections, and the prune sections, and even to get into the prune packing-houses, something very few people are able to do. Among other places was the estate of Baron Rothschild, about thirty miles from Paris, containing fifty thousand acres, and half of it as completely virgin as it was when Cæsar occupied that country and devoted it to all kinds of game. The pheasant and the wild boar come out in the evening to feed, and when frightened run back into the forest. But I went there to see fruit-growing in the high style of the art known to the French horticulturist. Among other things I found a new raspberry just being propagated. They have Burbanks over there—not quite so prominent, but they do things sometimes. That raspberry was bearing that year for the first time. It was nearly as big as my thumb, three or four times as big as ours, and apparently as rich in flavor and as bright in color, and it occurred to me that it would be a good thing to introduce it into California.

When I was at Fontainebleau, the great table grape section, I was shown the famous Duc de Voisart. It was the biggest grape I ever saw and it was as handsome as it was big. I only tasted one. I asked the privilege of tasting that grape, and the party looked around to find a deformed bunch and handed me one with a look as much as to say, "Eat a little and hand the rest back." I ate it by pieces and was satisfied with its flavor. There might have been one defect; it seemed to be rather thin-skinned, rather transparent, but, like some women, it was a fine looker. After a great deal of tribulation I got some of the vine of the grape and some of the raspberry and Mr. Bourson promised to send them to me. Believing I knew the French character well enough to doubt whether I would get the vines, I sent him $20, and I knew he would not send it back and that he would send me some vines, and he did. I turned them over to Mr. Maslin. I don't know whether Maslin knows his business or not, but he couldn't make them grow. I believe a great many good things could be picked up in that way that would mean a great many dollars for California.

THE CHAIRMAN. Mr. Sprague will now speak to us on "Improvement of Inland Waterways."

IMPROVEMENT OF INLAND WATERWAYS.

By A. R. SPRAGUE, of Sacramento.

Mr. President, Ladies and Gentlemen: When the Chairman asked me how short my paper would be or of what length it would be, I told him he might make it long or short, according to the necessities of the occasion, inasmuch as I should speak from carefully prepared notes, but that the subject, it seemed to me, was so important that it demanded a very general discussion. We are very fortunate, indeed, in President Roosevelt's administration in very many ways, and in none more than his large grasp of affairs. He is not a man who is satisfied to follow along in the narrow groove of precedent, and in no other particular has he demonstrated this more completely than in his treatment of the subject-matter of waterways. You know the history of the river and harbor bills for years and years. It has been the custom for each locality to lobby for an appropriation for its particular creek or river, quite regardless of the real merit of the plan. If the representative was successful in securing a large appropriation for his district, he was considered to have served his people admirably. President Roosevelt, in common with many other citizens, had got tired of that thing, and so, something over a year ago, when the subject was presented to him, he determined to find out the facts in regard to the improvements of rivers, in regard to all of the complex problems involved in the improvement of navigable waters, and so he appointed a commission which is known as the National Waterways Commission, to take into consideration the whole problem connected with the improvement of navigable waters. We were fortunate in having a large portion of that commission present at the National Irrigation Congress, which, as you know, convened in Sacramento a few weeks ago. In order to confer with that commission and forward its work, especially in California, a committee was appointed by the California delegation to the National Irrigation Congress, a committee which should be known as the California Waterways Committee, and I have the honor to be secretary of that committee. I make this explanation of the reason for this particular subject on your program to-day.

It has been discovered, by the investigations of these gentlemen who have gone to different portions of the United States studying the question of the improvement of waterways, that it is a complex problem. You can not properly deepen a river unless you do a good many other things, and here in California they said, "You have the very ideal situation for the work of such a commission. You have here all of the problems involved." If you deepen the waterways you must do that in harmony with natural forces. The stream itself must scour out a large part of the débris which has accumulated there. Consequently there must be levees erected to confine the stream within its proper channel, in order that it may gather force and scour out its channel. This was demonstrated, in the first place, in the Mississippi in such a wonderful fashion that it has vindicated that method for all time. But in the presence of such vast volumes of water as roll down the steep mountain slopes of California in times of flood, levees and channels and other such things are utterly disregarded. You must do something else. You must make arrangements in those natural reservoir sites back in the mountains to hold back a portion of this great flood until it may pass safely down along the channels, natural or artificial. Consequently you must not only dredge the channels, but you must erect levees, you must store the floods.

Now, then, in order to diminish as much as possible the danger from flood, you must see that your mountain slopes are covered with the native vegetation, the brush and the trees that nature placed there, instead of allowing them to be denuded by the wasteful processes of the lumberman and of the sheepman. Secondly, then, this introduces, in addition to these other problems, the problem of forestry, the preservation of the covering of the slopes of our waterways.

You see, then, we have a very complex problem which this commission proposes that the American people shall undertake. You can not do one of these things effectively without doing them all, and we are peculiarly fortunate that here in California, within our own State boundaries, we have all of these conditions presented, so that it will be a typical plan, a typical instance, for the commission to start with. This problem is a vast one; it is not for California alone, but for every state in the Union, because it means the reclamation of vast areas of swamp land, and those areas of swamp land exist in almost every state. Our irrigation problem, for which we so earnestly solicited the attention of the whole people, was almost a local one, confined to arid America and western America. But we got the attention of the people of the United States to that. We showed the merchants of Chicago and New York that they were interested. Much more should we be able to show the men of commerce in the East and the Mississippi Valley that they will be interested in this broader plan of proper storage for the purpose of irrigation, of deepening the waterways and of reclaiming the vast fertile acres of swamp land which are now of service to no one.

This is a gigantic problem, but one which may well command the great energies of the American people. The lands subject to flood, as you know, are the most fertile lands that exist anywhere. From the nature of the case they are lands situated near to natural waterways where transportation will be cheap.

There are two main things essential to the development of a country. The first is an abundance of fertile land, to be had cheap. The second is cheap and abundant transportation. A thing that has already interested this Convention in the previous sessions this year is the question, "What can we do to secure better transportation?" You have been told by officials who know, that you can not have that better transportation .because the present railway systems are gorged with traffic. That is not so alone on the lines of the Southern Pacific leading east and south, but on their connecting lines as well, as is well shown by the waybills received after our cars of fruit have gone to Boston and New York and elsewhere; those Eastern connecting lines are also gorged with traffic. J. J. Hill, than whom there is no better authority, has said that the transportation companies would need to spend billions of dollars in the immediate future in order to provide railway facilities sufficient to carry this vast product which these prosperous years have brought to this country. We know it is utterly impossible to so expand railway construction in a few years. Roads could not be built, even if the money were provided to build them. Consequently, the problem comes up to us of doing what other nations, in Europe and other places, have done, namely, improve our waterways, thereby making it possible to convey the heavy traffic in which time is not necessarily a matter of importance, and let the traffic like fruit and other perishable products and general merchandise go by the railways.

Now, in this proposition which is submitted to the American people, you have exactly that element, the improvement of the waterways, as the principal question, the principal thing sought, and that is imminent. It is not a thing to be postponed, even for a single year. I see that already a measure has been introduced in Congress looking toward the beginning of this great undertaking. The waters of the East leading to the Gulf of Mexico, the waters leading into the Mississippi River, and so all the waterways which facilitate traffic east of the Rocky Mountains, as well as our own San Joaquin and Sacramento rivers, should be improved at the very earliest possible time. We can hardly conceive of the traffic which would result from such improvement in the Sacramento and San Joaquin valleys as this project contemplates. The officers of this commission, who have studied the matter very carefully, report that in this great inland valley there will be recovered fertile acres enough to support thirty millions of people in comfort, even in luxury, so great are the possibilities of such improvement as this national plan proposes. And moreover, the incidental benefits to come from this are great almost beyond conception. The water which can be stored in times of flood in these reservoirs, which incidentally will protect from overflow the fertile lands below, is sufficient to produce a revenue, at a lower rate than has ever been given to California users, from the sale of electric power, of one billion dollars per year. Just think of that! And it is cheap power that most promotes rapid improvement and settlement of any country. Give us cheap power as well as cheap transportation and we can beat the world in manufacture.

In California especially rests another advantage which is found nowhere else in all the United States where it is proposed to apply this system of reclamation. We have here a climate which is so favorable to production that we can easily produce two or three times as much from the lands reclaimed from flood as in any other portion in which it is proposed to operate. So that here is another reason why California is very likely to receive the first attention when this great plan shall be brought well under way.

Now, what is our duty in connection with this? This is not going to be done unless the American people get behind it and demand that it shall be done; and so great are our interests here in California, essentially so great, that it demands that all California shall get behind this whole movement and back it; not that we shall start it and ask that our particular job shall be undertaken first, but that our people shall be made to understand the great importance of it all and that we shall be present at every convention where it is possible to influence public opinion, to spread the intelligence concerning this plan and to show that California is united in supporting it. This is inaugurating a new era for California. Heretofore it has been the Sacramento Valley against the San Joaquin, the cities against the country, and southern California against the north. This is a plan big enough to appeal to all, to bring the cordial support of southern California to this plan; all California should spring forward to its advocacy, because southern California can not be great unless this great interior valley be developed, unless millions shall be induced to come here.. California, of which we are so proud, has lagged behind in the development of the United

States. You very well know that in central California and northern California we have but little greater population than we had twenty years ago. During this time empires have been made; Texas has been settled up; the Dakotas have developed into populous States, and Nebraska and Kansas have grown to princely power and importance; therefore with all of the natural advantages which we have here, it is time to put ourselves in shape to invite the populations of the world. We can do so when, added to our wonderful climate, we have this vast body of reclaimed land, matchless in fertility, and cheap water transportation, almost at the very doors of the settlers.

Now a thing like this, an agitation that must aim at so much, must be carefully planned. This talk at this Convention is but preliminary. It will be forgotten, perhaps, to-morrow or next week unless something is done, but it is the business of the people of California to see that something is done; in the first place, that this great plan shall be thoroughly understood by all the people of California. Bring it to the attention of your local press, the editor of your local paper. Get a number of the "Great West," that publication in which these several papers from the Government office were published—November 30th, I believe. Show that to your local editor. Interest the members of your local improvement association. The chambers of commerce should take this up by special meetings and determine that it shall be made a special subject for California. Let California unite in this one thing now, centralize, concentrate, and we shall help to bring forward this great national project which will do more for the American people than anything which has been proposed for the last fifty years. (Applause.)

At the request of President Jeffrey, Mr. King assumed the chair.

THE CHAIRMAN. Are there any questions you wish to ask?

MR. JUDD. Has there been any general plan covering any particular section, or is it a general plan covering all the State that you have got in shape, so that the public will understand where it is and what it is for?

MR. SPRAGUE. The plan of the National Waterways Commission is that Congress shall appropriate, say $50,000,000 a year to inaugurate this project; that it shall be left to the Government bureaus, as the irrigation projects have been left to those bureaus, after careful examination into the facilities afforded, to determine what project shall be undertaken. And so we want to be particularly careful in California to refrain from urging that this project or that project be undertaken now, but say to that commission or the whole United States, we are content to have this matter inaugurated as soon as possible and when the time shall arrive to determine which project shall be undertaken first we then shall desire to be heard on the merits of the case. We expect that Petaluma Creek and the waterway to Napa and all other possible navigable waters will receive benefits from this, and the indirect benefits, of course, will come in great power to the cities of the south, where this greater energy will be immediately felt.

MR. JUDD. The object of asking the question was to get some tangible fact whereby different localities could make themselves felt or heard and where to ascertain what to do in order to get this matter in proper shape.

MR. SPRAGUE. The California Waterways Committee meets on the 12th at San Francisco, and we will be glad so see any of you there at the Fairmont; and in the meantime, any correspondence with that committee may be sent to me at my office in Sacramento.

THE CHAIRMAN. We will now listen to "Nut Culture in California," by Mr. Leonard Coates.

MR. COATES. It is a little difficult to come down from these subjects of so great magnitude, such as the canals and waterways and all those things, to a matter of detail in the cultivation of any particular crop. I have endeavored to sift it down, trying to make a few points as briefly as possible.

NUT CULTURE IN CALIFORNIA.

By LEONARD COATES, of Morgan Hill.

Twelve years ago the United States Department of Agriculture published a very interesting report on "Nut Culture in the United States," covering very comprehensively descriptions of all species and varieties of nuts then cultivated in this country, giving the various methods adopted and results attained, from the experience of practical men engaged in the business.

A glance over this work at this time, and in view of much added experience, is particularly valuable, expressed opinions in some cases being confirmed, and in others being useful only negatively.

However, nut culture in California embraces only the almond and the walnut as established industries of commercial importance, omitting the peanut as belonging more to vegetable culture, and alluding to the pecan, filbert, chestnut, and pistache as still in more or less of an experimental stage.

In the current Yearbook of the Department is published the article on "Nuts and Their Uses as Food," by Prof. M. E. Jaffa, of the University of California. This forms an exceedingly interesting, instructive, and valuable addition to the literature pertaining to the subject. A study of it can not fail to impress any one with the fact of the rapidly growing importance of nut culture, and the permanent establishment of the commercial product as one of the great food factors of the United States.

Quoting from the chapter on the "Place of Nuts in the Diet," Professor Jaffa says: "It has been shown by numerous investigations that nuts are rich in protein and fat, and that these nutrients can be fairly well assimilated. Nuts being such a concentrated food, their proper place in the diet is a matter for more careful consideration than is the case with many of our ordinary food materials. It must not be forgotten that a certain bulkiness of the diet is conducive to its normal assimilation, and that too-concentrated nutriment is often the cause of digestive disturbances. It might be expected, then, that nuts could be most advantageously used in connection with more bulky foods, such as fruits, vegetables, breads, crackers, etc. Most rationally used, they should constitute an integral part of the menu rather than supplement an already abundant meal. Since nuts are so concentrated, eating a considerable quantity out of hand at odd times will mean an oversupply of food, if a corresponding reduction is not made in other foods. The distress sometimes experienced when nuts are eaten is undoubtedly often due to improper mastication or to over-indulgence. The investigations made at the California station indicate clearly that considerable quantities of nuts, properly eaten, do not cause distress. There is a popular belief that a little salt with nuts prevents the digestive disturbance resulting from eating them. To most persons, salt undoubtedly adds to the palatability of the nuts, but no investigations have been found on record which demonstrate any actual improvement in the digestibility of nuts due to salt."

The *Almond* was the first of the "nuts" to become of commercial importance in California, and, owing to climatic conditions, this State will always enjoy a monopoly in its cultivation. Success, however, has been, from the start, rather uncertain, although added experience, and a record of some partial and total failures, may now be taken advantage of, and mistakes therefore avoided by those who are engaging in the production of this crop. The earlier planted varieties consisted of the Languedoc, imported from France, and the Tarragona, from Spain. These were not generally profitable, and the almond industry languished, until it received a fresh impetus on the introduction of the Hatch seedlings in 1885. Since then other good seedlings have been grown, so that at this time we have, as standard varieties, I X L, Nonpareil, Ne Plus Ultra, Llewelling, Drake, Peerless, and Texas (Texas Prolific).

The almond has been an uncertain cropper owing to its early blooming, rendering it liable to injury during spring storms or frosts, and to the more or less self-sterility of the blossoms of some varieties. To produce varieties, by intelligent crossing, that are late bloomers and self-fertile, as well as of high quality, is what plant breeders should have in mind when experimenting with the almond. The Jordan has been planted rather extensively the last few years, some old trees of other varieties being grafted in order to hasten bearing. Samples of California-grown Jordan almonds are reported at Washington as inferior to the Spanish product in quality, and the suggestion is here made that seedlings of the Jordan type may be raised in the State that more nearly meet the requirements of the market. I would recommend that Texas, Llewelling, or Drake be planted alternately with the other named varieties to act for them as pollenizers. Just to what extent this will increase the chances of regular bearing is largely conjectural, but there is no doubt that an almond orchard should always be planted in this way.

A mistake has been made in the endeavor to produce almonds with abnormally thin shells, rather than having the quality of the kernel the main object. No good is gained when an almond or a walnut is produced having an excessively thin or paper shell, but the reverse. Rapid eating, causing indigestion, would be encouraged, and nuts, with shells so easily broken, would much more readily deteriorate and become rancid. The almond succeeds best on almond root, and requires a deep, warm soil, or a hill location where a shaly or rocky subsoil permits free access for the roots.

The Walnut.—California produces at the present time about 12,000,000 pounds of walnuts annually, in comparison with which the production from other states is not worth mentioning. The Persian or so-called "English" walnut has been planted in several Eastern and Southern states for more than a hundred years, but it is still considered merely as a curiosity. Its non-adaptiveness to those regions is doubtless due to the great extremes in climate. The tree thrives and bears well in France, England, and other European countries. In the former country selected seedlings have become fixed types for many years, and from these trees others are propagated by the ordinary processes of budding and grafting.

All trees and plants are amenable to climatic influences. Hence, seedlings raised from trees which have been transplanted into a climate where the conditions are less favorable than those to which they have been accustomed, will have a tendency to become hardier than the parent. Plants adapt themselves or become acclimatized to a much greater extent than is generally believed. Take, for example, the two species of eucalyptus, *E. corynocalyx* and *E. rudis*. Both have roundish leaves, changing slightly as they grow older, but the former, being used to a cool climate, carries its leaves horizontally, enjoying all the sunshine it can get; while *E. rudis*, finding itself farther in the interior, under the rays of a hotter sun, swings its leaves over, hanging vertically, to escape injury therefrom and to retard evaporation.

So we find many seedlings of the walnut first planted in California bearing good annual crops of first-class nuts, while the parent trees were very unsatisfactory. Some of these have long been recognized as varieties, such as Santa Barbara paper-shell, Ford's Improved, Placentia, Perfection, and others, many thousands of trees having been grafted from the original ones, but, unfortunately, many more thousand seedlings have been grown, which has resulted in the production of a large percentage of second-grade nuts.

As I have on other occasions stated, it is a grave mistake to imagine that these varieties do not succeed and bear well in almost any good fruit section in northern as well as southern California. The trees first planted, more than half a century ago, in Sonoma and Napa counties, never bore well, and it is claimed the trees were frequently diœcious; neither is there any record of their success elsewhere, but only of their selected offspring.

Since the advent of the walnut blight, given a specific name by those who have studied the disease, the theory has been promulgated that some French varieties would be immune, because growth is later in starting in the spring. As this same disease is very prevalent in France, and as these varieties have only been planted in California to any extent for comparatively few years, and are in new, rich soil, there is nothing to warrant the assertion. We need to work out our own salvation in regard to the walnut as in other things, and should not tie ourselves too securely to a record of experiences had under totally different conditions. The best of the California raised walnuts blossom rather early, hull freely, and mature early, being in the sack before the hulls of some French varieties have cracked. The French varieties start to grow later in the spring, and are less liable to be injured by frost or late rains in consequence. But they are very late in maturing as a rule, and are apt to get caught in the fall rains. Growers must choose between the two chances, but, for myself, I would, if possible, determine what walnut trees are the most profitable in a given locality, and plant the same. The blight undoubtedly may be controlled largely by propagating from grafts of the healthiest trees, as well as by careful selection of the root stock, and also by keeping the trees vigorous by the best of care and abundant manuring or fertilizing. There are many details, here barely alluded to, which the successful grower can point out to those in search of knowledge. The walnut requires rich soil and abundant moisture at the root. A climate midway between the extreme heat of the San Joaquin Valley and the fog of the coast line is to be preferred.

Pecan.—The pecan has had no attention bestowed upon it of recent years. The late Dr. Strentzel planted a grove at Martinez, and isolated specimens are to be found in most of the older settled valleys of the

State. The pecan is very often diœcious, which accounts for single specimens frequently being barren. This is a reason why the pecan is so often said "not to do well in California."

While our summers are long, the usually cool nights retard growth, and in consequence the nuts do not ripen near the coast. A rich soil, plenty of moisture, and a hot summer form a combination congenial to pecan culture. The river bottoms of the Sacramento and San Joaquin valleys form an ideal location for this tree. This is no theory, but a statement based on observation, for any one may see the pecan flourishing and ripening good crops of excellent nuts from Oroville, Butte County, to Tulare and Kern. But, as with the walnut, it does not necessarily follow that varieties or fixed types succeeding well in Texas or Florida, will do equally well in California. The conditions being so different, it is more than likely that what is best in Florida would be a partial failure here. Therefore we want to raise our own seedlings, and by selection, produce types worthy of varietal propagation.

I would strongly recommend that the pecan be planted extensively in the interior valley as a street and avenue tree, its symmetrical, upright growth being so much in its favor. A double purpose would then be served, as in the course of time varieties would thus be found suited to our climate and meeting the requirements of the market.

Chestnuts deserve more attention. The European varieties, or those imported from Japan, form highly ornamental trees, and, with the ever-growing demand for nuts as food, they will have added value. The chestnut stands heat well, some of the largest trees in the State being in the Thermalito Colony, near Oroville.

Filberts have not been much of a success thus far, though Mr. Felix Gillet reports them as bearing well at Nevada City. There is no doubt that the nut trees (excepting, of course, the almond), while in some instances diœcious, or bearing staminate and pistillate blossoms on different trees, more often suffer or fail to bear good crops through a lack of simultaneous blooming of the male and female blossoms.

Pistachio.—Pistachio, or green almond (*Pistacia vera*), has been grown to a limited extent in California for many years. G. P. Rixford of Sonoma was perhaps the first to grow the nuts, having a crop from his trees in 1881. The tree is very ornamental, and well suited in every way to the climate of California, or to those regions where the almond tree thrives. It is an exceedingly deep and rapid rooter, succeeding well in dry locations. On its own root it makes rather a low, spreading tree, although from a lot of young trees I have growing, from seed produced in Fresno County, they are by no means dwarf in character, properly selected. *Pistacia vera* belongs to the sumach order, and is distinctly diœcious, producing nuts on the pistillate trees only.

The future of the nut industry in California is very bright. To avoid mistakes and disappointment, however, greater care should be exercised in the selection of soil and location, as well as of the varieties to be cultivated.

President JEFFREY resumed the chair.

THE CHAIRMAN. Mr. Isaac has a telegram which he will read.

The Secretary read the following telegram:

SAN FRANCISCO, CAL., December 6, 1907.

To President California Fruit-Growers' Association, Marysville, Cal.

The Japanese Association desire to place upon record their appreciation of the militant stand taken by your association in dealing with exclusion. They further express keen gratitude to the gallant Colonel John P. Irish, whose eloquent voice has been raised in the interests of justice and humanity.

FRANK YASSO MORI, Acting Secretary,
1612 Geary street.

MR. SPRAGUE. Mr. Chairman, I have a resolution which I wish to read.

Resolution Favoring the Development of Inland Waterways.

WHEREAS, Our present lines of transportation are already gorged with traffic, giving little hope that the great increase of traffic which is inevitable in the near future will be better provided for, except by promoting better inland navigation; and

WHEREAS, Vast areas of our most fertile lands are now covered with flood or yearly subject to such danger; and

WHEREAS, Such floods are largely increased by the progressive denudation of the mountain slopes of our waterways; therefore be it

Resolved, That we strenuously urge upon our members of Congress that they support the most practical plan for national action in support of the comprehensive plans of the National Waterways Commission, which propose that navigation, reclamation, forest preservation, and development of vast water power shall all be promoted by any plans which the nation shall undertake.

Resolved, That to this end we pledge our most earnest endeavor to secure the active support of these plans by the people of California.

On motion of Mr. Judd, duly seconded and carried, the rules were suspended and the resolution unanimously adopted.

A recess was here taken until 1:30 o'clock P. M.

AFTERNOON SESSION—FOURTH DAY.

The Convention was called to order by MR. KING, Chairman pro tem.

Secretary ISAAC stated that President JEFFREY had been compelled, by the illness of his son, to leave for his home.

THE CHAIRMAN. I believe it is now within our province to go to the discussion of the resolutions.

The report of the Committee on the Governor's Address was read and, on motion of Mr. Mills, duly seconded, was adopted.

THE CHAIRMAN. The next order of business, I presume, will be on the communication from your Committee on Resolutions. What will you do with its report?

MR. JUDD. I move the resolutions be adopted.

The Secretary read the resolution favoring forest reserves, which was duly adopted.

The Secretary then read the resolution in favor of an exhibit at the Alaska-Yukon Pacific Exposition which, upon motion, was unanimously adopted.

The Secretary then read the resolutions of thanks to the Committee of Arrangements, the Ladies' Club, the Marysville press and Eben Boalt, which, upon motion, were unanimously adopted by the Convention.

The Secretary then read the following resolution, offered by Edward Berwick:

Resolution Favoring Parcels Post.

WHEREAS, This Thirty-third Convention of California Fruit-Growers, assembled at Marysville, California, this 5th day of December, 1907, realizes the great benefit that would inure not only to the producers but to all classes of citizens from the introduction of an up-to-date parcels post at such rates as are found feasible by other civilized countries; and

WHEREAS, The American express companies find it possible to profitably carry parcels up to eleven pounds weight, from New York to any point in the United States, for 24 cents for the British Postoffice; therefore be it

Resolved, That we call on our representatives in Congress to take such measures as shall permit the Postmaster-General to inaugurate such a system of parcels post as has been found in other lands an inestimable boon to all classes and an incalculable stimulus to trade; be it further

Resolved, That copies of these resolutions be sent by our Secretary to President Roosevelt, Postmaster-General Meyer, and to all United States Senators and Congressmen from the Pacific Coast.

The above resolution was, on motion, adopted by the Convention.

The Secretary then read the following resolution:

Resolution Thanking The Ladies of Marysville.

WHEREAS, The good ladies of Marysville, with much care and labor, provided a delightful entertainment for this Convention on the evening of December 3d, thus enabling the members of this Convention to meet each other socially, partake of dainty refreshments, and listen to rare music, and we feel we would be lacking in showing our appreciation for the fine courtesy shown us if we departed without some public ackowledgment of the same; therefore be it

Resolved, That this Convention tender the ladies of Marysville a rising vote of thanks for the courtesies shown us while sojourning among them.

The foregoing resolution was adopted unanimously by a rising vote.

The Secretary next read the resolutions: Asking for increase in the appropriation to the Horticultural Commissioner; Suggesting quarterly meetings; Requesting funds for the insectary; Establishment of national quarantine; Appointment of legislative committee to ask certain relief of the Legislature; In favor of extending State quarantine; which resolutions were all duly adopted.

The Secretary read the following resolution:

Resolution Opposing the Conversion of Hetch Hetchy Valley into a Reservoir.

WHEREAS, The citizens of San Francisco are appealing to the Federal Government to allow them to use the beautiful Hetch Hetchy Valley, in the Yosemite National Park, as a reservoir for the waters of the Tuolumne river, to be used by them as an addition to their domestic water system; and

WHEREAS, There are all too few of these gloriously beautiful mountain valleys accessible to the people; and

WHEREAS, These beautiful National Parks have enriched the lives of past generations, are enriching the lives of the present generation, and will enrich the lives of future generations; and

WHEREAS, There are many other sources of water supply that can be secured by the citizens of San Francisco without robbing the children of men of the profit and pleasure of these wonderfully and gloriously natural temples for worship by the sons of men, of Nature, and Nature's God to their everlasting good and welfare; now therefore be it

Resolved, That we, the Fruit-growers in Convention assembled, do most sincerely deplore the selfishness of our fellow citizens in San Francisco in thus attempting to destroy for commercial purposes this beauty spot of earth; and be it further

Resolved, That we most earnestly protest against this commercialization of this our heritage and the heritage of our children; and be it further

Resolved, That we demand that the Federal authorities shall forbid the use of Hetch Hetchy Valley by San Francisco for a domestic water system; and be it further

Resolved, That these resolutions be forwarded by the Secretary of this Convention to the President of the United States and to Secretary of the Interior Garfield.

After a spirited discussion, the above resolution was adopted by a vote of 24 in favor to 11 against.

MR. JUDD. Mr. Chairman, I have a resolution here that I wish to present at this time.

Resolution Indorsing the Officers of the Convention.

WHEREAS, The first convention under the new administration is about to close; and

WHEREAS, We fully appreciate the worthy and able efforts of President J. W. Jeffrey and Secretary John Isaac; therefore be it

Resolved, That we, the Fruit-growers in Convention assembled, express our hearty appreciation of their fair and able and impartial execution of our complex business; and be it further

Resolved, That we express our sympathy for our President in his family sickness that deprives us of his further attendance, and express a hope that an early recovery will gladden his fond heart.

On motion, duly seconded, the foregoing resolution was unanimously adopted.

MR. A. R. SPRAGUE then read the report of the Committee on Roads, as follows:

REPORT OF THE COMMITTEE ON ROADS.

To the State Horticultural Convention:

GENTLEMEN: Your committee to whom was referred the subject of good roads beg leave to report as follows:

The advance of human knowledge is made possible only because each generation of men records the results of its investigation for the use of succeeding ones. These in turn endeavor to determine what truth appears to be clearly established, and then proceed to push farther on into the unknown, leaving for their successors an increased store of ascertained facts and deductions. In this way only has been made possible the wonderful achievements of the present age in all lines of human knowledge.

Therefore, your committee conceives that it will be doing a service by classifying and summing up the very generally conceded truths regarding road-building up to the present time.

A rough classification of country roads may be made as follows:

1st. Main trunk lines of travel leading toward principal centers of population.

2d. Cross lines—connecting the main lines.

3d. Roads in sparsely settled valley districts.

4th. Mountain roads usually main lines.

In the interest of economy and of the efficiency of the whole system of public highways, the methods of construction should be proportioned to the amount of travel which the road is to sustain.

To illustrate: When a city begins to macadamize its streets, usually the travel into and out of town, and nearly all of the traffic of several streets on either side of its first macadamized street, concentrates upon the newly paved roadway, as upon H street in Sacramento, two years ago. Thus was thrust upon this road several times the traffic which it must carry after other parallel streets near by are improved. This caused a very rapid wear, especially in the middle of the street, so that when last season this was coated with oil, it was too flat to drain well, and while a perfect surface was maintained all summer and for a month after rains began, during the long-continued wet weather of last winter, and with very heavy traffic, the surface softened up, and now is again wearing badly, whereas a cross street, Ninth from H street north, treated in the same way a year earlier, has yet an absolutely perfect surface, having suffered no perceptible wear in those three years.

No country road in California, even in the most thickly settled district, is subject to such heavy traffic as is such a street of a city—even outside of the principal wholesale and retail section.

The general method of road building is the same for all roads. It is so universally conceded that it may be regarded as axiomatic.

1st. The roadbed should be well drained.

2d. During construction it should be thoroughly packed, the harder the better.

3d. It should be moderately rounded or crowned.

4th. It should be surfaced with some material which will leave every square yard like every other square yard—in wearing quality.

5th. The thickness of this surfacing material, when different from the material composing the substructure, should be proportioned to the travel which the road is expected to carry.

6th. When this surfacing material, placed upon a well-compacted, hard surface beneath it, has been well beaten together and thoroughly consolidated by travel, upon this hard surface should be spread a thin coating of oil, which should be given a week or two in which to penetrate the hard surface of the road, keeping travel off of it during this period by oiling but half of the roadway at a time, with sufficient barriers so placed as to make travel upon the freshly oiled surface quite impossible.

An alternative method for the application of oil is to place it upon the rounded, well-compacted surface of the substructure of the roadway and then apply sufficient fine gravel, macadam, or disintegrated granite, to form a hard, waterproof surface when well compacted by travel. One or the other of these methods may be chosen, according to local conditions.

To sum up: The roadway should be drained, packed, rounded, surfaced and waterproofed. Any roadway anywhere should be subjected to these five processes, if nature has not already rendered one or more of them unnecessary.

In a large portion of the Sacramento Valley, roadways are well drained by merely turnpiking them; often, too, the soil affords excellent road material; less often, however, is this material sufficiently homogeneous to do for surfacing, and the road, when made, always requires packing and waterproofing. If the roadbed is well packed while sufficiently moist, the surface will be hard and firm, so that unless there is very heavy travel upon it, two to three inches of crushed rock will give excellent satisfaction after becoming smooth and hard by travel and after it is properly oiled.

Except when a road must be made in clear sand, no oil should ever be placed upon a roadbed except upon a smooth, hard surface. Such a surface will not yield to the wheels of heavily loaded vehicles and hence will not increase the draught.

Most of the dissatisfaction caused by the use of oil upon roadbeds has been caused by disregarding this rule. Often the plaster formed at the surface of the road when oil is placed upon an inch or two of loose sand or dust, is so serious an obstruction to the wheels that not more than half the customary load can be hauled upon it. When using oil to make a roadbed in clear sand, it should be thoroughly mixed with it to a depth of five or six inches, in such proportions as will cause the mixture to become thoroughly hard and unyielding after a few weeks.

When clay can be added to sand, or sand to clay, the mixture will be found to pack well, giving excellent material for the main body of the road. Adobe must have sand or gravel or macadam before it can be made useful as a road material.

Gravel should always be screened before applying to the road surface—the coarser being put on first, after which the finer may be applied, as in the application of macadam or crushed rock.

Good material for mixing or surfacing may often be found in the subsoil of portions of the valley.

Above all, *experiment* with the material most available, constructing a few rods in each of several ways which give promise of good results, and following the general laws of roadmaking as above quoted. After a demonstration of just what method and material is needed for each particular class of road in each section, proceed to as extensive construction of permanent roadbeds as funds available will permit.

Several counties of the State have voted bonds sufficient to build good roads upon all main lines of travel. There is a great saving in such construction, as the interest on such bonds, together with an annual sinking fund sufficient to pay the bonds at maturity, will not exceed the annual expenditure in most counties simply for road repair—an expenditure which we all know is now almost wholly wasted from lack of sufficient money at one time to build permanent roadbeds, lack of a general plan pursued from year to year, and lack of a businesslike administration owing to the inadequate road laws of this State.

A. R. SPRAGUE,
NATHANIEL ELLERY,
W. H. AIKEN,
Committee.

MR. JUDD. I do not believe that there is in the State anybody who is more in favor of good roads than I am. It has cost me a great deal for good roads and I am still in favor thereof, but I am strongly in favor of an equal distribution of the expense of building those roads. As I told you in my paper, all of the good roads so far built in this State have been built by the farmer and the fruit-grower and the cities take no part in it; but, if you notice, they come up every time with resolutions for good roads. If they will amend their resolutions saying that they believe in amending the law to make equal taxation, I am heartily in accord with it. The last Legislature passed an Act for the making and maintaining of boulevards. I had occasion to read that law in framing a resolution to our Board of Supervisors against voting bonds of $600,000 to build a boulevard to the Big Trees. That law says that the boulevard shall be not less than one hundred feet wide; that no wagon shall go on it unless it has a four-inch tire; but there is nothing in the law to prevent a farmer from crossing the road if he wants to. And again, under no circumstances shall franchises ever be granted upon this boulevard for electric or telephone wires, electric lines or rails. The very inlet to the Pajaro Valley to-day is down the Pajaro River and the only place that a railroad can get in there reasonably. They select that particular place for a road one hundred feet wide. This law further says that when the road is completed satisfactorily and a commission appointed for the purpose, then it shall be turned over to the present road law for maintenance by repairs, and so forth. In other words, after they have got it built, or partially built, or the money runs out, the balance of it will be finished by the farmer as usual, and he will get no benefit out of it. It is class legislation and is one of the worst laws ever passed by the Legislature in this State. It is a burden to the farmer. Look out for it.

MR. SPRAGUE. Under the law, which is considered to be constitutional, under which Sacramento County voted $600,000 of bonds for good roads, it is possible for every other county, I presume, to proceed in the same way. You have got to have a large sum of money. In Sacramento County the matter was referred to the people as to whether they should vote for these bonds, taxing the inhabitants of the city, and the vote in favor was much larger in the city than it was in the country, showing that the cities are ready to help in building good roads. We certainly need more and better road legislation, and I heartily agree with Mr. Judd in that respect.

MR. FILCHER. I may refer to a fact which I read in a Government report in the last day or two, that it costs, according to the figures of the United States Government, three quarters of a billion of dollars a year to carry the farmers' produce to market; and the United States Government experts estimate that two thirds of that money is chargeable to bad roads. If we can save half a million dollars a year, as a producing country we ought to build the road.

On motion of Mr. MILLS, duly seconded, the report of the Committee on roads was adopted.

THE CHAIRMAN. The next thing on the program is a paper on "The adaptability of Grapevines to Different Vineyard Soils," by Prof. George C. Husmann, Pomologist in charge of Viticultural Investigations for the U. S. Department of Agriculture. Mr. Husmann was unexpectedly called to Washington, and is therefore unable to be with us, as he had intended, but he has sent his paper, which the Secretary will now read to you.

THE ADAPTABILITY OF GRAPEVINES TO DIFFERENT VINEYARD SOILS.

By GEORGE C. HUSMANN, OF WASHINGTON, D. C.

Phylloxera was introduced into California either from this country east of the Rocky Mountains, where it has existed on the wild vines for ages, or indirectly from Europe, or both. It appears to have been in California about as long as it is supposed to have been in France, although it was not located in the State previous to the year 1875. Preceding circumstances, however, indicate vines to have been affected with it as early if not earlier than 1860. It was first detected in France in 1863 and was most likely introduced on American vines imported for propagation purposes at the time the total destruction of French vines from oidium was feared, some ten or twelve years before the insect was discovered in the Valley of the Rhone. In 1869 it had gained a strong foothold in southeastern and southwestern France. There would be no special object in giving data relative to the time the insect was located in other European grape countries.

In 1882 the phylloxera was well established in Sonoma, Napa, Yolo, Solano, El Dorado, Placer, Sacramento, and San Joaquin counties, California. Records of the California vine disease were first published in 1885 to 1886, although some claim to have noticed effects of it in 1882.

Phylloxera and the vine disease have been the two principal agencies in the destruction of vineyards in California. To give some idea of the losses occasioned by them, I would state that in 1903 it was estimated in conservative figures that the loss of acreage of vines through them in California at that time amounted to at least $1,000 per day. In southern California from twenty-five to thirty thousand acres of vines had been laid waste, while in northern California the entire vineyards of several of the leading grape-growing valleys had been destroyed, a number of the second plantings having also succumbed. In one valley where four years previously 6,000,000 gallons of wine were made, in 1903 the crop only amounted to 500,000 gallons.

Innumerable remedies have been suggested, and as many tried, with which to eradicate the phylloxera from vineyards, but no practical one has been found, and it has become an accepted fact that the only way to successfully combat the insect is to establish vineyards on resistant stocks.

The great diversity of soils and climatic conditions found in California which make it possible to achieve such wonderful results in various lines of horticulture make the adjusting and proper selection of resistant stocks a complicated and difficult problem.

As far back as 1876 introductions and plantings of resistant vines were made by some of the more intelligent growers in the State, and some very good results were achieved on Riparia stock, because the soils and conditions where these plantings were made happened to be favorable. On account of these few good results, the Riparias as a stock were planted indiscriminately in high and low localities and on various soils. Unfortunately, in most instances the conditions were adverse to Riparias and failures predominated. Again, some thought the Californica was a resistant, and by 1883 at least 300,000 vines of it had been planted as grafting stock. Later on its resistance to phylloxera was ascertained to be very low. In the meantime, the Lenoir had given good results on some soils and all who could planted Lenoir, and more would have been planted had more cuttings or vines of it been available. Of late years just such a stampede has occurred to the Rupestris St. George, and similar mistakes are being made with it. These and other resistant stocks are good where conditions are suited to them, but are worthless where such is not the case. Had a systematic study of the wild grape species and the soil and climatic conditions where they grow been applied in resistant stock plantings from the start, most of these disastrous results would have been prevented.

Resistance to the phylloxera or the ability of the vine to overcome the injury of the insect is influenced greatly by whether or not the vine is in soil, climatic and other conditions suited to it. A vine otherwise rated lower as resistant, under conditions congenial to it will often prove more resistant than one whose resistant qualities are rated higher but for which the conditions are not suited. Thus, the Lenoir, which in California on deep and loose soils has given excellent results and is the vine on which some base hopes of its resistance to the California vine disease, is not much thought of by the French as a resistant. The Concord, a Labrusca, the principal grape grown east of the Rocky Mountains, is only rated by French authorities as 5 in resistance out of a possible 20. Nevertheless, it thrives under conditions suited to it right where the phylloxera is at home. Instances like this, and the fact that in France much of the resistant work is as much directed toward resistance to calcareous conditions as to phylloxera, make it plain that resistant standards established by the French should not be accepted as infallible, but can perhaps only serve to indicate what might reasonably be expected here.

Were not other conditions involved to complicate matters, the simple determination of what resistant stock to use on any given soil need not of necessity be such a difficult problem. A study of the native species, and of the soils and conditions in which they thrive best, should come very near telling us that. To illustrate: some of the principal characteristics of the native species of most value as resistants and direct producers are herewith given:

Vitis riparia is vigorous on moist soils only, and its varieties attain their best growth on sandy, fresh banks of rivers. They root easily from cuttings, graft well, and are very susceptible to drought.

Vitis rupestris is found in hilly, mountainous country, nearly always along gravelly banks and ravines where there is moisture all the year around but where water abounds only a portion of the time. Its varieties should never be planted where there is stagnant water. Their resistance to drought is good, they root easily from cuttings, bench graft readily, but are very difficult to handle as field grafts.

Vitis æstivalis varieties delight in high, warm, sandy and gravelly moist soils, and are rarely found in very dry soils and never in swampy lowland or lime soils. They are good growers, very fruitful, hard to root from cuttings, and graft well in vineyard.

Vitis linceumii is found in sandy, high, well-drained timber lands on ridges in siliceous or granitic gravel mixed with clay, rather compact soils, and also in very deep soils on river banks. It is very resistant to heat and drought, is a good grower, quite fruitful, but hard to root from cuttings.

Vitis bicolor varieties grow well on black sandy soils derived from old formations. Moderately good growers, fruitful, very resistant to heat, drought and cold, and hard to propagate from cuttings.

Vitis berlandieri is found in limestone hills, on top of and along the side of hills, on creek bottoms. Its varieties are of the most resistant to lime, drought, and phylloxera. They graft easily and are good graft bearers, but most varieties of them are exceedingly hard to root.

Vitis monticola is also found on limestone hills. Its varieties grow exclusively on low mountains or on tablelands—never in low places. They are resistant to heat and drought and graft well; exceedingly hard to root from cuttings.

Vitis cordifolia is found on soils similar to those in which the Riparia is found. Its varieties are vigorous growers and graft well, but are very hard to root from cuttings.

Vitis champini is found in the limestone hills of Texas. Its varieties adapt themselves to a variety of soils, stand heat, drought and lime conditions well, are good growers, root easily from cuttings and graft well in vineyard.

Vitis solonis is found in ravines, along banks of streams. Its varieties are of fair growth on sandy or lime soils and root easily.

Vitis doaniana varieties are moderate growers, do well on sandy or lime soils, root pretty easily from cuttings, stand heat and drought well, and graft well in vineyard.

Vitis cinerea is found in deep rich, loose soils, on river banks, and also quite often found in low swampy clay land, but is never found in very dry soils. Its varieties are hard to propagate and are of no special value except on swampy lands.

Vitis labrusca does best in fairly fertile, deep, fresh alluvial soils. Its varieties are moderate growers, very fruitful, root easily from cuttings, and graft well. By far the largest part of the varieties of our native grapes cultivated for their own fruit in this country are of this species.

Vitis vinifera, given because nearly all varieties of grapes grown for their fruit in California are of this species, loves a warm dry climate, but varieties of it thrive in nearly all well-drained soils. It is, however, not resistant to the phylloxera.

The resistance of none of the species to cold is given, because all of them resist more cold than is found in the viticultural areas of California.

The United States Department of Agriculture, finding that at least twenty years after the phylloxera had been well established in most of the leading grape districts on the Pacific Slope and that scientific and practical men had tried and spent large sums to counteract the devastations caused by it, and that these on account of the diverse soil, climatic and other conditions were as often, nay, oftener failures than successes, and realizing the gravity of the situation and that similar conditions were likely to arise at any time in any of the states and territories of this country where the growing of Vinifera grapes might become a commercial business and that a comprehensive investigation of the entire subject such as only the Department of Agriculture is competent to undertake was necessary, has for this purpose located eleven experimental vineyards, one at each of the following places: Colfax, Chico, Cucamonga, Fresno, Geyserville, Livermore, Lodi, Mountain View, Oakville, Sonoma, and Stockton. These were located with special reference to a diversity of soil and climatic conditions, nearness to and distance from ocean, bay or other bodies of water, in order to afford opportunity of testing and adjusting varieties and hybrids of the different species to varying conditions, the locations also taking in wine and brandy producing as well as table grape and raisin districts.

Of some of the many important problems receiving consideration in these experimental vineyards, the following are four of the cardinal questions under consideration:

1. To make a comprehensive test of the resistant vine varieties to determine their adaptability to the different vineyard soils and climatic conditions.

2. To study and determine the congeniality of Vinifera varieties to the different resistant stocks.

3. To ascertain which varieties are best adapted to the different localities and for the different purposes.

4. To afford opportunity for testing all classes of grapes with reference to their resistance to diseases which have been doing such serious injury to the vineyards, and if found necessary to undertake the creation of an entirely new class of grapes to resist them.

Your attention is here called to the fact that these experimental vineyards happen to be so located that there is not a grape-grower in the entire State farther than a day's journey from some one or more of them, and a cordial invitation is extended to all to visit them and profit by them individually. We are especially anxious to have you see them and tell us what you think of the investigations conducted in them and give us your ideas, suggestions, and criticisms. This will encourage us and spur us on to greater effort. Special pains have been taken to have the names conspicuously placed on each variety so as to enable any one visiting the vineyards to see and study the varieties, and we will also be happy to have you write to us for any additional information you desire.

In these vineyards over three hundred varieties of resistants and direct producers and over four hundred Vinifera varieties grafted on resistant stocks and growing on their own roots are to be found, and to this already large collection of varieties additional varieties are constantly being added. We have just completed over eight hundred acid and saccharine tests of Vinifera varieties fruiting on resistant stocks in the department experimental vineyards. These tests were largely made as a back check on our congeniality studies, and are bringing out a great many interesting facts. They indicate, for instance, that the same Vinifera varieties grafted on different resistant stocks may be much sweeter on one, may have relatively more acid on another, ripen earlier on some than on others, be more productive on one stock than on others, etc.; in fact, often are entire successes on one variety and failures on another. They show the important fact that in order to successfully establish a vineyard on resistant stocks, while it is imperative that stocks be selected that are suited to soil and climatic conditions, it is not less important that stocks be selected also with reference to their congeniality to the varieties it is desired to graft on them. They indicate the important fact that some of the commercially well-known varieties which are now being so largely planted for diverse purposes, although they are on resistant stocks, are likely not to prove successful, because the stocks they are on are not congenial to them, even though such stocks may be well suited to the soil conditions into which they are to be placed. Therefore, there are at least three questions that every intelligent grape-grower should ask himself and have answered before planting:

1. What Vinifera variety or varieties he desires to grow and whether they are suited to the environments in which they are to be grown.
2. The stock best suited to the soil and location.
3. Whether his Vinifera variety or varieties and the resistant stock in question are congenial.

It should, of course, also be determined beforehand whether bench grafts are to be used or whether it is intended to nursery or field graft, the suitability of stocks in this respect varying decidedly. Such points as these it takes years to solve and the individual grower can not afford to solve them. This should, however, be all the more reason for the growers to keep in close touch with what is being done for them in the experimental vineyards. The lack of doing so may mean to them only partial success or even failures when successes can be just as well and cheaply had.

I desire also to mention that some of the direct producers, especially red varieties, have so far given us some very good results. Conclusions should, however, not be too hastily reached, as it frequently happens that varieties do well for a few years and then decline. The real resistance of many of them to phylloxera is still undetermined.

In order that the investigations carried on in the experimental vineyards may have as direct application as possible to the vineyard soils, analyses and maps of the soils have been made and correlated by the Bureau of Soils.

A few words of caution are not out of place relative to the enormous vine plantings that have the last few years been made and that will be made the coming season. These have resulted largely on account of the shortness in the wine supplies on hand that were occasioned by the San Francisco disaster, where at least 15,000,000 gallons of wine were lost, and the heavy demand and increased shipments of table grapes from California the last few years occasioned by the shortness of the Eastern grape crop and other deciduous fruit crops. Of these plantings a majority are not on resistant stocks, and not enough consideration is given to the selection of varieties with reference to their fitness for the purpose grown or the surroundings in which they are planted. While the lack of information that has heretofore been on the adaptability of resistant stocks is some excuse for the planting of non-resistant vines in soils where the insect is naturally restricted in its progress, and this is especially true in districts where the phylloxera has not yet been located, there is absolutely no excuse for again planting Viniferas direct on land where the vineyards have been previously destroyed by the insect or where it is known to exist.

THE CHAIRMAN. We will now proceed to the subject of "Grapes," by Mrs. M. E. Sherman. I believe her paper is here, if Mrs. Sherman is not.

DR. SHERMAN. There is a little error in the subject. It should have been "Muscatel Grapes" instead of "Grapes."

MUSCATEL GRAPES.

By Mrs. M. E. SHERMAN, of Fresno.

The earliest of historical people had raisins, dates, and figs for food. Man's inventive genius was not taxed by having to cure these fruits, for in a dry, warm climate they dried on the vines and trees. The simplicity of the foods of the ancients suggests the Garden of Eden, where food was the product of plant life, secured to man without toil.

In California, twenty years ago we had nearly perfect conditions. Then there were no codling moth, no phylloxera, no pear blight, no white fly, and no petty thieves. The rich people kindly took themselves off to New York or Paris for their foolish display. We lived the simple life, for none were over rich and none in dire poverty. Child-like we babbled of our blessedness. Then came codling moth and pear blight. One-lungers and remittance men followed, then tourists and Paris fashions. These things we have assimilated. All the undesirable races of humanity have found a resting place in our earthly Paradise, and when we dare to object the whole United States is shocked at a lot of talk, until it fears a further attack of gastritis, and we are silenced.

The workers for social betterment are appalled at the increased number of men who, with opportunity to earn money, refuse to work. They loaf, living on the earnings of their wives, and (thank God, we have no longer to add) "of their children." These helpless ones are released, by the strong hand of law, from the weary hours that make a day's work in the canneries and packing-houses.

The first raisins made in the United States came from California. To whom the credit is due I do not know. I am not here to throw that apple of discord into our midst. They were made (and that is enough) in the seventies, and along in the eighties became a commercial success. The peculiar suitability of Fresno soil, the abundant water supply, the long drying season, free from dew and fog, soon singled out Fresno County as the raisin center of the State.

The details of planting and laying out of a vineyard will be passed over, as time is limited. The choice soil for raisin grape culture is of small area, even in Fresno County's vast domain. The deltas of the many wet-weather streams that rush down from the Sierras and sink away into nothingness on the sandy plain carry the rich fine red soil to make raisin land. This heavier soil is a little later, about ten days, in maturing the grapes, but it makes the rich meaty raisin, one that is a mass of tender jelly inclosed in a thin skin.

On the heavy red soils the vines reach maturity earlier and make larger vines than on less favored soils. The often told story of paying crops of raisins on three-year-old vineyards is true of this soil. I have had three fourths of a ton of raisins to the acre on a three-year-old vineyard. To secure this result the curing and cultivating seasons must be ideal in their way. The vines as ordinarily planted are picked up at random, often made from cuttings taken from a brush pile. This is not the way to make a first-class vineyard. A vineyard is well made when the cuttings are first selected from market vines, then rooted, and again, only the best of these rootings are planted. There is no royal road to vineyard making more than to any other kind of goodness; it is ever the narrow, straight path of doing each day's work well.

The varieties of grapes used for raisin making are of European origin. The Muscat de Gordo Blanco, the Muscatelle of Alexandria—both names are used for a white grape in Fresno County that is too nearly alike to have different names. It is a large, light yellow-green grape, with a distinct flavor, thin-skinned and very sweet; a good table grape, as the berries are large sized. It has a fair number of seeds that are closely held in the pulp. The Sultana and the Sultanina are small, light yellow-green grapes, that grow in large bunches and are entirely seedless. A few Feher Zagos and Malagas are dried each year, also for raisins. Under proper conditions the Muscat is a vigorous grower, but it has little ability to withstand adverse conditions. When it is starved it takes to making small two-crown and seedless berries. When this occurs it is time to lengthen the pruning and to put on some fertilizer. The Muscat has been pruned short, very short, to force it into producing crown clusters of large berries. The demand for the Dehesa cluster has grown less each year. Fresh fruit is plentiful all winter in the large cities and raisins are no longer a necessary part of the dessert. To-day, quantity rather than quality is in demand in raisins; the pruning has been lengthened; three, four, and five buds are left on the spurs where a few years ago two would have been considered as enough.

The Muscat is pruned to low stumps. It was strongly brought to me how forlorn they look after pruning time by a woman on the train saying to me, "I thought this country had grapevines." I said, "Yes, there is a vineyard." "Oh," she replied, "I thought that was newly cleared land covered with stumps." Certainly it requires an eye of faith to see those stumps in a few short months become a vineyard full of beauty. Nature, however, even in the winter time, paints the red brown soil and surrounds the blackened stumps with the gorgeousness of the poppies, and they fill everything with the sunshine of their fragile beauty.

Frost and defective pruning produce "nigger heads" in a Muscat vineyard. These round black masses with a fringe of new canes around their bases are indications of a failing vineyard. The remedy now applied is to raise as many of these canes as possible to the crown of the vine, tie them together and cut them across to make a new crown over the old one. As soon as these spurs are stiff enough to be self-supporting the cord is removed. The next year's pruning uses these spurs as old wood and cuts to leave two or three buds on each cane coming from them. Old vineyards that had dropped in production until unprofitable, after three years of long pruning have come into full bearing again. What the ultimate result will be we can not foresee, but it is certain that old blasé vines have been restored to youthful verdancy.

Spring frosts are one of the troubles that make the morning naps of the raisin-grower far from peaceful. These are mean nips that kill back the early leaf and take the tiny, new-born bunches. The baby bunches of grapes are folded away with the tiny leaves and tendrils in the bud by the mother vine for next year's unfolding.

While it is known that the crop is often greatly shortened by this nipping, little has been done to prevent its ravages. It does not come often enough to be a serious menace, fortunately. We have tried brush burning, fire pots, and all the rest of that smoke-forming cloud-protection. It was lots of fun for the boys to get up at three o'clock in the morning, have hot coffee out in the vineyard, and then have half a day off to sleep. However, the smoke would never obligingly form a cloud, but sailed straight up and up and up out of sight.

Water on the land will lessen frost in a large way; consequently, the skilled vineyardist now tries to have the small irrigation ditches full of water. It is also a matter of observation that during the heaviest spring frost we ever had the coldness flowed like water, so that a fence or a row of trees turned aside the flow and in many cases that portion of a vineyard was saved. These hours of coldness come at about three o'clock in the morning and pass with sunrise, so that it is only for a few hours at most that the vineyard needs guarding against frost.

The vineyard in the springtime rapidly takes on beauty. The tiny green woolly leaves put out on the brown, lifeless-looking trunk and touch the heart with their tender, baby-like helplessness. Quickly they grow, and soon the leaves take on a shining surface, like the school boy's happy face. Then comes youth and the outreach of the clinging tendrils of love outreaching until they clasp hands across the rows with another outstretched hand. Middle life is the long hot summer days, the period of fruitage and of silent work; and autumn, like old age, has the perfect grapes, the wine of character tried is ready for the gathering. The leaves as earthly gross silently fall one by one, returning back to earth. The vintage is here and the vine sinks into the silent sleep, awaiting the resurrection of spring.

Good plowing and plenty of it, varying the depth year by year so that the plow sole is controlled. Then cultivating to retain the moisture. The old story of increasing fruitfulness of the vineyard in which the old father told his sons he had buried a treasure is applicable to California. The land needs working. Try it this season for yourself. Water a ten-acre piece of vineyard, then divide it into four equal parts; plow the first quarter as usual, then give the next quarter one extra plowing, the third quarter two extra plowings, and the fourth quarter three extra plowings; double the cultivating and harrowing in the same proportion. The result will show not only the first year, but will continue to show for a term of years.

The chief defect in the Muscat grape is weak pollenization, or dropping of the berries at blossoming. It is a good plan to plant the long way of the vineyard every other check with a good vine for pollen. The wine grapes have many varieties that are useful for the purpose; if it is cared to grow wine grapes extensively, then a row every ten or twelve rows will answer very well.

The Sultana and the Sultanina are trellis vines and add to the expense of handling. The sale of these seedless varieties of raisins is somewhat hurt by the seeded Muscat, as a commercial product. The tendency this year was to ship them green, and they are desirable and profitable for that purpose.

As the years pass we are more and more confirmed in the opinion that all vineyards are cleaner and healthier that are sprayed with Bordeaux mixture every winter; a spray 4–4–40 in strength we find necessary to raise clean table grapes. On the Muscat the rough "nigger heads" are full of fungous growths.

Careful sulphuring of the Muscat is important. The first sulphuring is done when the buds first swell and open, the next at blossoming time, and a third when the vines need it. In a warm year the vines rarely require the third sulphuring, while a cloudy spell will quickly develop mildew in a dirty vineyard. The sulphuring machine makes this work much easier and reduces the expense over one half when compared to the old way of sprinkling from a can.

The worst pests we have had in the last few years are thrips and hoppers. These are thick at night, or rather at dusk. In driving alongside of a vineyard they blind the eyes of the horses and drivers. In the vineyard they cause early loss of foliage, leaving the grapes to sunburn.

A raisin vineyard represents a heavy investment nowadays, for sweat-boxes and trays eat into money very fast. The trays are of wood two by three feet in size; across the end are two-inch cleats. These cleats are made higher than the trays, to permit stacking and turning.

The weather agent earns his pay in Fresno if he answers the telephone in September and October, for whenever a cloud no bigger than a man's hand appears every grower expects a terrible storm. When the message does come, "Stack your raisins," the big bell rings, every man on the ranch leaves his work and all hands pile up the trays. If it does not rain, some are ungrateful enough to growl. If it does rain, the raisins are stacked and the grower goes to bed to listen to the patter and pour of the rain. Perhaps all the next day it continues and he frets over the prospect of heavy dews after the first rain. This is one of the pangs of growing raisins.

The life of a raisin tray is about nine years. After the third year the repairs increase until the tray is like the boy's jackknife, first new blades, then a new handle, until all the original tray has gone glimmering. The need to-day is for some substitute for wood for trays and sweat-boxes as well as for the packing-boxes.

The ripening of grapes is shown by the dulling of the bright green foliage and when the juice of the grapes tests twenty-four per cent. Then the trays are hauled out and the flurry of picking begins. It is not long before the trays stretch along the rows full of the light yellow-green grapes. The air is full of the soft, sweetish, acrid smell of the drying grapes. After ten or twelve days of exposure to the sun the half-dried raisins are turned. This is quickly done by putting an empty tray on a full one and reversing them, leaving the raisins other side up exposed to the sun. After a week they are stacked and allowed to finish in the shade. This makes a more meaty raisin than if they are permitted to finish entirely in the sun.

In former years the size of the bunches and berries counted as extra money; then the picking was carefully watched and paid for by the day. Now that all this has passed, the work is contracted. This year the price was $15 a ton, delivered in the sweat-box. This is the highest price we have ever paid.

The quality of the raisins has fallen steadily of late years. The first and second settings or crops are picked together, and many of the raisins are deficient enough in sugar to be merely dried grapes.

Raisins are not handsome in coloring and require more skill in adding color to them by means of ribbons and fancy paper than any other class of fruit. The ordinary package of commerce is not only expensive, but it is a hideous, unappetizing-looking affair. At present crude colors seem to prevail, with gold trimmings. No one desires to eat gold or silver.

The packing of the raisin grape has become centered in the towns. The home packer is down and out in nearly every case. The cause has been railroads and the large seeders. The royalties on raisins seeded had to be paid and it has cut greatly into the profits of the raisin industry, for seeders and railroads charge all the traffic will bear.

The packers in dealing with the growers have always shown a surprising lack of tact. One man among them, who will always do right, when appealed to personally has been nicknamed in derision. Moral honesty, the honesty advocated by Mr. Roosevelt, the honesty that is honest because it is right, has been largely lost sight of and mere honesty that serves to keep a man out of jail has taken its place. The brotherhood of mankind has been forgotten by grower and packer alike; it has become a game of who can beat the other.

The present conditions are shown in the reluctance of the older settlers to plant Muscat vineyards. The wine men are trying to discourage the further planting of wine grapes. They certainly have stopped it for some time by the policy of this year's settlements. When money was scarcest and things looked darkest, the Wine Association paid the growers in notes, at a low rate of interest, not due for six months. This was the loyalty they have shown in helping the credit of the people.

Phylloxera and pear blight are still in our midst. The vine disease has not reached Fresno. The vine disease would be, like pear blight, a wipe out. It would not pay to fight it. So far our vineyardists can, like the good Indian, say, "Thank God that others are worse off."

In fighting phylloxera we have the experience of Europe in growing resistant roots. In Fresno it does not do to talk phylloxera. On one vineyard, where vines were being removed as worthless, I said something about phylloxera, but the foreman was indignant and said, "Why, it is only nematodes on the roots." I smiled, for all my neighbors know so much more than I do that it is useless to say much.

The right root on which to graft the Muscat has not as yet been definitely settled. In South Africa the Rupestris Metallica has given good results. The Rupestris St. George, that we all rushed for at first, is at present rather under a cloud, as it has not proven altogether satisfactory as a root for Muscat. The present root that seems most promising is 1202 M (Morvedre Rupestris) of Franco-American stock. This root has proven vigorous and seems to like Fresno conditions of a rising and falling water table.

After all, the grape industry in California is new, when compared with the old world. New industries must find their places in the world's economy. The new industry brings with it changed conditions in the world's markets. Time will balance some of the evils of bugs and bacteria. Fruit packing-houses that live on the growers' money and hand out "red ink" are of a necessity self-limiting. They are like the bacteria that die from their own poisoning.

Let us not lose, in the present times of depression, the upward looking toward better things. By our reaching out to help the small portion of the world around us back to the old-time industry and honesty, when labor had its own perfect reward in its honest pride of achievement, and when grafter did not seize the money of the people; let us laugh and rejoice that we live in a land of sunshine and flowers, that California is our home and our earthly Paradise.

MR. BOOTH. Mr. Chairman, in that paper there is one item to which I would like to call your attention. Mrs. Sherman states that she does not know who made the first raisins in California. They were made by B. N. Bugby of Sacramento. His orchard was a little above Nigger Hill, in El Dorado County. They were made in 1868. Shortly after that, R. B. Blowers of Yolo County began to make them out of the Muscat grape, and I believe the first quantity of grapes that Mr. Blowers had was in 1870, and from that sprang this whole business of raisin-making.

MR. SPRAGUE. I would like to ask what appears to be the advantage of leaving the canes so long the first year and then cutting them down to two or three buds the next?

DR. SHERMAN. It seems to be the experience there, that when they have pruned their vines so short they have sacrificed so much of the wood that they have reduced its vitality and it produces neither the grapes nor the wood that it should produce, but by leaving the crown higher they get more grapes. The Emperor grapes suffer in the same way. The old Emperor vineyards in Fresno County to-day are suffering from something of that kind.

MR. FILCHER. How many canes do you use generally?

DR. SHERMAN. That is a matter of judgment. We leave as much wood as we think the vine will develop, according to its vigor. In this new method of pruning we leave about four buds. It is all a matter of judgment as to what the vine will stand. If it is in a heavy soil we leave more than if in a light soil, and if the vine is vigorous we give it all the wood we think it will stand. The vineyardists have been pruning heretofore for big clusters and big grapes, and the Japanese and all the others who make a business of pruning have learned this way of pruning and they whack it off to make as much speed as possible.

MR. ISIDOR JACOBS, who was on the program for a paper on "Relations Between Fruit-Grower and Canner," was prevented from attending, but forwarded his paper, which is given below.

RELATIONS BETWEEN FRUIT-GROWER AND CANNER.

BY ISIDOR JACOBS, OF SAN FRANCISCO.

There can be no doubt that these relations should, and must necessarily be, pleasant and mutual where both are agreed to do the right thing by each other. It must be recognized that the fruit-canning business of California only uses a small proportion of the fruit crop, variously estimated from six to twenty-five per cent of the production, according to different varieties. It is, therefore, evident that the prices the canner should pay for fruit are largely dependent upon conditions outside the canning business. First, upon the dried fruit demand, and the facilities for drying. Second, upon the demand for fresh fruit in the East, and the facilities for handling it.

It is certainly self-evident that a fruit-grower should not be a speculator; but when he can make a contract for one year, or a period of years, with a canner in whom he has implicit confidence, at a price that will pay him a good estimated profit on his estimated crops, it is to his interest to make such a contract. It is a fact that the fruit-canner is willing to pay to the grower, a good, fair price for fruit, but he requires first-class fruit to be delivered in accordance with the contract. Although it is frequently the idea that when the market goes down, or there is a glut and the canner can not handle the fruit, he is more inclined to reject it, yet this occurs very seldom. It is, of course, human nature that when such a state of affairs occurs the canner will be more critical in the examination of the fruit than he would ordinarily, and when he is faced by a tremendous loss because he can not handle the fruit he has contracted for, he is certainly going to endeavor to get out of the contract if the fruit does not comply with the same; whereas, on the other hand, when the market goes up, and the canner can handle the fruit, he is inclined to frequently overlook the conditions existing, and accept the fruit even if it does not comply with the contract. Yet, after all, when we consider the amount of fruit handled by the fruit-canners of this State, there is comparatively small reason on the part of the grower to complain, for if the fruit-canner is honest and intends to do the right thing and live up to his contract, and if the fruit-grower is honest and intends to do the right thing and live up to his contract, there certainly should not be any reason for complaint on either side. It is in every way a question of right-doing, and dependent entirely upon the good faith of both parties to the transaction.

One thing is certain, whether the fruit is for canning purposes, or for drying, or for shipment East, it is to the advantage of the fruit-grower to use his best efforts to produce a good grade by properly thinning the fruit on his trees, and exercising careful and good judgment.

The relations of fruit-grower and canner, therefore, it may be stated in conclusion, depend entirely upon good faith and honesty on the part of both.

Mr. Judd here presented the following resolution:

Resolution in Favor of Good Roads.

Whereas, There is a greatly increased demand for good roads in California, owing to the constantly increasing traffic and increasing demands upon them; and

Whereas, The wealth and population of California are fast being concentrated in the cities and towns; and

WHEREAS, The road law of 1883 exempted said cities and towns from road districts, thereby putting the whole burden of road construction and maintenance upon the farmer and fruit-grower; therefore be it

Resolved, That we, the Fruit-growers of California, in Convention assembled, respectfully ask the incoming Legislature to amend said laws so as to equalize the burdens of taxation for road purposes fairly between country and cities.

MR. JUDD. I move the suspension of the rules and that this resolution be put upon its passage.

The motion was duly seconded and carried.

MR. S. C. MASON, of the U. S. Department of Agriculture, was requested to speak of date palm culture.

DATE GROWING IN CALIFORNIA.

BY S. C. MASON, OF WASHINGTON, D. C.

Ladies and Gentlemen of the Convention: I have been an interested listener to your discussions and papers here and had not expected to take any part in this meeting. I will be glad, however, to say a few words regarding the date industry, which is something that is comparatively new to California and the southwest. Of course, date trees have been grown—are grown in the region north of Los Angeles, but probably very few fruiting successfully.

The date, as it is expressed by the Arab, is the "queen of fruits." It must grow with its roots in abundant water and its head in the glowing skies. We have the glowing skies in the southern part of the State and we have the abundant heat. Briefly, dates require a very long growing season of extreme heat and extreme dryness of the atmosphere and lack of rainfall, especially lack of rainfall during the ripening season, in the months of September, October, and November. I think the first introduction, in a systematic way, of date varieties from the regions of Africa was made about 1888 or 1889 by the U. S. Department of Agriculture. There are a few surviving trees of those importations, the only one that I know of personally being a tree growing near Indio, an offshoot that was given by the Department of Agriculture to General Towne and by him transferred to a homesteader named Patrick Kelly, who planted it when Indio was simply a wood siding. This tree, then, is something like eighteen or twenty years old. I had the pleasure of pollenating that tree last spring. It stands, perhaps, as high as that gallery. Perhaps I ought to say that the date has the fruiting flowers on one tree, the male or pollen-bearing flowers on another. This is true almost without exception, although we found near Tempe a very curious condition, male and female flowers on the same tree, like on the corn stalk; but these are very rare cases, so far as we know. In systematic date culture about fifty of the female or bearing trees are planted along with one of the males. The male flowers are cut from their sides as they emerge, carried to the female trees, and a very fine pollen dusted over the female flowers. If, for any reason, the crop of pollen should be destroyed in a given year, the date-growers realize that they would lose their crops; so they make a practice of drying these pollenating flowers, wrapping them in some tight material and hanging them up until the next season. It is a very interesting fact that the pollen will keep its vitality until the next year. I pollenated these trees from flowers that were born in the little park next to the Indio Hotel, took the pollen out three times, and it set fourteen magnificent clusters of fruit. At the time I left the hotel in the latter part of July I think there were fully four hundred pounds of green dates—perhaps they would have weighed more than that—on the tree. They didn't allow those dates to ripen properly, for I have been told that the partly ripened dates were carried away by the pocketfuls.

The most extensive date plantation is at Tempe, Arizona, where the U. S. Department of Agriculture furnished the offshoots. It now contains six hundred trees, including something like two hundred of the choicest grown in the north of Africa and the Persian Gulf district.

The ground is furnished and the work carried on by the Arizona Experiment Station, and the results as to fruit, usually shared by the Department of Agriculture and the state. I spent two weeks in the study of this recently. The conditions for successful date-growing are rather reversed this year. Instead of having the dry, hot weather all autumn, there were two and a half inches of rainfall in the month of October at Tempe, cool nights, heavy dews, and plenty of water in the river, so that irrigation began on the ranches and the water came up to within thirty-one inches of the surface. The date garden was filled with a blanket of almost saturated air during the nighttime, moisture emanated from the soil during the day and the dates began to rot, so that only the earlier varieties were successfully cured. We are hoping that some of the very choicest of the later ripening bunches may still be cured, as they have had much better weather in the latter part of November and into December.

The very queen of all the dates so far brought into this country is the Deglet Nuer, meaning the "date of light." Of all the varieties that we have studied thus far, this is the date that requires the highest number of heat units for its perfection. It is considered that the minimum temperature for date-growing is about 64.4 degrees—that is, of mean temperature of the day—so that all the heat units above that during the growing season, from May to October, may be placed to the credit of the date. If something like 3,000 or 4,000 units are accumulated during that time, that is, if we have about a mean of 70 degrees as is maintained in the Fresno country where the raisins are perfected we believe that the earlier, quicker ripening dates may be grown. If the number of heat units runs up to 5,000 or so quite a large number of varieties will be perfected; but only in a reading of 6,000 or 7,000 units above the zero point can the very finest of Sahara dates be produced. Those conditions exist in the Coahuila and Imperial deserts of southern California, in the Pala Verde country and around Yuma, and to a limited extent in the lower Gila country. Throughout the lower Salt River and Gila River countries about Maricopa, Phœnix and Tempe, and perhaps up into the Pala Verde country, the medium quality dates could be grown to perfection in most years. There are already some fine old seedling date trees in the neighborhood of Phœnix. One interesting case is that of Mrs. Lount there, who says: "The first dates that grew on the ranch, my husband brought me the seeds in his vest pocket. He had been to town and eaten the dates and when he came home he gave me the seeds." She planted the seeds and quite a number of trees grew, and contrary to the usual rule, which is that the trees will come about half and half female, the majority of her trees proved to be male, but out of that number she secured one very fine sort, indeed, and others of fair quality and they are growing to-day in her yard in Phœnix. She said to me that the best date ever grown in Arizona was planted by a Mexican, and when that place was leased by a family and they began taking offshoots from that tree she wanted one and they would not give it to her. She says: "One night, when I knew they would all be away, I took my Mexican man, a lantern, and an irrigation shovel and went over there and stole one and brought it home and planted it. And it was a good thing I did, because they tried afterwards to move the old tree and it died, and the offshoots died, and that is all I have to represent that splendid variety. I have one old tree and six offshoots from it."

Now, this illustrates the way in which the date tree is propagated. In California it is an easy matter to take off a slip and graft it or root it; any single bud of these varieties of exogenous fruits is good; but in the case of the date there is only one bud, and that is at the top of the tree.

The date trunk makes no initial expansion in diameter except through the first month, because it has no growing, living layer, but the living cells are all through the trunk, so we depend on offshoots, and after fifteen or twenty years the date tree ceases to bear these offshoots. There are to-day very choice varieties of dates growing in the Gulf region and Florida from which we have no means of getting any more trees because they have passed the offshoot-bearing stage.

At the present time we are distributing a large quantity of date seeds of the choicest varieties to the settlers in that district which I have named, with the idea that from these seedlings may be secured, by careful selection, varieties better adapted even to California and Arizona conditions, and even in southern Texas, than all but a very few of the imported varieties would give us.

Last Tuesday I addressed a farmers' institute under the auspices of the California Experiment Station, conducted by Professor Neff—a gathering of people who were very enthusiastic on matters pertaining to the Coahuila Valley. We distributed about eight thousand seedlings last spring and great quantities of date seeds, so that in the near future we may hope to add to the wonderful resources of California this further industry of date-producing—in this country that is so hot and so dry that it bids fair to give success to this work.

MR. JUDD. We have with us other professors, and I would like to hear from Professor Stubenrauch and Professor Mackie.

PROFESSOR MACKIE. Mr. Chairman, and Ladies and Gentlemen: I have scarcely prepared anything for this meeting except a very receptive ear, which has been filled with very many good things. In regard to my own work, it follows very closely that which was outlined in the excellent paper read by Mr. Mills last evening, and a great deal of it would simply be a repetition of what Mr. Mills has placed before us. There is, perhaps, just one little matter which I wish to add to what Mr. Mills said, and which interested me personally a great deal, and that is in regard to the addition of humus to the soil in California. It is my province to classify the soils of California, get them into various groups and certain correlations, and in regard to the humus of the soil the State is divided into two or three groups. The soils of the southern portion of the State, as Mr. Mills has told you, are deficient in humus. There are certain soils throughout the San Joaquin Valley also in that class. The Sacramento Valley soils have very little sand in them; sandy loam is about the lightest soil we have, except where the rivers wash. In the Sacramento Valley the humus problem is not quite so great as it is in the southern portion of the State. The main problem in all these places is to get a certain amount of humus to carry food to the plants, and two ways are provided of supplying nitrogen to the plants. One, as we all know, is by the cover-crop method, or getting it into the soil by means of the bacteria on legumes. The other is by another set of bacteria which also live in the soil and produce nitrates by direct oxygenation of the hydrogen in the air. These can exist only where humus is found in the soil in a healthy state; that is, free from improper substances which will destroy the action of the bacteria. It may be said that the nitrates of the soil exist only where humus exists. That means that wherever we can extend the humus in the soil we can extend these two sorts of bacteria which form nitrates; and the growing of a cover-crop and plowing down, with the addition of barnyard manure, have been found to be the most efficient means of adding nitrogen to the soil; and I believe that the addition of the cover-crop, whether it is planted or whether it is the ordinary vegetation which comes in the soil, will produce humus, which helps especially this latter bacteria. This is just a little interesting item that I thought I would add to Mr. Mills's excellent address. (Applause.)

MR. JUDD. We would like to hear from Professor Stubenrauch.

PROFESSOR STUBENRAUCH. Mr. Chairman, Ladies and Gentlemen: I did not intend to have much to say at the Convention, because the work which I am doing is hardly ready to give out. I dislike to get up and say what I am going to do. I would rather wait until I have done something and then give you results. This morning you heard from Mr. Reed something of the work of the U. S. Department of Agriculture in southern California dealing with the investigation of the causes of decay in citrus fruits. I had the honor to be connected with that work and that is part of my duty in the winter. I am, however, taking up the interesting line of investigation dealing with the cold storage of California fruits. We attempted to keep some of the deciduous fruits in cold storage last year and also this past season. dealing with the peach and the plum and the pear. Going on further, also studying the behavior of our apples, particularly those from Watsonville and the Oak Glen country, and also the study of the storage of different varieties of California grapes, the idea being in this last investigation to see if we can not get for the California table grape the trade and market which now go to the Almeria. I had occasion to look into this matter when I was in Washington and found that about a million and a half dollars are spent annually for Almerian grapes, and it has been my dream or my hope to find some way of prolonging the market season of our own excellent table grapes so that we might get at least a portion of this mighty trade. This work is in progress now. In a small way we began last season, using about fifteen varieties, selected from the San Joaquin Valley, from the Tulare station conducted by the University, and packed them in different ways. This was merely a preliminary investigation to find out, if we could, the style of package, to see how the grapes should be handled and packed to keep in storage. We tried different packing materials, including cork dust. The Almeria grapes all come in cork dust. We were trying to find some material that could be used as a substitute for this cork dust. We also experimented with storing in the ordinary open crate. Our investigations last year showed that we could not keep the grapes as long in the open crate as when using some material in which to pack them. Cork dust was the best thing we had last year. Next to that we tried wheat bran, which did very well as far as it went, but after a time in storage it seemed that the bran absorbed moisture from the fruit and caked, becoming so hard that it was difficult to get the berries out. Then we had a lot of grapes, each bunch of which was wrapped in paper, as deciduous fruits are wrapped. I would discard all of these materials except the cork dust, though this year we are going along with these investigations and using other materials as well as cork dust. We tried to find some substitute for the cork dust because it seems impossible to get it in suficient quantity in California. We might have to grow our own cork, and that would not be so ridiculous as it seemed at first. We can use the outside of the bark and it would not be necessary to have very old cork oaks. However, I am on the track of some other materials. I won't mention them here because some of you may smile, but I am on the track of some other things which I think might be successful, and we hope to be able to tell you something about this at another time.

But the foundation of all is careful handling, just as we found in the case of the orange—carefulness in the packing and in all the handling of the fruit. I had occasion to get some grapes from a district, and found by actual count that from twenty-five to forty per cent of the berries had been injured in packing and the fruit would not keep.

You heard something said yesterday about the superiority of the California grape and the demand for the California grape if in as good condition as the Almeria. I think we have a problem there just as we have in the orange work. By studying the methods by which the grapes could be more carefully handled, and perhaps using some different method of packing these tender varieties, we could attain the end. These are some of the lessons which have been learned from the work thus far. It is wholly incomplete and I do not present it to you as conclusive in any way—simply to give you an idea of some of the work which is being done in our line of investigation.

One thing I might mention, and that is this: that with careful handling, the tenderest Muscat grapes and some of the varieties like that were kept in excellent condition last year from four to six weeks, even in open crates. I think that is very hopeful. It shows to what extent the life of the fruit can be extended if we use care in putting it up. I do not like to say much about the deciduous fruit work, the storage work, because I do not think that is going to be as important as the other. We have been able to keep peaches and plums from four to six weeks in storage. That extends the market for those fruits just that much. After that we can keep them perfect in appearance, but the taste and flavor seem to be gone. And another thing, the ripe fruit keeps the best; we can keep the ripe fruit longest and keep it in better condition.

Now, this is rather a rambling talk and gives no idea of the amount of the work we are doing, but, as I say, it is wholly incomplete. (Applause.)

MR. JUDD. Did you ever experiment with asbestos?

PROFESSOR STUBENRAUCH. No. I think that would be rather expensive to use.

MR. JUDD. I don't think so. Where you buy it by the ton I don't think it will cost as much as cork.

PROFESSOR STUBENRAUCH. How about the weight?

MR. JUDD. It is very light.

PROFESSOR STUBENRAUCH. We are using the pith of Indian corn. I don't know how that is going to turn out. The last time I saw my storage lots they were in very excellent condition. We were able to keep that fruit in splendid shape for six weeks. We have learned something there, anyhow, and can use it in our shipping work, if for nothing else.

MR. SPRAGUE. So far, what appears to be the best grape to rival the Almeria?

PROFESSOR STUBENRAUCH. Our Tokay kept in splendid shape for about two months last year, packed in cork.

DR. SHERMAN. How late have you kept grapes?

PROFESSOR STUBENRAUCH. We had Tokays until Christmas time last year.

DR. SHERMAN. I had some a few years ago on cold storage in New York that lasted until the fifth of January.

PROFESSOR STUBENRAUCH. We had some lots that were in fairly good condition as late as the first of February. The holidays probably offer the best market.

DR. SHERMAN. How about redwood sawdust? Some man told me he had a method of sterilizing redwood dust.

PROFESSOR STUBENRAUCH. I would like to get on the trail of that man. I am using redwood sawdust this season. Its weight is against it.

DR. SHERMAN. How were those grapes handled where you found so many of them injured?

PROFESSOR STUBENRAUCH. Packed in the ordinary open crate.

DR. SHERMAN. Were they hauled from the vineyard?

PROFESSOR STUBENRAUCH. No, sir; they were packed on the ranch.

DR. SHERMAN. We have always made it a rule in picking to use hay in the box and then to put paper on, laying the paper on very carefully. We never allow a Jap or a Chinaman to handle them.

PROFESSOR STUBENRAUCH. I think that has a good deal to do with it.

DR. SHERMAN. Would it be practicable to destroy mold?

PROFESSOR STUBENRAUCH. I don't know. We have gone to the extreme in our handling operations and some of the bunches which were very closely packed with berries we cut apart in order to be sure to get out all the injured and unsound berries.

MR. JUDD. Do you find that soil conditions have anything to do with keeping qualities?

PROFESSOR STUBENRAUCH. We are studying that now in your own district, Mr. Judd. We are studying the influence of soil conditions on the keeping qualities of apples. There has been some trouble developed in the Watsonville apples which we have not found in apples from any other section. It seems to be something in the soil condition. Just what it is I do not know. There is no disease about it; the fruit simply does not keep as long as it ought to and turns brown inside. Some of your apples keep very well. I won't mention any names, but as far as we could determine last year in a preliminary way it seemed to indicate differences in soil. We had Professor Mackie make a survey and map of the Watsonville district this year and we have selected your four leading varieties and have gotten lots from the soil types and are storing them. Of course, it is too early to say anything about it this year.

DR. SHERMAN. What about the dipping of the stem of the grape?

PROFESSOR STUBENRAUCH. You mean in paraffine?

DR. SHERMAN. Yes, sir.

PROFESSOR STUBENRAUCH. We had no results from it whatever. In fact, it seemed to be a detriment because it made extra handling.

DR. SHERMAN. Are not all the Almerias treated that way?

PROFESSOR STUBENRAUCH. I do not think so. There is one thing about it. The variety seems to have a good deal to do with it and the condition of the stems. In some of the varieties the stems mold instead of drying. Shriveling of the stems does not necessarily mean the shriveling of the berries themselves.

THE CHAIRMAN. Mr. Butters is now here and we will listen to his paper on "Electric Roads for Developing Fruit-Growing." (Applause.)

ELECTRIC ROADS FOR DEVELOPING FRUIT-GROWING.

By H. A. BUTTERS, of Marysville.

It could hardly be expected that any paper or remarks offered by me to this Convention could add to the sum of technical knowledge concerning the important and interesting industry the welfare of which it is the purpose of this gathering to promote. I make this confession, alas, in sorrow! In sorrow, I say, because to be a fruit-grower was once the dream of my fondest ambition. In the free fancy of my golden youth there was a period when of all the brilliant array of pictures furnished by a fervid and fertile imagination the most entrancing were those which related to my plans for becoming a horticulturist.

Ah! what magnificent grapes, what luscious peaches, unrivaled pears, apricots unsurpassed by man, and record-breaking prunes! All these grew in the fields of my youthful pictures, as I lay stretched on a bed of verdure beneath the umbrageous spread of my own fig tree, breathing the perfume of millions of blossoms, and soothed by the low rustle of leaves that gently spread themselves to protect me from the sun.

It was all so beautiful and entrancing; and as I remember it now, so restful; in fact in my picture it was all rest; there was absolutely nothing doing except among the bees. They were always busy. In fact, on the fruit ranch of my dreams the only things which were busy were the bees; and my heart used to go out to them in pity whenever I dwelt upon their life of untiring industry with its insistent demands for activity, and I used to think, "Poor little bees, you have to work so hard I pity you. It is too bad you can not have an orchard, because then you would not be obliged to work."

Ah, ruthless irony of fate! Grim realization, the destroyer of ideals; I have since had a *real* orchard; and contact and time stripped it of romance and lay bare its wayward and contrary disposition and its predilection for all the diseases in the horticultural category; revealing the bugs and things hidden within its inmost recesses, not to mention the vagaries of the market, eccentricities of the commission merchant, and the peculiarities of a railway tariff. One after another, in a solemn and insistent procession, these evil things presented themselves to me to be dealt with by my inexperienced mind. But I grappled with them with all the optimism of youth, making mistake after mistake, until that train of strange and unintelligible conditions overwhelmed me and I saw with tears my beautiful air castle in ruins.

I think that about the last straw which broke my back was the discovery that some trees which the nurseryman had labeled early apricots and sold to me as such, turned out to be very late seedling peaches, and sour at that.

All this happened many years ago, and I was thereby forced to try some means of obtaining a livelihood not connected with the chosen vocation of my youthful dreams.

Those early memories, however, are very dear to me and are fresh in my mind, even at this late day, and I have recently acquired an interest in some orchards near Chico. Profiting, however, by my early experience, I decided to hedge on that investment by having an interest in some one of the various things which seemed to me in my early experience to have me so much at their mercy, and so I started the Northern Electric Railway.

The philosophy of the occultists and theosophists teaches that in each incarnation there is something either of good or of evil, generally both, coming to each individual, and the votaries of those teachings call that something Ego. Well, by the intensity of my leanings toward horticulture, it seems that in my Ego there must be some good coming to me out of that business, and as my early experiments with production were so disheartening it has occurred to me that whatever of good is in my Ego connected with horticulture may be in the transportation of the products, and so I am now demonstrating along that line.

To be entirely serious, however, for the moment, we are now touching upon a subject of most vital interest to the industry and, as I look around upon the thousands of acres in this fine valley so admirably adapted to the purposes of the fruit-grower, I can not help being impressed with the part that is to be done by the electric railway in the great development which is to take place in this valley, and the importance to the local growers of having this local line here to coöperate with them.

While giving to transcontinental lines their just due, and while they are of immense importance to the whole State, yet it is as they stand in their relation to the whole State, and not so much to particular localities, that their importance is to be considered. It is to the local line that we must look for those particular facilities which are to count as most potent factors in local development. A transcontinental line, strung out, for instance, from the Great Lakes to the Pacific, has many and varied interests to consider and does not, because it can not, concentrate upon any one locality, while the local line must concentrate all its efforts on its locality. It makes very little difference to a local line in the Sacramento Valley how much freight or passenger business originates in Reno or Los Angeles, which are questions of the greatest importance to the transcontinental lines and must be considered even though they affect the local line unfavorably. But the local line must understand all about the business originating in and for its locality, because that is the vital issue of its existence, and being the vital issue of its existence it must be fostered and nursed and extended to the utmost, because out of its locality, and there only, must the local line produce the only revenue possible for it to obtain; and consequently it must, and will, pay greater heed to the needs of the community, and therein it is the ally of the producer. By working in smaller units it is possible to give more frequent and more rapid service, a service most suited to such a locality as ours; and without being invidious at all, I say frankly, because the Northern Electric Railway is a local line and because it must get its revenue locally only and can get none from any other source, it should have all the local business in the section through which it operates; and if the people of this valley really had a realization of what the welfare of that company means to them, no other railway in this section would receive a dollar from the local business.

It is a well-known fact that the transportation problem in the Sacramento Valley has vexed the people more than any other, except perhaps that relating to drainage. They have needed better facilities than those existing up to date, and they are beginning to materialize. We have made a good beginning, and only a beginning. Our service, both freight and passenger, is not at all what we wish or intend it to be, but we confidently expect that within a reasonable time it may be much improved. I am not so optimistic as to suppose that the service we or any other railway company can give will be entirely satisfactory to the public, because it is the privilege of the public not to be satisfied with the performance of a public utility company, and they generally exercise that privilege pretty freely; nevertheless, we shall do the best we can and that will be better than anything we now offer. Our main difficulty lies in finding good men. Since our line opened in September we have hired something over three hundred men in our operating department and discharged fully two hundred and fifty for inefficiency. We are gradually getting a good force, however, and when we are finally organized most of the present inadequacies will disappear. We have some fine men in our service, as good as there are in the Union, and these have operated right along with the incapables without trouble or accident.

There is one thing that comforts me in the many troubles I have had in connection with this railway, and those troubles are legion. I refer to the absolute knowledge that none of those nuisances that made my life as an orchardist so miserable are connected with a railway. Railways don't have codling-moth, nor pear blight, nor scale; and I think most of you will agree with me when I say that any business that is free from those pests need not be considered hopeless.

We are sailing now in troublous waters at the mercy of adverse winds, and are suffering from the same troubles that are affecting the whole business community owing to the scarcity of money; but please bear in mind that the Northern Electric Railway once built is bound to remain an important factor in the community. Men may come and men may go, but the railway will continue doing business at the old stand and must now be considered in all plans connected with the country; its integrity will not be obliterated; and although circumstances might arise to curtail its extension for the present, ultimately its mission will be to branch out in all directions, affording facilities for interchange of help, for shipment of merchandise and products to and fro, and performing all the great public functions of a servant of the people. When these extensions are all completed, the conveniences afforded will induce a greater population and more intense cultivation, which will in turn bring about a corresponding development in drying, packing and canning, and therefore greater facilities for marketing the products.

Between this city and the town of Biggs on the north, a distance of twenty-three miles along the line of the Northern Electric Railway, taking a strip one and one-half miles wide on each side of the track, there are about fifty thousand acres of land in every way adapted to the culture of fruit, and upon which there is already a large acreage under production, and this production has been going on for a long term of years and has resulted in a demonstration of the adaptability of this soil and climate to the purposes we are now considering, which removes it entirely from the realm of uncertainty, and leaves nothing for the imagination in connection with what would be the given result of an investment of time and labor upon any of these lands.

It is not the purpose of this paper to go into the figures of production, as they have been more ably dealt with by others who are more familiar with that subject, but the above facts are mentioned simply to bring vividly before you a picture of what can be accomplished in this immediate section alone, provided the available resources were put to practical purposes. The value of an electric railway to this belt of land can hardly be overstated. I believe that it is generally conceded that it is of very great advantage for a grower to be able to market as much green fruit as possible, and our railway in this section would enable every fruit-grower upon that entire strip of land to market his fresh products so far as the local railway facilities are concerned. The hauling from any of the lands within that belt to such a railway would not be serious and would not result in damage either by the wear and tear of wagon transportation or by delays incident thereto. This is particularly true of an electric railway, because one of the chief advantages of such a railway is the facility with which it can operate small units frequently. Under a system of electric railway which is properly equipped with cars, a frequent service would be quite practical, so that fruit could be loaded and moved expeditiously and it need not be subjected to delays incident to a system which operates perhaps one long, cumbrous freight train per day in which there is a great deal of switching and banging about. It is obviously advantageous, for instance, in hot weather, if a fruit-grower can load a car quickly and have it moved to its destination without having it exposed too many hours in the heat; this can be brought about only by such a system as an electric railway would establish.

To refer again to the belt of land between this point and Biggs, and which you will all agree with me is just being hardly more than touched at present. I am told by well-informed persons that the whole section of country is as admirably adapted for the culture of citrus fruits as is the land at Palermo and Oroville, and to give you an idea of what could be accomplished there I will state that last year from two thousand acres of orange orchard at Palermo there were 300 cars of oranges shipped. The value of these cars will average about $600, take it good and bad years, which would give a gross value of $180,000 for two thousand acres of land, or $90 per acre. Now we all know that the Palermo and Oroville orange business is conducted in more or less of a large way, and that yields are not generally so great from farming operations that are conducted upon a large scale as they are from the smaller farms, because the man who has twenty acres or less does a great deal of his work himself and gives to his trees and to his land that particular personal touch which is not embraced in the service which is given by hired help, and it is safe to say that with these two thousand acres in the hands of two hundred holders the products would be a great deal larger.

I understand also that the value of the Thompson Seedless grape is much in excess of these figures which I have quoted from the citrus belt. I can not be considered authority upon this subject, however, and simply make the statement in relation to the oranges, because this culture is very attractive to many Eastern people; it is a fine advertising feature for a country, and I do not think that the people in this vicinity give quite enough prominence to it. I do not think that they quite realize the value of the citrus feature, or they would make more of it in their advertising.

The Northern Electric Company has recently put in a siding at Thermalito and we have hauled away a great many cars of oranges this year that have heretofore had to be delivered in wagons to the Southern Pacific station several miles away, and manifestly it has made a considerable saving to the grower. I do not sight this particular section which I have mentioned, between here and Biggs, with the idea of accentuating it in any way to the detriment of any of the other sections of the Sacramento Valley, all of which are equally as advantageous and equally as extensive. The acreage is sufficiently vast to dazzle one's imagination and it is difficult to realize what the ultimate destiny of this valley will be when all of these broad acres are brought, as they will be, under the guiding hand of intelligent growers. It is the aim of the Northern Electric Company at present to keep pace with the development that is going to take place in these various sections, and as rapidly as we can obtain the money, to build the requisite branches in order that the people may get the full benefit of the best facilities which can be afforded by man for the transportation of their products. This fact alone should give to this section of the country a tremendous fillip and be a great incentive to the inauguration of new industries in horticulture; because nowhere in the State of California, outside of the vicinity of Los Angeles, will there be such facilities for transportation of passengers and freight as will be afforded in the Sacramento Valley when our extensive plans are carried to materialization.

Nearly every one in the Sacramento Valley concedes that a complete revolution of conditions and values has taken place since the Northern Electric Railway was established. This is true of all regions where electric traction enters in, and the change in the conditions which you have seen in the last twelve months is but a beginning of the new era upon which the Sacramento Valley is entering and which will be an era of change, evolution, development, and consequently progress, to such an extent that in a few years those who have lived here under past conditions will look upon those past conditions almost as a dream, and it would be hard to realize that they ever existed in the country; and this brings us to the point as to what is the exact value of these facilities to the fruit-grower, and that is a point which only the fruit-grower himself can determine, and in this connection I would like to point out the two chief factors for your consideration upon this subject:

First—It is manifest that the haul to the chief transcontinental points can be made much more cheaply by electric railway than by team.

Second—A great deal of fruit that could not be hauled to any destination by wagon can be easily transported by electric railway, and this last advantage would enable the grower to market a very much larger proportion of green fruit than it is possible for him to do without these facilities.

These two points must give very material added value to every acre of land which can be served by such a system, and that added value, whatever it may be, must be considered as an increase on every acre of land which is affected, and thereby the owner of these lands is directly benefited to an appreciable extent, the value of which every grower himself can estimate, and these advantages are entirely exclusive of generalities which are embraced in the usual estimate of benefits afforded by such a system.

MR. JUDD. Mr. Butters, isn't it a fact that the electric railroads in the East, especially in the agricultural sections, have been almost the redemption of a good many of those New England and Middle States?

MR. BUTTERS. Yes, sir.

MR. JUDD. In Bulletin 44 of the U. S. Department of Agriculture, in regard to the rise and fall of values in the United States, the only bright spot in the bulletin was where electric lines were run through a section of country, thereby increasing the value of the lands.

MR. BUTTERS. That is very easily illustrated by Sacramento. I know two or three bankers in Sacramento who have large ranches between Marysville and Sacramento. These gentlemen have been in the habit of heretofore taking a day off. They used to drive out twenty-five or thirty miles on a hot day, and take all the forenoon to drive, and they were gone a day and a half or two days. Now, after banking hours, they jump on the electric cars and come out and transact their business and go back again. When this system of railways is finished as we plan it, you can take an electric car and go anywhere you please. You can't realize how much the conditions will change. In sections of the East where the boys have left and gone to the cities and the old folks live alone, the electric roads have gone through and those farms have all come back into prominence and the old values are being restored and, in fact, more.

MR. JUDD. The reason I asked the question was because I thought that in your paper you did not sufficiently drive home the fact that the salvation of California, all over the State, is in the getting and maintaining of electric lines, because transportation is much cheaper over electric than over other lines. We had that experience in Watsonville. It was a godsend as long as it lasted. Well, they fell in among thieves—I think that is what they call it—and they sold the road to parties who are not congenial, and it is not running.

MR. MILLS. Do you intend to reach out to the large market around the bay, Mr. Butters?

MR. BUTTERS. So far as our own personal, individual plans are concerned, I can not perhaps talk quite as freely about that as I would like to, but I can say this, that already there are two or three surveys from Sacramento to Vallejo and other points on the bay—Tiburon and Vallejo. The actual outcome of this whole business will be that an electric line will be extended—in fact, I have reason to believe that had not this money stringency come on work would have been commenced on a line between Sacramento and Tiburon which would have enabled the Northern Electric to make a traffic arrangement to put all its traffic through as far as Tiburon, and reaching the bay it would have been easy to get water transportation to San José or any other point. There is no doubt that that is the ultimate outcome—that there will be a trunk line from the northern part of California to San Francisco; that it will run down the west side of the river; that the products will come in from Woodland, Vacaville, Suisun, Napa, Petaluma, and that whole country, and they will all feed the electric railway. Of course, we have personally no such project as that, as we have got enough to do in the Sacramento Valley. In fact, we have laid out a system here covering several hundred miles and not covering the entire valley. We have covered 360 miles and that is all in the Sacramento Valley north of Sacramento.

MR. MILLS. One need not have a very vivid imagination to see the wonderful happiness that will come to a people thus served.

MR. BUTTERS. I think you will find that it will revolutionize the conditions there.

MR. MILLS. I move that the paper be accepted, placed on file and printed in the bulletin.

The motion was duly seconded and carried.

MR. JUDD. I wish to make a motion that this Convention pass a vote of thanks to Professor Stubenrauch and Professor Mackie and Mr. Mason, and to ask them to have papers on those subjects at our coming convention.

The motion was duly seconded and carried.

MR. MILLS. There is one thing I would like to mention, and that is this, that this Convention recognizes the splendid work that has been done by our State University authorities, in connection with the fruit industries of this State, in the pathological stations and the experiment stations. We want to appreciate that they are doing a very great work for us. I can mention one thing, where Professor Smith, who was here, has solved a very great difficulty for some of the fruit industries in that brown rot. By a very skillful examination of that question he has solved it and saved us many tens of thousands of dollars; and in the stations all over the north and south they are solving very many such questions; and I wish to place on record, and that this association will allow me to do, the good work that has been done by the Federal government and by the State through the University. I move that we recognize this good work by both the Federal and State authorities.

The motion was duly seconded and carried.

On motion of Mr. Judd, duly seconded, the Convention adjourned *sine die*.

J. W. JEFFREY, President.

JOHN ISAAC, Secretary.

REPORT

OF THE

CALIFORNIA STATE AGRICULTURAL SOCIETY

FOR THE YEAR 1906

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1907.

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REPORT

OF THE

STATE AGRICULTURAL SOCIETY.

To His Excellency, James N. Gillett,
Governor of the State of California,

Sir: We take pleasure in submitting herewith the fifty-third Annual Report of the State Agricultural Society. You will find herein some special articles on pertinent subjects, copies of some of the bulletins issued by the Society during the year, and a review of the physical conditions and characteristics of most of the counties of the State, with statistics showing the farm acreage, the assessable wealth, and the industrial resources of the said counties.

These statistics are obtained from statisticians appointed in the different counties by the respective Boards of Supervisors, pursuant to an Act of the Legislature approved March 20, 1905. Some Boards of Supervisors yet show an indifference to this provision of the law, and yet we are pleased to state that quite a number more counties sent in reports for last year than did for the year before. We believe now that as soon as the respective Boards of Supervisors begin to see and realize the value of the work which their united effort will render to their several localities and to the State at large, they will perform their part of it with pleasure, and when they do—when all the counties shall report fully and intelligently—we will be able to issue an annual summary of unusual interest and of very great value to the State and all its interests. When all report, the figures can be compiled in tables showing not only the county's output, but State aggregates, and such showing will at once become of incalculable value to every property owner and prospective investor in California. At present we are compelled to present the showing from each county separately, as aggregates are of little value unless complete. But even in the present crude form the report is in great demand.

The issue last year, not so complete as this, has become exhausted, and had the edition been ten times as large as it was we could have distributed every copy to advantage. Besides the constant and increasing demand from individuals at home and abroad, commercial bodies in California, and people elsewhere interested in exploiting this State, have made requisitions far in excess of the supply, to be used by them as an immigration document.

Valuable as this report may be regarded, however, and great as may be the demand for it, we are restricted in the size of the edition by the limit of our printing fund. When all the counties participate, as they should, and the value of the report becomes to be recognized by all the people, as it doubtless will, then we anticipate legislative representatives from all the counties will provide a way for increasing the edition equal to the demand.

In line with the statistical work imposed on this Society, and which has been too much neglected, we have made a compilation of the cereal acreage and output and value in California for the year 1905, and also for the year 1906, and these articles will be found herein. In the meantime, beginning with last spring, the Society has undertaken the issuing of periodical bulletins on crop conditions in the State, and on various industrial subjects of present interest to the people. These have been largely copied by the press and have met with general approval. A few of the industrial bulletins of standing interest are embodied in this report.

In October last our Secretary went East as a delegate to the Farmers' National Congress, and improved the opportunity while away to visit the Fair grounds of seven states, and interview the officers of the different Societies on the line of their work and the system practiced by them in obtaining crop reports and agricultural and other industrial statistics. He thinks the Ohio system can be most easily adapted to our use, and accordingly he is now at work trying to organize the necessary corps of correspondents, and preparing the blanks for their use. This system contemplates a correspondent in each political township in the State, and to obtain the addresses of suitable people and their consent to serve is no trifling task. It is believed, however, the result will be worth the effort, since from such direct source, when once in working order, not only crop reports through the season, but reports on industrial progress in any line or calling, or on any subject about which information may be desired, will be available and of the most reliable character.

The present management conceives it the duty of the Society to do these things, and in all other ways within its means and working force make itself valuable to the agricultural and other industrial interests of California.

It should be known and appreciated, however, that it is handicapped in its work between fairs for want of means, and handicapped in its fairs by reason of an incongruous condition which requires it to divide its attractions and impose a double admission on visitors. Such an arrangement exists in no other State that we know of, certainly not in any of the states that hold successful fairs, and the sooner arrangements can be made for erecting suitable buildings at the Park for the display of industrial products so that all the fair and all its attractions will be together in one inclosure, with one admission, one set of gatekeepers and one set of officers, the sooner it will be started on that road which gives assurance of leading to success.

Our State Fairs of recent years have not been all that they should have been. The exhibits of farm and other industrial products became to be not only less in quality and variety than they ought to be, but they were becoming also too much localized. Instead of representing all products from all the State, they represented only a few of the products from near-by localities. This condition was recognized by the management and it was determined to remedy it so far as energy and effort, hampered by limited means to work with, could do so. Last spring, therefore, an effort was started to overcome the grounds of complaint and get up a fair that would more nearly represent all of California's rich and varied resources. About the time, however, that the campaign for a bigger and better and more representative State Fair was planned the unprecedented disaster by earthquake and fire overtook the City of San Francisco and other cities near the San Francisco Bay. This appalling calamity so absorbed the attention of the people of the State and called for such demands on charity and energy, that the appeals for exhibits and interest in the State Fair became hushed by the louder cry for immediate help for suffering humanity. In face of the condition caused by this disaster, and its exhausting drain on individuals, communities and public bodies, the difficulties of working up the last fair was greatly increased, and yet, as indicating what persistent energy can do in the face of difficulties, the State Fair of 1906 was a comparative success. For once samples at least of all the products of all the State were displayed. More counties participated than ever before, and those counties with their diversified products covered all the distinctive portions of California from Siskiyou on the north to San Diego on the south, and from the forests of the coast to the mines in the mountains.

The Sacramento *Union*, which has reported perhaps all the State Fairs ever held in California, and which ought to be capable of making just comparisons, summarized the Pavilion exhibit of the last fair as follows:

> If any one doubts that the State Fair exposition at the pavilion is the most representative of the natural resources of the State that has been made, the doubt must arise out of misconception of resources or forgetfulness of the past exhibitors.

If one should resolve to choose any particular feature as most representative, and of highest informing value, he would be unable to reach a definite conclusion between the mineral and the purely agricultural and horticultural exhibits, to say nothing of those of products which lie at the foundation of leading manufacturing interests. In the effort to decide and reach the judgment desired it is probable that the fair-minded examiner will return the verdict of the hung jury, and let it go at that.

In making a comprehensive review of the pavilion exhibits, what must first strike the observer is the wide geographical range of the show; that is to say, its comprehensiveness reaches geographically from San Diego on the Mexican border to Siskiyou on the Oregon line and from the Nevada boundary on the east to the tides of the Pacific on the west. This is not to say that every county is represented—that was hardly to have been expected, for they number considerably more than a half hundred—but it is to say that very nearly all products of this State of growth or mine are represented fully, handsomely, and with teaching and informing effect, while most of the industries leading out of growth or mine have their representative suggestions.

But in addition to the mineral wealth of the State being established by the most exhaustive and largest exhibition of resources yet made for California in the State, including not only the precious metals and those which are destined for the furnace, the forge and the anvil and for structural purposes, there is shown for the first time at the State Exposition a collection of precious stones and gems mined and washed from California soil, an exhibit at once a surprise to the mass of the people and a striking feature of the fair.

But over and above these exhibits of productiveness of the great valleys, the foothills, and the coast and mountains there are others semi-related to agriculture, as for instance the largest exhibit of fine-bred poultry ever made in the State; an exhibition of the progress made in industrial art at the State Polytechnic School at San Luis Obispo; an exposition of advances made at the Federal Plant Introduction Garden at Chico; a remarkably fine exhibition by the University of California in the agricultural, entomological, irrigation, and several other departments, including a fully equipped laboratory, where, day and night, soil analysis is carried on, and in which any soil-owner may, free of charge, have tests of the quality and constituents of his land made and their highest adaptability determined.

But more than this the pavilion exhibition presents the richest and most beautiful examples of finished-in-the-grain California woods ever made at a State Fair. In this day when natural-grain finish is so much in favor, this great showing should command exceeding attention, while for those who deal in timber and lumber, and those who would fathom all the resources of the State, the exhibit is one of great attractiveness.

Let the stranger and inquirer name a desirable citrus or deciduous fruit and it will be shown to him at this fair in its highest development. Let him ask for any manner of desirable vegetable growth and its representative will be produced by some exhibitor. Let him ask for any leading staple of growth from tobacco to cotton and from the cereals to their form in flour and meals, and they will be pointed out in the pavilion. Let him ask for samples of vineyard and olive, and both in ripened and green fruits, in grapes, wines, cured fruits and cordials, in oils of earth, or fruit in those forms of appetizing preparation which are parts of the art of the housewife, and he will find them in the pavilion.

Add to all this that there is the largest and best and most exhaustive showing of poultry; a finely representative exhibition of several of the craft arts, numerous examples of large industry, such as ostrich-plume culture, wagon- and carriage-making, rug and carpet manufacture, construction of incubators, products of canneries and factories, work in wood, leather, straw, iron, etc., and that there is with it all a fair showing of the mineral waters of the State, for which it is distinctively famous, and one has suggestion of what the State Fair is as shown in the pavilion.

But the details here indulged in by no means exhaust notice of the pavilion exhibits. There are elegant carriages, harness, rugs, embroidery, basket work, examples of Indian ingenuity, beautiful boats and other exhibits, but these are minor considerations in the face of the great productive exhibition by so many counties of the State. There is entertainment also in the pavilion by night in the form of the potter's curious wheel, the music by the band and singing of choirs, and in the social communion of great crowds of people.

And in machinery hall there awaits a treat for those interested in mechanical devices. Here are to be seen all of the implements used by the California farmer while preparing, seeding and tending his crops and harvesting them, and they are the latest to be had. Here every night is the threshing machine used by the farmers of the Mississippi Valley, and which, it is thought, the California farmer must utilize. Here, too, are to be seen the newest things in the line of pumps throwing great streams of water, and in the yard outside is the ostrich herd from the Santa Clara Valley.

The attendance at the fair was not proportionate to its merits. This we attribute to several causes: In the first place the people would not believe, in spite of claims to the contrary, that the fair was going to be any improvement on recent years, and unless it was they did not particularly care to see it. Then again, a short time before the opening of the fair the Directors took rigid action against the much-complained-of gambling and drinking evil, by resolving that no bookmaking or pool-selling should be permitted, and that no intoxicating beverages should be sold, on the State Fair grounds, and to guard against the possibility of any parties setting up business in these lines near the gates for the purpose of catering to State Fair visitors, the Directors further ordered all side entrances to the grounds closed and prohibited the issuance of return tickets to patrons.

As the revenue from these prohibited features had supported the running races, and as it was then too late to obtain revenue for running races from other sources, the runners had to be cut out. This action antagonized a certain element and they and their sympathizers started the word that without running races the fair would be a failure—that cutting out the chance to gamble and the chance to drink had killed the fair. Unfortunately a great many people had come to believe that these features at State Fairs were essential to success, and there is no doubt that the attendance was affected accordingly. The fair run several days before the people right here in the City of Sacramento awoke to the fact that it was worth seeing, but as the report of its merits spread abroad the attendance rapidly increased, and at the close it was found that the revenue from all sources was sufficient to meet all demands against the Society at that date, and, to put the institution in better standing with is creditors, it was resolved to pay all premiums and accrued bills at once, though to do so would leave only about $1,000 for current expenses until another year. This situation was fully explained to your honorable predecessor, Governor Pardee, and he consented to the use of $2,036.50 of what has been known as the State Fair Construction Fund, then remaining in his hands, to help out the current expense fund until more revenue might be obtained from other sources. In the meantime we have rented portions of the pavilion for storage and for a skating rink, and have increased our usual winter stall rental at the park by letting barns for housing a dog and pony show, and other barns for show and sale stables to Crouch & Son, of Illinois, breeders and importers of fine horses, and to W. M. Carruthers, of North Yakima, Washington, breeders of Shorthorn cattle. From these sources we are realizing a little more than $200 a month, and this revenue will further help the current expense fund.

From all these sources combined, however, there will not be revenue enough to meet all demands until after the next State Fair, and unless helped by the Legislature in the meantime, the Directors will be compelled to draw on their credit or forego the payment of salaries and other current expenses for a few months.

At this time, however, it can be said with much satisfaction that the Society is out of debt. This is a condition it has seldom enjoyed in the past, but with proper encouragement, which it is hoped to merit, it is a condition which the management will strive to maintain.

At this time the prospects for a successful fair this coming fall are better than they have been at the same season for many years. This we attribute to a persistent campaign which has been carried on ever since the last fair to work up interest in the next one; and we are encouraged to believe that with continued hard work intelligently directed along the lines we are now pursuing, backed by due encouragement from the State, the Agricultural Society of California can be made to rank with the biggest and best of similar institutions in the older states. California has the resources, and once started in the right groove there is no reason why an institution organized and designed to exploit them should not gain in strength with the passing years, and become a powerful instrumentality for the advancement of all industrial interests and the upbuilding of the State.

Very respectfully,

B. F. RUSH, President.

ATTEST:

J. A. FILCHER, Secretary.

FINANCIAL STATEMENT.

APRIL 1, 1906, TO JANUARY 31, 1907.

SUMMARY.

RECEIPTS.

1906.			
Apr. 1—	Cash balance	$2,011 04	
	Park and Pavilion receipts	7,364 35	
	Construction	8,504 05	
	Races	4,030 00	
	Entrance due collected	253 00	
	James Whitaker, special treasurer	3,360 00	
	Premiums	15,976 52	
	Rent	1,412 00	
	Fixed events	2,675 00	
	American Shorthorn Breeders' Association	775 00	
			$46,360 96

DISBURSEMENTS.

	Expense	$12,758 69	
	Races	10,640 00	
	Salaries	4,150 00	
	Payrolls	4,465 50	
	Advertising	857 30	
	Entrance due	125 00	
	James Whitaker, special treasurer	3,975 00	
	Premiums	7,598 36	
	Interest	110 00	
	American Shorthorn Breeders' Association	1,102 00	
1907.			
Feb. 1—	Cash balance	579 11	
			$46,360 86

THE OPPORTUNITIES FOR HOMES IN THE SACRAMENTO VALLEY.

By O. H. MILLER.

The Sacramento Valley is preëminently a home land. In distributing her many blessings the Power that placed the seas, mountains, valleys, plains, and rivers, must have worked with most bountiful desire when it came to the Sacramento Valley, for the combination of soil, water, and climate which this great interior valley of California possesses, is designed to make this a favored land for those who love the happy, prosperous, and comfortable home. An equable climate and fertile soil have here joined hands, and now the Sacramento Valley invites the home-seeker of all regions, and offers advantages which are distinctly its own and which can not be found in any other country under the sun.

The climate of the Sacramento Valley is the same as that which has made California famous. There are no hurricanes, blizzards, or cyclones. The summers are rainless, giving a long period of harvest which is seldom, if ever, marred by rains to injure crops.

The summers are not too warm to be a drawback, cases of sunstroke being so scarce as to be almost unknown. The rainless summer is a decided advantage in many ways, not least among which is the fact that the atmosphere is dry and which tempers the apparent high degrees of temperâture and renders this section comfortable, while other and more unfortunate communities are suffering from the heat. Then, again, the nights are almost always cool and inviting, rendering sleep and rest pleasant and refreshing.

The average rainfall of the Sacramento Valley is about twenty-three inches, while on the watersheds in the mountains it is much greater, in some cases as much as from forty to sixty inches falling annually. The precipitation is sufficient for all crops, and the mountains furnish enough water which could be used for irrigation to cover the floor area of the valley nine feet deep without interfering with the navigable streams. This immense amount of water which could be used for irrigation purposes presents a problem which is attracting the attention of the officials of the United States Government, with the result that but a short time ago the Secretary of the Interior set aside from the reclamation fund the sum of $650,000 for the construction at Orland, Glenn County, of a large irrigation project that will place about 15,000 acres of land under water. Under this system the Federal Government will advance the cost of building the system, supervise the work, and the actual cost of the building of the project will be returned to the Government by the landowners, in ten annual installments, without interest.

This means that the landowners are to pay only the exact cost of the system, and at the completion of the ten years' contract, the entire system, together with all water rights and other property that shall have accrued, will become the sole and exclusive property of the people.

The plan which will be carried out at no distant date is to erect in various places in the mountains bordering the valley, immense reservoirs capable of gathering great quantities of the flood waters of the winter season, and in the summer time the stored water will be turned into the canals and carried to the fertile lands of the valley and used for irrigation purposes. The Sacramento Valley contains in the neighborhood of 2,500,000 acres of rich land, and the time will soon be at hand when every particle of this empire will be under the most extensive and complete system of irrigation that the world has ever seen.

The Sacramento Valley offers such exceptional advantages for irrigation that the system at Orland will be built so other systems may be added to it, with the avowed purpose in mind of eventually irrigating the entire valley.

Besides the Government schemes, there are numerous private enterprises which are supplying water to thousands of acres of rich lands. This season will see in the vicinity of 400,000 acres under irrigation. This area is in itself larger than some states of the Union, but in a principality such as the Sacramento Valley it is but a step in the right direction.

Aside from the water and climatic advantages of this valley, there is a potent factor in its development in the character of its soil. It is not a matter of theory, but of record, that the soil of the Sacramento Valley will produce a greater variety of products and of a better quality than any other section of the country. In the Capitol Park at Sacramento may be seen three hundred and fifty different varieties of trees—natives of every country upon the face of the globe—all growing together and flourishing as if they were at home. This is the finest capitol park in the United States and is the wonder of all visitors who are acquainted with the many varieties of trees that are to be found from the tropics to the poles.

Besides all kinds of trees, almost every vegetable and berry known to civilization does well in the Sacramento Valley, and the opportunities for the small farmer to raise a variety of crops are nowhere so favorable as they are here. The large grain ranches are being subdivided and placed upon the market in small tracts suitable for intensive farming, and the prices are not such as to scare anybody away. Many of these lands are under irrigation and can be purchased at from $50 to $125 per acre when unimproved, while places having improvements may be had all the way from $60 per acre up according to the class of improvements.

Among the industries which now present themselves for the consideration of the prospective home-seeker, and from which not only a good living can be made, but which would at the same time give the proprietor a bank account, are dairying, chicken-raising, fruit-growing (of all kinds), truck-farming, berry-raising, and many others about which information can be furnished upon application.

There are building at the present time through the Sacramento Valley a number of railroads, both steam and electric, which pass through some of the most fertile farming lands and connect with the largest cities and towns of the valley. The Southern Pacific Company has its main line to Portland extending the entire length of the valley and on both sides of the Sacramento River. In fact, the lines which are now in course of construction, when completed, will give to this region passenger and freight accommodations equal to the best.

When one stops to consider the climate, soil, and other advantages of the Sacramento Valley, he can not help find here the ideal land for his home. It is a good place to live; the earning power of the soil is greater here than in any other section of the country, and taking it all in all the Sacramento Valley challenges the world to an open, honest, and liberal competition, and the offer is open to all comers.

OPPORTUNITIES FOR HOMES IN THE SAN JOAQUIN VALLEY.

By WILLIAM ROBERTSON.

California, the land of gold, the land of sunshine, the land whose favored furrows produce more abundantly than those of any other State, has within its borders a series of valleys all of which are marvelously wonderful, each having its distinctive greatness, and out of all these variations of climate and production forming the splendid aggregation which places it in the position of greatest among the family of Uncle Sam.

Among the valleys that of San Joaquin is probably the grandest and most varied in its range of product and climate, as well as grandeur of scenery. In depicting the wonders of this famous valley, the most conservative statement one can make is almost incredible to the Eastern farmer, who can not understand why a man in California can make more out of forty acres of land than he can out of two hundred and forty there, and with infinitely less trouble and expense.

For many years this valley was in the hands of comparatively few holders, and in its arid condition was considered to be of little value, but gradually a change came "o'er the spirit of the dream," and with the utilization of the babbling brooks and stately rivers, by spreading their refreshing waters over the parched land, there arose a new era of wondrous prosperity, a revelation of prodigality of production, that astonished the world; and with the inauguration of railroad service, and the perfecting of transportation conditions, came the opening of new markets that have kept pace in their demand with the rapid development of our farming conditions. Change is a fixed law of nature, and nowhere on earth is it more apparent than in the San Joaquin Valley, and throughout its 250 miles of length the hand of man and the sap of water are constantly changing it from a desert waste to a veritable Garden of Eden.

When reading many of the advertising puffs by real estate men and others, one frequently finds the phrase "Land of Opportunity." Sometimes it is a truthful statement, sometimes a figment of the imagination, but without dissimilation and without fear of contradiction we can truthfully state that the San Joaquin Valley is California's greatest agricultural center, and offers the grandest of opportunities to the rancher, especially to the hard-working, persevering man with moderate capital. One finds in many parts of California, magnificent homes and beautiful ranches maintained as show places by millionaires, who are anxious to leave the severe winters of the East for the clear skies, the balmy breezes, and the beautiful flowers of this sun-kissed land; but the man of moderate means, who has to work for a living, and who depends upon the profitable investment of his small capital, will reap a richer reward by settling in the San Joaquin Valley, and putting in a year or two of strenuous effort. By this I mean not overwork, but steady, earnest, industrious application; if he looks after the soil, the soil will look after him in the abundance of its productivity.

We have hundreds of instances in this valley, where, only a very few years ago, men began with little and are now well off, and all they possess was taken out of the land they till, and not only that, but out of comparatively small holdings.

Every county in the San Joaquin Valley has some special branch in which it excels, and no matter what line of farming one wants to engage in, from truck-farming to raisin-making, he can find conditions here that can not be duplicated elsewhere. Here, then, is a home man's opportunity, or opportunity for the man who desires a home, and throughout the whole valley development, enterprise and prosperity are to be seen on every hand. As a striking example of what that means, let me state that in Fresno County alone there are thirteen banks with deposits amounting to $8,500,000. That money is not the property of the rich investor, but of the average ten-, twenty-, forty- and sixty-acre man.

In an article necessarily limited in extent it would be impossible as well as invidious to speak of any particular district, but we would impress upon every intending settler the all-important fact that nowhere under the blue canopy of heaven does the industrious home-seeker find such varied conditions so universally prosperous as exist in this great San Joaquin Valley.

Chambers of commerce exist in each of the eight counties the valley contains. Bureaus of information, honestly and intelligently conducted for the purpose of disseminating reliable information to inquirers, and I would recommend all who are interested, and who desire to learn the truth in a conservative way, to make inquiry of these bodies.

OPPORTUNITIES FOR HOMES IN SOUTHERN CALIFORNIA.

BY FRANK WIGGINS.

I take it for granted that I am not to write for the rich and the well-to-do, whose coming to Southern California carries with it no increased risk or responsibility, but on the contrary a substantial increase in the delights of living, and with whom home is a mere matter of choice.

We have a very large and constantly increasing number of home-seekers of comparative leisure, persons with plenty of money, who seek channels of occupation for their capital in the section where they find so much enjoyment. While the opportunities for these are large, I would rather they were larger; but such things adjust themselves, and the awakening of manufactures bids fair to provide the necessary openings. Real estate continues as brisk as ever, and a large amount of capital is kept busily employed.

But what are the opportunities of the home-seeker and wage-earner? How may he better himself by coming to Southern California? May he safely make the change from his Eastern home?

No matter what the conditions are, or where the place may be, the rules of common sense must apply. Trite though it may be, the inevitable warning against false impressions must be sounded.

Risks and responsibilities must be assumed in Southern California as elsewhere. The idle and the dissolute can not better themselves by coming here. Those who come in search of health, expecting to get light employment, must take into consideration the fact that there are thousands here like them. Because of the very fact that Southern California possesses many attractions, the people pour in by thousands and tens of thousands—twenty thousand a year. The great majority of these must have work. The great majority of them get it.

Having sounded the note of warning, and assuming that those who wish to come here are able and willing to work, and that they are self-supporting, surely there is no other spot in the wide world possessing so many attractions.

First of all, there is the climate. Say what you will, here is the magnet. Southern California is not merely a winter resort. Nowhere in the country is there a better summer climate than that of the Southern California coast. The heat is rarely excessive, and the absence of humidity makes 95° here more endurable than 75° in the East. The nights are always comfortable.

It is scarcely necessary to extol the winter climate. It has spoken eloquently and compellingly for years. No frost, no snow, no chilblains.

The coming of so many thousands to Los Angeles has in itself vastly increased many businesses and occupations. A city that has constructed a million dollars' worth of buildings every month for the last four years, gives occupation to many trade-workers; and there must be stores and shops to supply their needs. We are building—or rather the

Government is building it for us—a $3,000,000 harbor at San Pedro; we have a new transcontinental railroad, the Salt Lake; the larger part of the enormously rich new gold fields of Nevada are tributary to Los Angeles; the Huntington system of electric railways is a network covering a dozen large towns and two counties; E. H. Harriman is to spend $6,000,000 in improving the Los Angeles-Pacific electric system; and H. E. Huntington equally as much on his interests. All these and many other things make opportunities for homes in Southern California.

The nature of these improvements is such as to call for more manufactures, and the awakening in this direction has been marked. Still, it has been largely along the lines of necessity, and there are virgin fields yet uncultivated which promise much. We have a favorable climate and cheap fuel.

The orange groves still blossom in Southern California; every year we ship from 25,000 to 30,000 carloads of the golden fruit. But the day is long since past when people came to California, planted or bought an orange grove and sat lazily down to snuff the fragrance and pocket the profit dollars from the crops. Orange-growing is hard, scientific work.

Nevertheless, the open-air opportunities in Southern California are very large. Those who understand poultry-raising and can make it a success, may do very well here. Prices are high for poultry and poultry products, of which we import an enormous quantity. Alfalfa-raising is profitable. Walnut-growing, celery-growing, and truck-farming have made money for many, and these are but a few of the channels of outdoor occupation that are open to those who seek wisely for them.

I honestly believe that nowhere else in the United States is it so easily possible for persons in very moderate circumstances to own their own homes as in Southern California, particularly in and around Los Angeles.

The workingman may, if he chooses, buy a lot within fifteen or twenty minutes' ride, for a dollar down and a dollar a week. He can get a first-class, moderate-price lot for $50 down and $10 a month. On the back end of his lot he can put up a tent or a cheap board house, and live in it until he can afford to build a cottage on the front end. The mild climate permits him to do this. Thousands of workingmen have built modest homes after this fashion, rather than continue to pay rent. It may be humble, but it is their own.

In Los Angeles, with those willing and able to work, there is plenty of employment at good wages. This city has been singularly free from labor disturbances, much to the comfort and profit of both employers and the employed.

Drawbacks? They are such as encountered everywhere. Human nature is much the same here as everywhere, albeit the climate has its soothing effects and its uplifting inspirations which can not be had elsewhere.

The transient may have an occasional grouch; and when he does he usually airs himself in the newspapers; but I firmly believe that no person who has lived a year in Southern California would be contented elsewhere.

In conclusion, the opportunities for homes in Southern California are even greater than in past years. The conditions have changed, and the opportunities have to some extent changed with them; but only for the better.

THE BAY COUNTIES OF CALIFORNIA.

By GEORGE M. FRANCIS.

To Central California, that prominent part of our Golden State which pays cheerful tribute to San Francisco as the metropolis of the Pacific Coast, home-seekers have been coming in greater number the past two years than in any previous corresponding length of time. This is largely due to the introduction of new and modernly equipped transportation lines, covering the interurban idea of quick communication and cheap travel. The earthquake and fire of April 18, 1906, worked destruction to millions of dollars' worth of property and brought desolation to many homes. But this greatest disaster of modern times was not to effect a lasting ruin, nor to quench the spirit of the brave men and women temporarily overwhelmed by it. Promotion work along the many industrial lines previously pursued ceased only long enough to secure the readjustment necessary to fit new and harder conditions. State building was taken up in May where it was dropped in April and is now going forward at a pace never surpassed in the progressive history of our commonwealth.

The counties to be taken note of in this article are known as "The Bay Counties"—counties which touch at one point or another the waters of San Francisco and San Pablo bays. They include Alameda, immediately opposite San Francisco; Contra Costa, adjoining Alameda on the north; Solano, whose port faces Mare Island Navy Yard and whose territory extends into the early fruit belt of the Sacramento Valley; Marin, directly north of San Francisco, with a magnificent water front extending from the Golden Gate around to the navigable waters of Petaluma Creek; Sonoma, whose area covers 1,540 square miles; and last, but by no means least in size or importance, Napa.

That the counties above named should attract settlers—from whatever clime they come—is not surprising to those possessing an accurate knowledge of the natural advantages. Each boasts an equable climate and an annual rainfall that insures bounteous crops of almost limitless variety without the artificial irrigation so necessary in most portions of the State.

In Alameda County there are thriving cities and rich fruit-growing valleys. Its chief towns are Oakland, with an estimated population of 200,000; Berkeley, a seat of learning and home of the California State University, numbering some 22,000 inhabitants; and Alameda, a beautiful town in which some 18,000 people reside. These three places are near enough together to be united under one municipal government if by their votes they saw fit to so elect, and they form a pretty picture from the deck of any of the many ferry steamers that ply hourly between the peninsula on which San Francisco stands and the several systems of wharves they maintain.

In Contra Costa, the county adjoining Alameda on the north, Nature reared Mount Diablo, whose summit pierces the clouds 3,860 feet above sea level and whose meridian marks the geographical north and south line in countless documents filed for record in the archives of State. Contra Costa County is spoken of as the second manufacturing county of the State, San Francisco alone surpassing it in this particular. The largest smelter and refinery for precious metal in the world is within her borders, likewise powder works, oil works, brick-making plants, fruit canneries, furniture factories, etc. The Southern Pacific and Santa Fé, both overland systems, serve the people of that section with inland transportation, and at Port Costa and other wharves deep-water vessels take on and discharge rich cargoes.

Solano County has in her principal city, Vallejo, a lively port—the starting point of the Vallejo, Benicia and Napa Valley Interurban Electric Road, which has been in operation now over a year and does an immense business in connection with the steamship line belonging to it. A great flouring-mill, capable of producing 2,500 barrels of flour per day, is a Vallejo institution, and fish- and fruit-packing establishments, iron works, and the famed Vaca Valley, where the earliest fruits of the season mature, are to be numbered among Solano County's most valuable assets.

Marin is a county of cozy retreats and delightful health resorts, and in her chief town, San Rafael, one of the finest hotels in the State is maintained. Above San Rafael rugged old Mount Tamalpais rises skyward, and to its top probably the crookedest railroad ever built by man runs to carry in airy steam cars the thousands who go to the summit for the view that altitude affords. The Marin Terminal has a road on the outskirts of San Rafael which is partially completed, and work will soon begin on the Bay Counties projected road from Richardson's Bay to Napa and Lake counties. Report says the road recently purchased 1,000 acres of marsh land fronting on Richardson's Bay, costing over $100,000, for shops. The Southern Pacific runs fast trains from Tiburon Point, on San Francisco Bay, through Marin to the City of Napa and on to Calistoga, the head of Napa Valley.

Sonoma County is great as a grower of cereals, fruits, berries, and hops. Her capital, Santa Rosa, is one of the most prosperous cities in the interior—made so by liberal-minded and public-spirited citizens, who refused to be conquered by the catastrophe which so terrorized that community and made trouble for San Francisco in April of last year. Petaluma, one of the oldest towns in Sonoma, is the center of a great poultry-raising district, which seems to keep everybody in ready money and to a great extent does away with the credit system so common in most communities. At the head of Sonoma Valley, in the pretty town of Cloverdale, citrus fairs are yearly held by way of demonstrating the success of lemon- and orange-growing begun in that locality several years ago and from that time to this carried on extensively. And let it not be forgotten that Sonoma County is the home of Luther Burbank, the originator of new varieties of fruits and flowers, a distinguished and withal a very modest gentleman who has more calls from more noted people than any other man—official or private citizen—in this part of the State.

Napa County—a charming combination of tree-covered mountains and fertile valleys—touches the northern point of San Pablo Bay just above Mare Island. Through its main valley runs Napa River, a navigable stream for ocean craft as far up as the City of Napa, and within its boundaries are as thrifty and fruitful vineyards, orchards, grain and stock farms as the most exacting agriculturist could ask for. Napa, the county's shire town, has within the last decade become a busy manufacturing center and is as much noted for her leather in the Eastern States where her "Napa-Tan"—her gloves and shoes—find preference, as the county in general is celebrated as a producer of fine fruits, especially stone fruits—cherries, peaches, and prunes. The extending of a new steam road into Napa the past year and the building through it of an electric car line have put Napa in speedier and cheaper communication with the outside world and accelerated greatly her growth. She now enjoys the advantages of a daily boat service to San Francisco and the full operation of one electric and two steam car lines. All of which means a cheaper freight and passenger rate made by competition than could possibly be secured by a State-made railroad commission. Napa has several large fruit packing and drying plants. To these a cannery—the largest in the State—is to be added the present season. A company has just incorporated with a paid-up capital of $100,000 and bought the land along the riverside on which to build it. Since the last Federal census there has been a gain of some two thousand people in the City of Napa and a multiplication of business enterprises that employ at remunerative wages all the skilled and unskilled labor that offers. Napa has her full quota of schools and churches and those institutions which develop the right sort of manhood. It was years ago predicted that in good time Napa Valley would become one of the suburbs of San Francisco. That good time has arrived. With trains and boats departing and arriving at all hours of the day and into the night, business people in the metropolis can have their homes here and spend little time and money on the road going back and forth. Here the skies are as sunny, the air as balmy, the people as happy, as in the most favored sections of the universe, and dwellers here cordially invite honest and industrious immigrants looking for homes to share with them their goodly heritage.

OPPORTUNITIES FOR HOMES IN SIERRA FOOTHILLS.

By J. H. LINDSEY.

Every newcomer to California, who arrives here with the intention of making a home for himself, is naturally interested in location and climatic condition, and it is worth the while of all such intending settlers to investigate the advantages of the Sierra foothills. They are among the most fertile regions of California. This, of course, is due to the richness of their soil and the mild, even climate they enjoy. This region has the most varied climate of any other section in the State, and surpasses in all points of desirability. The foothills extend from the valley proper to an altitude of almost 2,000 feet, and the territory between these points has an abundance of area where ideal and beautiful homes may be established, either for summer residence or for permanent abodes.

These gradually rising hills are already dotted with hundreds of prosperous farms and orchards, whose owners not only enjoy an ideal climate, but gain a profitable sustenance as well from fruits and agriculture.

It is here that the voice of opportunity calls to the man with small means. Here he can establish himself on a five- or ten-acre farm and make a good living for his family by poultry-raising and the growing of small fruits. Berries, for instance, have become a rising industry in the foothills, for which there is a constant and profitable market. From Newcastle, the principal foothill shipping point for fruits, the average daily shipments of berries during the season amount to 2,000 cases, and proportionate quantities from the other points. Then there are all the other varieties of fruit for which the foothill region is noted, and a never lagging demand for all that can be raised, which the fruit houses buy for cash.

There are also opportunities for the newcomer who desires to follow mining, as prospecting along the streams and cañons is still profitable, and affords a means of livelihood for many citizens.

During the fruit seasons there is a great demand for labor in the orchards, shipping houses, and canneries, so that the opportunities of the wage-earner are alike bright with the farmer and the fruit-raiser.

So popular have the foothills become as summer and health resorts that many farmers engage in entertaining tourists, and have built up and enlarged their homes into charming summer retreats. These in many instances have become well known and patronized by travelers who avoid the crowded resorts.

Great, indeed, is a region which offers the opportunities in the two cardinal industries of the State—mining and fruit-raising—such as are to be found in the picturesque foothills.

The largest shipping center in the Sierra foothills, and for deciduous fruits, in the State, is Newcastle, five miles below Auburn, the county seat of Placer County. Here are congregated no less than nine large fruit houses, all engaged in shipping carloads of green fruit to the markets of the United States, Mexico, Canada, and Great Britain. These houses are also doing a large business in small fruits throughout the mining sections of neighboring states. The average number of cars shipped from Newcastle alone during the season is about 1,400, each car being loaded with twelve tons of fruit.

Good fruit land can be had in any sized tracts in this region at from $25 to $100 per acre, according to the distance from the nearest shipping point. Bearing orchards bring from $150 to $500 per acre, according to the nature of the improvements.

Picturesque scenery abounds throughout the hills, and the many panoramas of Nature's wonders have made the Sierra foothills famous with travelers and tourists.

Transportation has given Newcastle as a shipping point and Placer as a county their prominence and wealth in the fruit world, but the region from Bakersfield to Shasta, an empire in extent, has practically the same conditions, and with better transportation, which is near at hand by the electric roads being built and projected and considered, this foothill empire will be the scene of the most desirable homes, by reason of climatic and scenic conditions, on the American continent.

HUMBOLDT AND THE NORTHWEST COUNTIES.

(SUPPLIED BY HUMBOLDT CHAMBER OF COMMERCE.)

For those seeking new locations, new homes, the counties on the northern coast of California present exceptional advantages and attractions. This region is endowed with crude resources, which, for wealth, magnitude, and variety are surpassed by no section of the Pacific Coast; the climatic conditions, as recorded by the Government weather reports, show a climate as even and perfect as can be found; and by reason of position, the opportunities have never been exploited as have most other sections, thus leaving it a fresh field for the home-seeker, inviting and full of opportunity, and presenting an opening to almost every calling and condition of life.

First, to take a general view of Humboldt County, which is central to this rich region, and that portion of contiguous territory which is by nature immediately tributary to Humboldt Bay and harbor, we have an area which embraces all of Humboldt and Del Norte counties, a greater portion of Trinity County, a section of Siskiyou County, and a large portion of Mendocino County. This territory extends fully 150 miles along the Pacific Ocean, and from 40 to 80 miles inland.

This portion of California embraces within its outlines the heart and bulk of the unparalleled belt of redwood timber, in area about 700,000 acres, also numerous other varieties of wood, well adapted to manifold uses; it has an undeveloped petroleum field of 1,500 square miles in extent, from which the purest crude oil known is taken; it possesses untold copper deposits, some locations of which have been sufficiently developed to demonstrate beyond the possibility of a doubt that they will soon become rich producers of copper; gold, both in quartz and in placers, is to be found all along the eastern boundary, and offers a great field for both capital and labor, and this field is now attracting the attention of a large number of practical business men who are also practical miners. This mineral belt extends from the Oregon line southward fully 150 miles, and throughout the whole area is distributed in abundance timber, wood, water, and water-power, natural auxiliaries to mining development. In lesser degree of importance may be mentioned the existence of coal, iron, chrome, asbestos, mineral paint, kaolin, lime, shale, and clay.

With such an array of resources, the possibility for business, manufactures, and industrial expansion are almost illimitable.

Embracing a portion of this mineral section, and also covering the contiguous territory inside the forest belt, is a large area of country where all the tree fruits of the temperate zone grow to their greatest perfection—and yet at present it is used largely for grazing purposes, cattle and sheep being the interests mainly occupying the ranges. With the present lack of transportation such occupation is the practical one, but with the coming of several lines of railroad that are now promised, and which promises seem to have tangible foundation, conditions will change and this land converted to the more profitable use of producing fruits and nuts.

On the coast side of the timber belt is the dairying and farming section, the best and most extensive in the State. The cool, moist climatic conditions along the coast are especially favorable to dairying, and this interest is second only to the great lumbering industry. In 1905 the dairy products of Humboldt alone reached a total value of $1,335,850, exceeding all other farm and orchard products combined. In some of the more sheltered sections of this coast country, back next to the timber and foothills, apples and most of the tree fruits do well, and the whole of this section is particularly adapted to the berry fruits, a fact that has been demonstrated, since these berries, either for the table or for canning, challenge the world.

In direct connection with these possibilities must be taken into consideration the splendid distribution of water-power in five considerable rivers that traverse this portion of California—the Klamath, Trinity, Mad, Eel, and Mattole rivers, all of which furnish power that can be readily applied direct or converted into electric energy. The first named stream, the Klamath, is a large river having a flow of 500,000 cubic feet a minute, and it is safe to say that for a distance of 150 miles, duplicates or multiplies its power every 10 miles of that distance.

The lumbering interest at present is by far the leading industry of this region. It is estimated that for the year 1906 the output of Humboldt County alone, when summed up, will reach 350,000,000 feet of sawed lumber, which, at $18 a thousand, gives an income to one county from this single industry of $6,300,000, and all indications point to the fact that this figure will be increased the present year.

The profitable industries that have been and may be founded on the many resources which this section possesses, may readily be conceived by the practical mind, and the power available to operate them, industrial activity and expansion need be limited only by the volume of demand.

With the conditions above enumerated there are two other factors necessary to make up an ideal situation—health conditions and facility of transportation.

Taking up the health conditions, let us refer to the United States weather report regarding temperature. For a series of years for the three winter months, December, January, and February, we have as the lowest average for 1899, 30°; 1900, 35°; 1901, 32°; 1902, 34°; 1903, 33°; 1904, 31°. On the other hand, the highest average winter temperature for the same years was, in 1899, 59°; 1900, 65°; 1901, 65°; 1902, 68°; 1903, 65°; 1904, 68°; or a general average of highest temperature for the winter months during the five years of 62°. During these six years the range of winter temperature, from highest to lowest, was 27°. The average given by the Government reports by months for thirteen years is as follows: January, 46.4°; February, 46.4°; March, 48.2°; April, 49.5°; May, 52.3°; June, 54.7°; July, 55.6°; August, 56.4; September, 55.4°; October, 53.3°; November, 50.8°; December, 47.8°; making a yearly average of 51.4°. The annual rainfall is about 45 inches.

This even temperature comes as a powerful aid and supplement to other conditions which stand preëminent for their health-giving and corrective properties. The temperature of the coast is cool, bracing, and invigorating, giving life, strength and vigorous health to hundreds of persons afflicted with bilious complaints or malarial fever.

But every one does not require the same climatic conditions. There are those who labor under pulmonary weaknesses, and are not able to stand the bracing, invigorating coast atmosphere and sea-breezes, and for such nature has designed a most perfect sanitarium among the hills inside the timber belt which extends through the country, occupying a strip of territory parallel with the coast from 5 to 20 miles wide. This forest is balsam laden, through which the strong ozone sea-breezes drift and filter, till upon reaching the open country beyond they have become tempered, softened, medicated to a degree that brings with them a grateful, healing balm to weak lungs and bronchial tubes. In this interior section, however, there is more cold in winter, and greater heat in summer than on the coast.

The development of this magnificent territory of natural wealth has been aided by the cheapest transportation that commerce knows—deep water. In the earlier stages of the settlement of the country, when industrial development clustered mainly around Humboldt Bay, this water transportation afforded an admirable avenue for the growing commerce in the chief product—lumber. But as the community broadened, and its business requirements enlarged, local railroads have been constructed and put into operation to the extent of a mileage which now reaches from 150 to 175 miles, all serving as feeders to the commerce of Humboldt Bay, the largest and most central shipping point of the Northern California coast. For several years, however, the need of direct connection with the railroad systems of the country has been growing more and more acute, and the plainly apparent traffic which such a railroad would receive, has attracted the attention, cupidity, or ambition of a number of railroad interests. The prize that lays in this traffic is such that the several projects that are now on foot are not at all likely to abate until railroad connection with this rich region is an accomplished fact. Preliminary work is being prosecuted in three directions from Humboldt Bay—south, east, and north—and in a short time we are promised connection with the outside world in different directions. The projected lines north and south are each working from established railroad points toward Humboldt Bay. The projected line eastward commences at Humboldt Bay and works eastward, and probably 20 to 40 miles of this line will be in operation before the close of the present year. Each one of these roads, leading to the three points of the compass and centering at Eureka, traverse virgin country filled with varied resources which now lie dormant. The advent of the railroad in each of these several sections is certain to produce a great activity in all three directions, and this activity will be sustained, for the reason that in each case there are immense and varied resources awaiting the opportunity which better transportation will bring.

With the health conditions such as here detailed, the undeveloped resources at hand, and the movement to make these resources available, there is inviting opportunity for small capital and labor in numberless vocations.

SAN FRANCISCO.

Her Present Situation and Future Prospects.

By ARTHUR R. BRIGGS.

The year 1906 will be memorable in the history of California and of San Francisco. What occurred April 18th and the three days immediately following is not only ineffaceably impressed on the minds and grafted into the experience of those who were witnesses of the destruction wrought, but has become a part of the history of catastrophes over the entire country and throughout the world. It was but natural that many erroneous statements were made soon after the fire, and that early predictions as to the rehabilitation of the city and the ultimate effect of the catastrophe were made without any proper basis of calculation. These opinions and utterances came largely from irresponsible sources, made with assumed knowledge and with earnestness that carried weight not merited. Even at this time, nearly a year after the earthquake and fire, in the face of unmistakable evidence of vigorous growth, almost unparalleled industrial and commercial activity, misstatements in respect to conditions in San Francisco are being published. From the first there was no reason to doubt that the rebuilding of the city would be quickly accomplished. By reason of distance from the base of supplies, lack of established facilities for procuring men and material, and the unsettled financial condition, it took a little time to adjust the needs to the new situation. But the great forces that recognize no obstacle, that press forward the wheels of progress, were behind San Francisco—as they are behind all great commercial cities—and their necessities demanded heroic and untiring action. The State as a whole, the Pacific Coast and the commerce that naturally centers here, gave expression to a demand for the speedy rebuilding of the stricken city. The people declared with one voice, we will rebuild and in a few years make a city greater in extent, more beautiful and more durable than the one which was destroyed.

Within a period of ten months the wheels of commerce, domestic and foreign, have been set in motion with surprising activity. All branches of trade have been adjusted to the new order of things, and are now, despite temporary disadvantages, being conducted as though no fire had occurred. With the finances of the city on a sound basis, every commercial and savings bank unquestionably in strong condition; with the insurance situation fairly well settled, from which two hundred millions of dollars is released and put in use for rehabilitation; with mercantile and manufacturing interests again established, and with a foreign commerce going on as though no interruption had occurred; with the water, light, and sewer systems restored, and the facilities for transportation throughout the city renewed, there followed naturally the demand for permanent rebuilding and improvement.

The city for a time after the fire presented a unique appearance with its temporary structures situated in the midst of an extensive area of magnificent ruins. The year 1906 closed with a good record of high class business structures, already constructed or under process of construction, scattered here and there on the principal streets on sites that have for years been conspicuous. The record for the nine months since April last is told in the statement that building permits during this period, for permanent structures alone, aggregated $35,000,000. This is being augmented each week at the rate of about $1,500,000. Scores of the most prominent business buildings that withstood the fire are being restored and repairs are nearing completion. Some of these are already occupied. The Merchants' Exchange on California street has already many occupants, and by May of 1907 will be ready for many more. The Kohl Building on California and Montgomery streets is in condition for occupation almost throughout. The Monadnock, the Spreckels, the Flood, and many other buildings are nearing completion, and stand as monuments to the energy of the men who are devoting their money and their zeal to the rebuilding of the city.

A visitor from the city of Baltimore, who is entitled, by his position, to speak on the subject, recently said: "In looking over San Francisco I find no reason for thinking the work of reconstruction is not progressing in a most creditable manner. Where a large district is to be rebuilt, the work of reconstruction can not, to the casual observer, make much impression in a few months. Much preparation had to be made before building began. Most of these preliminaries have now been completed."

What has been done since April last is but a forecast of what may reasonably be expected for the year 1907. This prediction finds substantial support in a late compilation made by Labor Commissioner W. V. Stafford, showing the increase in the number of men in San Francisco engaged in the building trades on January 1, 1907, over the number likewise engaged on January 1, 1906. Summarized it is as follows:

January 1, 1906—All building trades, skilled workmen..	14,466
January 1, 1907—All building trades, skilled workmen..	28,459
A gain of......................	13,993, or 99.14%

Of this number the largest gain was in carpenters, or against 3,067 January 1, 1906, there were 9,802 January 1, 1907, a gain of 6,735, or 219.59 per cent. To this should be added a gain of about 2,000 in special lines of carpenter work, including millmen, etc., identified or affiliated with the union. This record is for unionized labor, the non-union men not being shown in the Commissioner's report. There is also a marked gain in the number of skilled laborers in other branches. On January 1, 1906, the record shows an aggregate of 402 union bricklayers in the city; January 1, 1907, the number was increased to 1,806, a gain of 1,404 or 349.25 per cent. This exhibit of increase in the number of skilled laborers employed in building trades is an indication of what is going on in the way of reconstruction. Rebuilding, when considered as a whole, seems a gigantic undertaking, but when reduced to units, each one doing for himself that which is suited to his means and his needs, the situation is simplified and the future presents a different outlook.

As indicating the activity and volume of business in the city, brief reference to figures again may be interesting. The bank clearings for the year 1906 aggregated $1,998,400,770. The total clearing for October last is reported as the largest in any single month in the history of the city.

In forecasting the future of San Francisco, two principal factors should be considered, viz: confidence and financial ability. Of the first there is no lack, demonstration of which is found in the progress already made and in the plans projected. Where the money for rebuilding is to come from may very properly be considered. Assuming that the fire destroyed $500,000,000 of property, the sum necessary to replace it must be provided before reconstruction is fully accomplished. What, then, is the source from which this vast sum is to come?

First, is the sum realized from insurance, aggregating in round numbers	$200,000,000 00
Next, the foreign capital that will come here to rebuild buildings, owned abroad, without reference to the money that is coming and will come for new investments (estimated)	25,000,000 00
Total	$225,000,000 00

This leaves an apparent loss to be made good of $275,000,000. Has the State an earning capacity sufficient to supply the deficit, fast enough to meet the requirements in the speedy rebuilding of San Francisco? Let the following exhibit of annual earning capacity of the State answer the question, viz:

Minerals (including petroleum)	$45,000,000 00
Fruits (all descriptions)	35,000,000 00
Dairy products	22,000,000 00
Wine and brandy	15,000,000 00
Cereals	25,000,000 00
Live stock	15,000,000 00
Lumber	25,000,000 00
Beet sugar	4,000,000 00
Vegetables	3,000,000 00
Hops	1,500,000 00
Wool	1,250,000 00
Sundry products not enumerated	33,250,000 00
Total	$225,000,000 00

From this exhibit, which does not count the manufacturing industries and the many unclassified sources, the yearly earnings are nearly, if not quite, equal to the deficit or net loss to the State from the fire of April last. It is therefore reasonable to believe that the money for rebuilding will not be wanting. Money seeks centers of profitable investment, and San Francisco presents rare opportunities. Nor should the fact be lost sight of that the population of the State is continually on the increase, and that larger population means increased earning capacity. The movement of people in search of homes and investment is from the east, westward. The development of the State at large promises to be more rapid in every branch of industry in the years to come than has been experienced in the past, and with development comes constantly increasing growth of the principal city to keep pace with the demands of trade and commerce.

As has been truly said, for individual enterprise, ability and strength, the men of San Francisco stand in the front rank: collectively they lack cohesion in matters of public interest, but in the rebuilding of the city they stand as a unit.

ALMOND-GROWING FOR PROFIT.

By J. P. DARGITZ, of Acampo, Cal.

The fact that I have been able to find so very little on the subject of almond-growing is my excuse for this paper. While I do not pretend to be an expert by any means, yet I will attempt to give you the result of close observation upon my part, hoping that it may be beneficial to those who may read it.

I am surprised that there are so few almond orchards being planted in California. My reason for this surprise is not alone in the market conditions, but in the fact that people are talking about over-production and under-consumption and wondering how we are to harmonize the market conditions with the very large acreage of fruit trees being planted. We do not import very much fruit, but we do import a very large portion of the almonds which we consume. It is safe to say that this country will not in this generation produce enough almonds to meet the demands for home consumption. Such being the case, have we not here a most inviting field for the horticulturist to enter? I will also try to show that it is a most profitable one as well.

There are some things to have and some things to avoid in embarking upon the growing of almonds for profit.

In the first place, one must have a deep rich soil, for the almond is a very voracious feeder. Its root system is one of the finest of any of our orchard trees, and we might note that it should therefore be a most excellent root for nursery grafting. It is one of the longest lived of all orchard trees.

Not only good and deep soil, but perfect under-drainage must be had, for the almond will not bear wet feet any more than will the peach.

Now, if these were the only conditions we might expect to find plenty of room to grow almonds. But we must next choose our location with reference to both frosts and rainfall. As the almond is such an early bloomer this is a very important point. I am of the opinion that California is the only State in the Union where the almond can be successfully grown on account of frost. A location must be chosen where there is no frost to amount to anything after the first of February, as the almond begins to bloom the last of January in much of this State. But even more important than frost is the matter of rainfall; for while the almond likes plenty of moisture it should have sunny weather while it is blooming to insure success. I am quite sure that very many of the failures that are charged up to frost are really due to rain during blooming time which prevents pollenization. Fortunately this tree holds its bloom from two to four weeks, and during that time we may quite reasonably count on a few days of sunshine. Only a few are absolutely necessary, for the almond is a very free bloomer and some varieties are very rich in pollen.

All the other requirements having been met, there remains perhaps the most important of them all yet to be considered, and that is the selection of the proper varieties. I am confident that right here is the rock upon which more growers have wrecked their hopes than all others combined. As a rule all the paper-shells are deficient in pollen and will not bear well, if planted alone. From what I have been able to learn the only two which warrant planting in this section are the Nonpareil and the Ne Plus Ultra. The latter is not a very good nut and needs much more moisture than the other. The Nonpareil will give good results if planted with some other variety as a pollenizer. It is one of the very best of nuts and is well worth planting.

For a pollenizer there is, in my estimation, no better nut than the Texas Prolific. This nut was found by a Mr. Williamson in his travels for the W. R. Strong Nursery Company of Sacramento.

He brought the nut to Mr. Robert Adams, who was in charge of the above company's nurseries east of Acampo, and told him not to be afraid to plant it, for if it bore here as it did where he found it it would beat anything in the almond line. Mr. Adams began planting it eighteen years ago, and for fifteen years it has not failed to fruit, and usually very prolifically. It blooms about two weeks later than the Nonpareil; in fact, is the latest bloomer of all almonds that I have observed and is therefore very desirable on the frost count. It is also the very best pollenizer and when planted row about with the Nonpareil will cause it to set fruit splendidly. We have abundant proof of this in our south orchard, where the profitableness of almond-growing has for several years been a theme for wonder by all who have seen them. The Texas Prolific on S. S. Murphy's lot yielded over $200 per acre in 1906 at the age of ten years. It is a soft-shell but not a paper-shell.

In our north orchard 240 acres of unprofitable I X L almonds were topped and grafted over to Sugar and Giant prunes. The second year there was quite a sprinkling of fruit. The third year they produced enough to pay all expenses of production and netted six per cent on a valuation of $180 per acre. The fourth year they netted twenty per cent on $200 per acre. I mention this to show the marvelously speedy results obtained, due, I am quite sure, to the fine root system of these trees. A few of them were worked over to the Texas Prolific almond and the third year they produced about $1 per tree and the fourth year about $2 per tree. How vastly much better is this than to grub up unprofitable almond trees, providing of course that they are thirfty and healthy.

The Drake Seedling is also a very profitable almond to grow in this section, but I do not think that it will by any means equal the Texas Prolific. For the year 1906 the latter yielded for us just three times what the Drake Seedling did.

As to prices: The Nonpareil at 14 cents per pound, the Drake Seedling at 11 cents per pound, and the Texas Prolific at 10 cents per pound will each bring about $10.50 per standard sack; the I X L at 13 cents per pound about $9.00 per sack, and the Ne Plus Ultra at 12 cents per pound about $8.50 per sack. From this it will be seen that there is no discounting the Texas Prolific because it is not a paper-shell or does not bring so high a price as a paper-shell. And when we remember that it will, on an average, give us twice as many sacks as any other almond grown, it will be seen why we are partial to the Texas Prolific as a matter of profit in almond-growing.

But what shall we do with our orchards of other varieties which do not pay as well or which do not pay at all? For instance, we have in our north orchard about 100 acres of fine large trees of Nonpareil, Ne Plus Ultra, I X L, and La Prima varieties which did not make expenses of cultivating and cropping for the year 1906. Shall we grub them out and plant peaches or grapes or some other fruit, as some people do? One block of 15 acres was so treated—and this was one of the best producing portions of those varieties, too—but I would not trade even acres of these almond trees which are not producing to-day for that 15 acres planted to grapes one year ago, for it will be five years before anything is received from it above the cost of caring for it, while we shall be able to make the orchard pay for itself entirely before the five years are gone if our conclusions are correct. Note the figures which I gave you where I X L trees were worked over to Texas Prolific. During the year 1906 we worked over about 2,500 large I X L trees to the Texas Prolific, and will endeavor to work all the rest of that variety over to the same during 1907. We expect that these trees scattered among the other varieties will do their work as pollenizers and bring the rest into bearing. We are now cutting about half of the wood out of the trees to be worked over, which will force a large growth of sprouts about the trunk, and then these will be budded next August. This will make a better tree than can be done by grafting where the tree is so large, and will be cheaper and will help to keep the tree vigorous. It will also leave us much bearing wood in them for 1907 and 1908. Then the remainder of the tops will be cut out, and by 1910 we shall look for about $1 worth of the Texas Prolific per tree, with a rapid increase thereafter. This method will give us the transition from one variety to the other with the loss of only one year's chance for a crop. But we shall not stop here, for we shall also water the trees, because water pays when used judiciously in almond-growing.

The question of watering, spraying, and fertilizing, as well as pruning and cultivation, will now play a very important part in the results to be obtained by the orchardist who is to make a profit. Plenty of moisture is necessary in the autumn to form good healthy fruit buds to insure the setting of fruit the following spring. In September of 1904 we had a most unusual rain of about four inches. This was hard on the raisin-growers, but very valuable to the almond-growers. It produced an abundance of good strong fruit buds and we had the promise of a record-breaking crop for 1905; but in July of that year came that awful hot spell which the "oldest inhabitant" had never seen before, and the trees called so heavily upon the soil for moisture that a large proportion of the nuts were blasted and others were made to be "sticktights." This cut down our expectations for the year's revenue, but taught us the necessity of being prepared to water to save the drying up of the crop in such an emergency. This also left us with no moisture in the ground to make fruit buds for the 1906 crop, and still worse we did not get any fall rains that year, in fact not until in January. This greatly interfered with our chances of a crop in 1906, but it also taught us to be prepared to water in August and September to make good fruit buds for the following year. Now, some one may ask why did the Texas

Prolific do so well in 1906 when these other large trees did so poorly, if the rain had so much to do with it? My reply is that the Texas Prolific seems to do better with less water than other varieties, but yet where they were only ten years old they did much better than where they were eighteen years old. It is safe to say that it will pay immensely to water them and all other almond trees after they are ten years old.

Every one should do something in the way of experimenting with any unprofitable almond orchard to see what can be done to better the production. Water, spraying, and fertilizers should be tried and the results carefully noted. It is very probable that spraying has some property of fecundity as well as of destroying insects and fungi.

As to the diseases and pests to which the almond is subject we are on pretty safe ground. The mossy fungus is easily cleaned off by lime and sulphur, while the red spider is easily destroyed by the fumes of sulphur in the heat of summer. As to the black knot it has not been demonstrated to my satisfaction whether it is a disease or the result of disease. Of course no one would pay any more for an orchard known to be infected with black knot than one free from it, but the best parts of our orchards have it and we have yet to study it further before being sure of our ground here. Mr. T. R. Burket, who bought the Foster place a year ago, reports that he found there seven trees of paper-shells which always bore well and which had every appearance of being thrifty and healthy, but because the birds from the river near by did the harvesting for him he decided to take them out. He was much surprised to find black knot on five of the seven and so bad that in some cases a knot had grown over and enfolded two roots. The 15 acres taken up by Mr. J. L. Johnson, and which were reported to be badly affected with the black knot, offer another bit of evidence. He left fifteen trees around his house for shade, and Mr. J. J. Ford, who lived on the place during a part of 1906, reports that he harvested and sold $12.60 worth of nuts from these fifteen trees without any pruning or cultivation whatever. The almond orchard of Mr. Ortman, ex-county assessor, is reported to have been so badly affected with black knot when two years planted that he was about to dig it up, but on the advice of friends left it and it has been a source of great profit for a number of years. The orchard of Mr. Wilhoit, near Woodbridge, was reported by him to have been full of this trouble ever since it was planted, and yet it pays a good income on $500 per acre.

To sum up: Select good, well-drained soil, deep and rich; plant Texas Prolific solid or in alternate rows with Drake Seedling or Nonpareil; prune, cultivate, and spray when necessary; see that your trees have sufficient moisture; in short, give your trees as much care as you would peaches or grapes, and I am quite sure that you will find profit in almond-growing.

RAISINS AND CURRANTS IN 1906.

By GEORGE ROBERTSON.

For the last five years I have made an annual statistical review of the raisin and wine industries, and other products of Fresno County, during the previous year. This year I send a brief summary of the production and consumption of raisins during 1906, compared with former years; and as foreign currants compete to a certain extent with raisins, I have also included the quantity of that fruit imported each year.

The California Raisin Crop.

Year.	Pounds.	Year.	Pounds.
1901	74,000,000	1904	80,000,000
1902	106,000,000	1905	73,000,000
1903	120,000,000	1906	85,000,000

A year ago reports were circulated in the press, and by others, that the stagnation which then prevailed in the raisin market and the falling off in the demand for California raisins, were owing to the large importation of Spanish raisins. This statement was entirely wrong, as I pointed out at the time. The imports of Spanish raisins, instead of being largely in excess of the average, were actually 2,825,928 pounds less than the previous year, and the exports of California raisins, instead of having fallen off, as stated, showed an increase of 3,034,406 pounds over the preceding year.

This last season reports emanated from the same source, endeavoring to explain that the reason why California raisins had risen to a higher price than ever known before was in consequence of the great falling off in the imports of Spanish raisins, and the large exports of California raisins to Europe, owing to the failure of the Spanish crop. This is not the true explanation, as the quantity of the imports and exports is not on a sufficiently large scale to account for such a great rise in the price of raisins as has taken place, as the following figures will prove:

Imports and Exports for Fiscal Year From July 1st to June 30th.

Year.	Foreign Raisins Imported.	California Raisins Exported.	Currants Imported.
1901	3,860,836 lbs.	3,512,164 lbs.	16,049,198 lbs.
1902	6,683,545	2,323,274	36,238,976
1903	6,715,675	4,280,028	33,878,209
1904	6,867,617	4,020,418	38,347,649
1905	4,041,689	7,054,824	31,742,919
1906 (ending Nov. 30th)	4,044,168	7,965,799	31,134,926

Nearly all Government reports and statistics are made up for the fiscal year ending June 30th, and as the complete figures for 1906 will not be published for some months, the above totals for 1906 are taken from the monthly summary of Commerce and Finance, which are for the calendar year from January 1st to December 31st, and therefore do not quite agree with the above totals for other years. Both sets of figures are here given for the last three years (although only for eleven months of the year), as they are near enough to be useful for comparison.

Imports and Exports for Calendar Year From January 1st to November 30th.

	November		Eleven Months Ending November 30		
	1905.	1906.	1904.	1905.	1906.
Raisins imported	5,323,938	1,293,178	3,814,119	10,139,498	4,044,168
California raisins exported	1,024,212	4,138,933	5,942,249	3,462,997	7,965,799
Currants imported	4,024,213	4,351,406	25,214,665	32,592,230	31,134,926

It can be seen at a glance that fewer Spanish raisins have been imported, and more California raisins exported, during last season, especially during the month of November, than in recent years; but the imports of foreign raisins in November only show a decrease of 4,030,760 pounds, and the export of California raisins during the same month an increase of 3,114,721 pounds over the year 1905, currants remaining almost stationary.

A difference of only three or four million pounds in either imports or exports could not have much influence on the price of a crop of upward of 80,000,000 pounds, and does not account for an increase in price of 100 per cent and upward, compared with recent years. The true cause was probably a smaller crop than was first anticipated, a considerable quantity of which was sold early in the season at comparatively low prices. Many who sold short were compelled to buy back at any price to fulfill their contracts. Then, again, there was a better domestic demand for dried fruits of all kinds.

The latter is an encouraging sign, for it is the home market that producers and manufacturers in all countries have to look to for their best customers, as it is invariably the largest, most important, and best paying one, beside which foreign trade can never compare. There should be room, however, for a considerable expansion of the export trade in California raisins, apart from Europe. Canada now imports on an average about 13,000,000 pounds of raisins annually, of which only some 2,000,000 are supplied by California.

THE POULTRY BUSINESS IN CALIFORNIA.

The State Agricultural Society has made some investigation of the chicken industry as conducted in California, and finds that while failures occur, as in all lines of industry, they are less frequent than in most other callings. On the whole, the chicken business in this State is growing and prosperous, and the communities where it is obtaining a foothold find their business being converted from a credit to a cash basis. Less capital is required to begin with in proportion to income than in most other lines of industry, and the returns are surer. Floods or drouths or unseasonable frosts do not materially affect the output. The market is close at hand, the pay is always cash, and the prices are generally satisfactory. Big farmers in California have been disposed to regard it as a little business, but its profits have begun to attract big men and superior talent.

On the question of capital required to start a poultry farm large enough to comfortably support a family of say five persons (man, wife, and three children), we have some figures from Colonel L. C. Byce, of Petaluma, who has been identified with the business in that great poultry center almost from its infancy, who has had great opportunities for a study of the industry, and who may be regarded as an authority.

Land required, from three to five acres, five preferable; cost, approximately $500. Character of land, sandy or gravelly soil preferred, next best sandy loam, adobe least desirable. Land should have natural drainage, and if the slope is toward the east so as to have the benefit of the early morning sun, so much the better. Cost of five-room cottage, $1,200 to $1,500, according to finish; barn suitable for horse and cow, $150; poultry houses, $20 per 100 fowls, or $240 for 1,200; a six-foot, two-inch mesh wire fence, about 15 cents per running foot, or for five acres $280; horse, $150; cow, $50; wagon, $100; well, pump, pipe, and household furniture, $250; poultry stock, $500; incidentals, $30.

These figures, which are based on the cost of buying all material and hiring all help, counting the house $1,250, aggregate $3,000. They mean good land, a good house, a good horse, good wagon, good cow, good stock, good fence, and fairly good outbuildings. A family can start with a much cheaper house, with a poorer horse and poorer wagon, and other articles of less cost, and thus cut the total very materially; or by the man and his boy giving a hand in helping to build the house, the fences, the barn, and the chicken houses, the quality of the articles in the first estimate can be had at a very much less cash outlay.

On this place one acre can be devoted to family orchard, garden, stable yard, and house yard, and four acres to poultry. Colonel Byce says, "This will suffice to keep from 1,000 to 1,500 laying hens. Usually, one can keep 300 to 400 laying hens to the acre of land. Of course, where it is desired to raise a number of small chicks calculation must be made for them. One half acre of ground is enough land on which to raise chicks to replace the old fowls." It must be borne in mind that the business requires diligent and intelligent care, and the more chickens one undertakes to maintain on any given sized piece of ground the more vigilance is required in keeping the place clean.

It is safe to estimate that the cost of feed will average $1 for each hen per year. The more green feed the garden produces the more this figure can be reduced.

"The profits," Colonel Byce says, "depend much on the man—the care, attention, and intelligence he puts into the business." Some are making as high as $2.25 per hen per annum, but $1.50 per hen is a good average. Some from lack of attention and careless habits, struggle to get along; others, more shiftless, fail entirely. In this it is like all other business. Most men, however, do well and many make money. On the whole, the business is profitable, and for the frugal and intelligent man with limited capital, affords a better income in California, along with a more agreeable occupation, than almost any other industry.

In most places in California fruit trees may be profitably planted on the ground intended for poultry. The chickens fertilize the trees and the trees afford shade for the chickens, while the fruit from four or five acres of thrifty orchard will add materially to the annual income.

In this connection it may be mentioned that notwithstanding the improved methods adopted and other stimulus to the business in late years, the average price of eggs in the United States for 1905, and 1906, about 25 cents, is higher than since the war period, when the average jumped from 15 cents in 1862, to 20 cents in 1863, to 28 cents in 1864, and to 35 cents in 1865, the highest ever recorded. After that the price gradually lowered to an average for the period from 1870 to 1900 of about 20 cents per dozen. Since 1900 the prices have gradually and uniformly tended upward.

THE AMERICAN HEN.

By PROF. NEWTON CLARKE.

In North Pacific Rural Spirit.

The cackling of the geese is said to have saved Rome, and the cackling of the hen has made many a home.

All honor to the American hen. She works harder and earns more, yet receives less consideration than any other creature that serves us.

The busy, happy little hen,
In open field or picket pen,
Goes swinging at her daily toil
To scratch a living from the soil.
She's through the orchard and up the hill,
For seeds and bugs her crop to fill;
And when her daily round is made,
A nice fresh egg she's always laid.

What adds so much life and cheer to the farm home as a fine flock of poultry, and what looks so lonely, so unfurnished and unfinished as a farm without chickens? From early morn till dewy eve the crowing of the cocks and the cackling of the hens remind you that at least one set of busy workers never goes on a strike for higher wages. No matter what comes or what goes, good times or bad, high wages or low, the busy hen keeps up her daily task of turning out the nicest article of diet put up in the neatest, most convenient package of all the products conjured by the ingenuity of those who cater to the appetites of their customers. The egg is an ideal food, palatable, rich in substance, yet easy of digestion. Good alike for laborers or invalids, rich or poor, young or old, and always ready if you ''keep a hen.'' And when the biddy has served a reasonable time at egg production, what makes a finer family feast than a stew of her carcass with plenty of dumplings and good thick gravy to sop both sides of your biscuit in? There's a piece to suit the palate of every one—the drumstick, the wing, the breast, the back, the light meat, the dark meat, the gizzard, the liver, the heart, and the sack the eggs grow in—more variety of flavor and texture than you would have in a half-dozen kinds of meat and fish and, like the egg, all done up in one package. Did you ever stop to think what a handy, valuable thing the chicken is? Nothing kept on the farm gives as large returns for the capital invested or the care bestowed, and the enormity of the poultry business is not comprehended till we stop to compare it with other industries that are thought of as being of far greater import. It seems unreasonable to think that the American hen can produce wealth equal to the capital stock of all the banks of the New York clearing-house in a little less than three months, and that in less than sixty days she can equal the gold production of the United States. And, while it is hard to comprehend the fact, statistics prove that she can pay off the interest-bearing debt of the United States in one year and one month. A little deliberation upon these facts should command profound respect for the ''old speckled hen.''

Solomon said, ''Of the making of books there is no end.'' If he had lived to-day he might have said, ''Of the making of breeds there is no end.'' But from the smallest bantam to the largest Asiatic, each has its particular attraction and special value and every one who has any love for feathered fowls can be pleased in style and color of plumage.

It seems surprising that an industry of so much importance, one of such general interest, and one capable of so much expansion, should have been so long classed among the little things and almost utterly ignored.

When the farmer wishes information about any other animal or any crop raised on the farm, he has but to send a request to his State experiment station and a practical bulletin will be forthcoming. Not so when he gets into trouble with the poultry. It is a notable fact that not more than two or three of all the agricultural colleges of America have paid any attention to investigation along this line and standard bulletins are not to be had. If the farmer or young fancier applies to the poultry journals, his replies are as apt to be in direct contradiction as otherwise. It will not always be so. Secretary Wilson, of the United States Department of Agriculture, is establishing a poultry department, and it will not be many years till all the agricultural colleges will be adding instruction in this branch. Then will the American hen come to her own.

DRY FEED FOR POULTRY.

In a bulletin issued by one of the Eastern States that has experimented extensively on the subject, we find the following information on poultry-feeding:

For many years warm mashes made from mixtures of different meals, sometimes with the addition of cooked vegetables, were given to the hens every morning during the winter season and in warm weather mashes of similar composition but mixed with cold water were fed. The hens seemed to like mashes made in this way better than anything except corn, and if fed anywhere near enough to satisfy their appetites, they would load themselves with food and then sit down in idleness during the early part of the day. They were not willing to scratch in the floor litter for the wheat, oats and cracked corn that had been buried there for them.

The losses of hens from what appeared to be the system of feeding, caused the change of the time of feeding the mash, from morning until near night, and giving the cracked corn, wheat and oats, in the litter in the morning and near noon.

These changes resulted in the better health and productiveness of the birds, but the crowding for the mash at feeding time, and the hurried filling of their crops to repletion even near bedtime, did not argue for the best.

Several different plans of feeding were compared by testing them for a year and finally the moist mash was abandoned altogether. The present system of feeding has been practiced here for two years and is regarded as the best method thus far used. The dry meal mixture is composed of the same materials in the same proportion as the moist mash was, but the method of feeding it is different. It is kept within reach of the birds at all times but they never stuff themselves with it. It is rich in the materials from which hens make eggs. Hens that lay many eggs must be generously nourished. In the changes in feeding made it was not the quantity or composition of the ration that was altered, but the feeding habits of the birds.

Early in the morning for each one hundred hens, four quarts of screened cracked corn are scattered in the litter, which is six to eight inches deep on the floor. This is not mixed into the litter, for the straw is dry and light and enough of the grain is hidden so the birds commence scratching for it almost immediately. At ten o'clock they are fed in the same way, two quarts of wheat and two quarts of oats. This is all of the regular feeding that is done.

Along one side of the room is the feed trough, with slatted front. In it is kept a supply of dry meals mixed together. This dry meal mixture is composed of the following materials, viz: 200 pounds of good wheat bran, 100 pounds of corn meal, 100 pounds of middlings, 100 pounds of gluten meal or brewers' grain, 100 pounds of linseed meal, 100 pounds of beef scrap.

These materials are spread on the floor in layers one above another and shoveled together until thoroughly mixed, then kept in stock, for supplying the trough. The trough is never allowed to remain empty. The dry meal mixture is constantly within reach of all of the birds and they help themselves at will.

Oyster shell, dry cracked bone, grit and charcoal are kept in slatted troughs and are accessible at all times. A moderate supply of mangolds and plenty of clean water are furnished. About five pounds of clover cut into inch lengths is fed dry, daily to each one hundred birds, in winter. When the wheat, oats, and cracked corn are given, the birds are always ready and anxious for them and they scratch in the litter for the very last kernel, before going to the trough where an abundance of food is in store.

It is very evident that they like the broken and whole grains better than the mixture of the fine, dry materials; yet they by no means dislike the latter, for they help themselves to it, a mouthful or two at a time, whenever they seem to need it, and never go to bed with empty crops, so far as noted. They apparently do not like it well enough to gorge themselves with it, and sit down, loaf, get over-fat and lay soft-shelled eggs, as is so commonly the case with Plymouth Rocks when they are given in the morning warm mashes in troughs.

Some of the advantages of this method are that the mash is put in the troughs at any convenient time, only guarding against an exhaustion of supply and the entire evidence of the mobbing that always occurs at the trough feeding, when that is made the meal of the day, whether it be at morning or evening. There are no tailings to be gathered up or wasted, as is common when a full meal of mash is given at night. The labor is very much less, enabling a person to care for more birds than when the regular evening meal is given.

EGGS IN WINTER.

In view of the high prices of eggs in California during the winter months, some suggestions as to how to have the hens lay during this season ought to be of more than passing interest. W. R. Graham, poultry manager and lecturer of the Ontario Agricultural College, has this to say on the subject:

To produce eggs in winter time, we have to consider the stock, the quarters or housing, the feed, and the weather.

The stock needs to be the best obtainable. An ideal bird for winter egg production is a pullet that is mature at about November 1st, and is strong and vigorous, and of a good laying strain. Something depends upon the breed, but more on the strain of the breed; also much upon a good strong constitution, and an abundance of vigor. These are the essential points.

To get pullets of such birds as Rocks, Wyandottes, and Orpingtons matured by November, it is necessary to hatch them in April. Some seasons May chicks mature quickly and begin laying about the first day of December, but not as a rule. If a pullet does not commence to lay before Christmas, it is doubtful if she will begin much before March, unless the weather is favorable. Then again, good yearling hens that have molted early are likely layers. The problem, how to get hens to molt early, is not entirely solved as yet. No doubt it has been noticed that hens which sit and bring out a brood of chicks from June 10th to July, usually molt about the time they are leaving their chicks. Some hens that sit earlier also molt early; but as a rule they begin to lay after sitting, and are rather inclined to late molting.

From the above, it would appear that the best method to get the flock in general to molt would be to place the flock under conditions similar to those of the sitting hen. This is done by some egg-farmers with more or less success. The plan followed is to change the hens to a new, free range about July 1st, and feed but very lightly, not more than one handful of grain to each hen daily. The object is to induce the hens to dine largely on grass and water, and *stop egg production.* After being thus treated for from two to three weeks, the hens are again well fed on a good laying ration. In many cases they begin to molt, and, if fed well, get their new coat of feathers quickly, and thereby save time. I have had a few hens which have begun to lay heavily as soon as I have started to feed them well; but this is not very often the case.

Hens over two years of age are seldom good layers. Leghorns, Minorcas, etc., are sometimes good during their third and fourth years; but, generally speaking, the Rocks and such fowls are of little or no use as layers after the second year, being much inclined to become excessively fat.

For *summer egg production* the lighter breeds and late hatched pullets of the heavier breeds are best. Do not expect a hen that has laid well all winter to lay exceptionally well during the summer. A hen that lays early is inclined to show a desire to sit early in the season.

MORAVIAN BARLEY.

While it is five years since the Moravian or Hanna barley was first introduced into California through a five-pound sample sent by the U. S. Agricultural Department to Professor E. W. Hilgard of the Agricultural College of the University of California, and while all the experiments seem to demonstrate its superiority over other barleys in practically all important points, yet we find that but few farmers in California are aware of its existence and still fewer of its properties.

The State Agricultural Society has made careful inquiry of a few farmers who have grown this barley more or less extensively, and if it possesses the qualities which those who have grown it agree that it has, the day ought to be hastened when it shall take the place of the common varieties of barley in all the grain fields of the State. If it is as much better than the common barley as we are led to believe it is from the reports made to us on the subject, then its general introduction throughout California one year earlier than might result through ordinary channels would be worth to the farmers of the State, in the increased yield alone, to say nothing about a better price by reason of its better quality, more than the cost of maintaining the State Agricultural Society for a good many years. Without affirming or denying its properties, therefore, we state the points claimed for it in the hope that barley-growers may be induced to try it for themselves, and thus earlier reap the benefit if their trial should prove this new grain possesses the points in its favor that are claimed.

Mr. August Hagemann, of Livermore, was the first to plant it in California and has been growing it for five years. He says: "The Hanna or Moravian barley has shown more resistance to drouth than the six-rowed common barley. In its normal state it weighs 56 pounds to the bushel; the standard weight of the six-rowed or common barley is 48 pounds to the bushel. The average yield under equal conditions is in favor of the Moravian. It is an excellent feed barley as well as a brewing barley. Its malt shows by analysis to have a larger percentage of extract than chevalier barley. As an export barley for Australia and England it should have a good demand, as this type of barley is almost exclusively used in those countries for malting."

Mr. H. C. Compton, of Chico, is another grower of Moravian barley, and he says of it: "In 1905, which was an unfavorable year for crops, this barley (Moravian) made about two sacks more to the acre than the common barley on the same kind of land. When it is clean it weighs 140 pounds to the sack."

From personal inspection we can say the grain is large, plump, and bright, and at a glance impresses one as being of superior quality. Samples from California were exhibited at St. Louis and at Portland, and at both expositions expert judges awarded it a gold medal.

As to the history of the barley, Mr. David Fairchild, of Washington,). C., says: "The barley in question was not secured by the American 'onsul in Moravia, but by myself personally while abroad as explorer or the Bureau of Seed and Plant Introduction of the United States)epartment of Agriculture. I personally talked with the originator of his barley, E. Ritter Proskowetz, of Kwassitz. It is claimed to be ne of the best brewing barleys in the world, and is noted for its qualiies of early ripening, unusually heavy yields, and special mealiness, vhich latter, together with other qualities of kernel, renders it one of he great favorites among the German as well as the Austrian brewers."

Von Proskowetz claims for the variety a pedigree and says that it was elected as a single plant from some barley which he knew to be of 'ery old Moravian origin. Through careful selections he has been able o bring its productivity up to 3,700 kilos per hectare (about 65 bushels o the acre) and shorten its period of growth by over a week. It is a ight straw producer, suited especially to light and sandy loams. Owing o its early ripening quality, it is especially valuable in Hungary, where the hot season occurs in the latter part of July, but after the Hanna barley has so far matured as to be little influenced by it. Owing to its heavy yielding capacity, earliness and high grade as a brewing grain, this variety is driving out all other sorts in Austria, and every year large quantities of seed grain are imported into Hungary.

SEED SELECTION AND CLUB WORK.

Professor G. W. Shaw, of the Agricultural Department of the University of California, has recently issued a bulletin on the subject of seed-breeding and seed-selection by farmers, gardeners, etc. No one is more competent to treat this important question than Professor Shaw, and that his words may bear the fullest fruit every farmer in California should send to him for a copy of his bulletin and should study it and act upon it.

We can hope to add nothing to what Professor Shaw has said as to the beneficial results of planting only the most perfectly developed seed, but we can emphasize the importance of the subject and call attention to the fact that Eastern farmers are manifesting much more interest in the matter of seed-breeding and seed-selection than are the farmers of the West, and that they are profiting accordingly.

The importance of breeding from select animals is accepted everywhere, and the Eastern farmer has come to realize that good, long ears of corn, with deep kernels, small cobs, straight rows, and filled to the end, can only be had from like parentage, and consequently he is becoming more and more careful in the selection of his seed. From the same land, and with the same outlay for planting, cultivating, and harvesting, he reaps a much larger yield, and the difference is just that much added to his profits. What is true of corn is true of all the vegetable kingdom, and when the California farmer takes as much pains in selecting his seed wheat and barley as the Eastern farmer does in selecting his seed corn, he will find the yield and quality of his crop relatively improved. He should no more consent to sow poor, half-developed wheat on his land than he would to breed his fine cow to a scrub sire, or his favorite mare to a plug horse. The ignoring of the common laws of nature in one case is attended by the same results as in the other.

Even in India, where the people are presumed to be but partially civilized, they recognize the importance of planting only the best, as it is their custom to drop their seed wheat from a high platform in the face of a strong breeze and select for planting only those heavy kernels which fall nearest to the wind.

The California farmers should take up this subject vigorously, agitate it, and apply it to everything they plant. Professor Shaw is at the head of the seed-breeding experiments of the University and can give those who address him many valuable suggestions regarding the most approved seeds and ways and means of securing it. In the meantime, any farmer can at least screen out his very best and plumpest grain for planting, and this he should certainly do. The proper time to make the selection of grain, however, is before it is harvested, when regard can be had to the strength of the straw, the size and fullness of he heads, and the plumpness of the kernels. While advising farmers o at least select good, plump, and clean grain for this year, we suggest hat when their grain is ripe for harvest they begin the practice of election by going through their fields and picking out the biggest and est filled heads for seed the year following. If in this way enough s secured for only one acre it will be sufficient to demonstrate the alue of the work, and when once convinced that it pays the effort in he direction of continued improvement will be followed as a matter of elf-interest.

We are not pressing this subject because we believe the farmers to be ignorant of the facts to the extent that they are indifferent, and as a class whose welfare is so closely allied to the welfare of all other nterests and the country at large, they should not be indifferent to any effort that promises to better their condition. Wherever there is a school house in a farming community there should be a Farmers' Club, where not only such subjects as seed-breeding and seed-selection can be considered, but where all questions affecting their interests can be discussed and acted on, where the results of experiments can be made known, and where by acting together in different ways much can be done for the benefit of the community which individual effort may not be able to accomplish.

More than 1,500 fine-blooded, high-class hogs were exhibited last fall at the Nebraska State Fair. When the writer was told this he suggested to the Secretary of the Nebraska Agricultural Society that they must have a great many breeders of thoroughbred hogs in Nebraska. "We have," said the Secretary; "you see, Farmers' Clubs are very numerous in this State, and they send out men to scour the country for the best boars that can be had and the clubs buy them and establish them in their several communities. Then if the individual farmer can afford to buy one thoroughbred sow he soon has some thoroughbred hogs, and in this way you may say we have an unlimited number of thoroughbred breeders, while the Nebraska hog is coming to the front as the best in the country." The same Secretary went on to explain that while the Nebraska Farmers' Clubs, by coöperative effort, were raising the standard of the Nebraska hog, they were also doing much in the same way to improve the Nebraska horse, cow, and sheep. In this respect Nebraska is simply doing what is being done in practically all of the Eastern and Middle Western states. These same clubs have annual exhibits in the fall of the year of farm and garden seeds which afford the members an opportunity to study points of excellence and make comparisons. When the fair is over they auction off the samples to the highest bidder, and for the best the bidding is generally quite spirited, as the Eastern farmer has become thoroughly convinced of the great value of choice seed.

WORLD INDUSTRIAL NOTES.

Valuable Liberian timber is available for the American markets, reports Consul-General Lyon, of Monrovia. The woods comprise red and white mahogany, red and white whistmore, red and white oak, cedar, cherry, corkwood, brimstone, and mulberry. Mr. Lyon gives the name of a business man [which is on file at Bureau of Manufacturers] who desires to ship this timber direct to the United States.

C. G. Hopkins shows that as an average of forty-two different tests by the Ohio Station, extending over a period of seven years, "the average value of farm manure was found to be $1.99 per ton, measured in increased crop yields produced, but when 40 pounds of finely ground rock phosphate were added to the ton of manure, its average value was found to be $3.23 per ton, making an increased value, due to the addition of the phosphorus, of $1.24 per ton of manure." The 40 pounds of rock phosphate used cost about 16 cents.

According to Consul-General George E. Anderson, at Rio de Janeiro, the linen industry of the world may possibly be revolutionized by the discovery and development of a linen plant indigenous to Brazil and some of the great fertile plains of South America. The new plant is known as "Canhamo braziliensis perini" or "Brazilian linen." It is named for its discoverer, Dr. Victorio Antonio de Perini, and its practical development is now being effected upon several experimental plantations, the most notable of which is at Boa Vista, in the State of Rio de Janeiro. The development was commenced with the assistance of the State government and has continued to a point where it may be stated without question that the fiber is a success and that its influence will be felt at once in the fabric world. The product of the plantations now established has been contracted for by British interests at a very profitable rate. One of the plantations established includes an area of 500,000 square meters of the growing plants at Rodeiro, and the one at Boa Vista will soon have over 2,000,000 square meters.

Consul J. C. McNally furnishes from Liege the following statistics of the consumption of strong drink and tobacco in Belgium: The population in 1905 was 7,074,910, and the consumption of beer reached the enormous quantity of 428,018,990 gallons, of which 422,618,714 represented home manufacture, while 5,400,276 gallons came from abroad. The consumption of foreign alcohol was 325,447 gallons, while that of home manufacture was 12,963,986 gallons. The consumption of foreign tobacco was 25,547,427 pounds, and of home-raised 26,742,273 pounds. The yearly consumption of beer per head was about 60 gallons, of wine about 5 quarts, alcohol (50°) about 8 quarts, and tobacco about 7 pounds.

There are no modern dairies in Panama, but in the Canal Zone, in the city of Panama, and throughout the interior, establishments may be found where cows are kept and milk, such as it is, is furnished to consumers. The management of these so-called dairies is carried on in a very primitive manner and furnishes a poor quality of milk and which, in quantity, is not sufficient to supply the demand. The milch cows are rarely given shelter, very little care is taken of them, they being compelled to forage around for feed. Milk is sold at from 20 to 30 cents gold per quart, and is usually watered before it reaches the consumer, and, poor as it is, is hard to obtain. Hence, condensed milk and evaporated cream have taken its place almost completely in hotels and private houses.

The total value of the exports of American provisions and dairy products for the year ending June 30, 1906, was $210,990,065, against $169,998,873 in 1905. The exports include 64,523,359 pounds of canned beef, valued at $6,430,446; 268,054,227 pounds of fresh beef; 4,719,805 pounds of cured beef; 361,210,563 pounds of bacon; 194,267,949 pounds of hams; 155,265,158 pounds of pork; 741,516,886 pounds of lard; 221,452,249 pounds of oleo oil and oleomargarine; 7,926,786 pounds of sausage; 27,360,537 pounds of butter, and 16,562,451 pounds of cheese.

Consul Covert, of Lyons, in a report on artificial silk, says: Several varieties of artificial silk are in the market in France, displayed in some of the stores and offered for sale at figures much below the genuine article. Next to Chardonnet the viscose is the most common. It is one of the valuable forms of dissolved cellulose, which may be precipitated and made to assume almost any form desired; that is to say, it may be precipitated into filaments of thread as fine as a spider's web or in masses that can be made as hard as rubber.

The British Board of Trade is not only sending commercial agents to Canada, but is dispatching commissioners acquainted with the various countries to South Africa, Australia, South America, Siberia, and Persia. The Canadian representative will visit every considerable place from Halifax to Victoria.

It is recognized by the highest medical authorities that disease germs are widely scattered by the dust clouds which motor cars place in motion, and that the dust thus circulated is one of the causes of consumption and diseases of the throat and lungs. Merchants' stocks are also damaged. Many protests and demands for relief have been made. Liverpool has been working on remedies, and satisfactory results have been secured through the use of oil sprinkled upon macadam roadways. The surface having the cleanest and whitest appearance was that coated with creosote oil mixed with rosin, while that covered with creosote oil mixed with tallow had the least odor. The surface covered with ordinary petroleum was the first to show the dust. The next in order was a mixture of creosote oil with rosin and tallow, and then the hot creosote oil alone. Creosote oil mixed with pitch, cold creosote oil, and hot creosote oil mixed with a small quantity of pitch gave good results, but the latter gave a bad appearance. The heavy black oil (coal-tar waste oil) lasted slightly longer than the creosote oil and was much cheaper. The Texas crude petroleum gave the most lasting results, and portions of the road heavily coated with this oil showed a somewhat glazed surface formed of oil and dust. From the standpoint of the wear and tear of the road surface, the oiling on the whole has proved advantageous.

According to reports received at Melbourne, Consul-General Bray states that recent shipments of chickens from Australia to England have been very successful. Size and uniformity must be adhered to, and white-legged fowls are most acceptable in London, being worth 6 pence (12 cents) per head more than others. Chickens weighing three or four pounds sell best, and it is said 5,000 cases could be taken next season if received at the proper time and in good condition.

Consul F. W. Mahin reports that the price of illuminating gas in Nottingham, under municipal control, is 60 cents per 1,000 cubic feet to ordinary consumers, with a slight reduction to large users. This has been considered quite a low price, but seems extortion in comparison with the rate given by the town of Widnes, in Lancashire. The price there is now 32 cents to small consumers. Large consumers pay from 22 to 26 cents.

Consul Marshal Halstead, of Birmingham, England, writes: "It is my opinion that if some association were to give a demonstration of proper methods of cooking and treating dried and evaporated fruits at some of the food exhibitions held annually throughout England, or if the demonstrations were given on the same system which American breakfast food manufacturers employ, the sale of dried and evaporated fruits would greatly increase. The sale of canned fruits, my informant said, was very large, but bottled goods have a small sale, owing, no doubt, to the fact that the cost is so great."

Many German concerns own dwelling houses, and rent them to workmen at actual cost. They provide restaurants and meals at actual cost, furnish fuel at wholesale cost, give transportation in whole or part to employés living at a distance, pay pensions in certain cases, and work people's reading rooms, baths, hospitals, savings banks, and cooking schools for girls are maintained.

The canning factories now working in Spain number 268, of which 147 are exclusively devoted to sardines, and the remaining 121 to fruits and vegetables.

Consul A. Gaulin, of Havre, quotes the statement of the Feuille Vinicole de la Gironde that the world's wine crop in 1905 reached nearly 4,000,000,000 gallons, divided among the different countries approximately as follows:

	Gallons.		Gallons.
France (including Algeria and Tunis)	1,710,900,000	Switzerland	22,190,000
Italy	856,520,000	Australasia	7,925,000
Spain	428,000,000	Servia	6,605,000
Austria-Hungary	192,800,000	Oceania	6,605,000
Portugal	108,320,000	Brazil	5,600,000
Germany	79,600,000	Cape Colony	4,490,000
Russia	76,620,000	Azores, Canary, and Madeira Islands	3,830,000
Chile	74,200,000	Uruguay	2,780,000
Roumania	52,840,000	Peru	2,400,000
Argentine Republic	34,350,000	Bolivia	610,000
Turkey	34,350,000	Mexico	425,000
United States	34,000,000		
Bulgaria	29,100,000	Total	3,775,060,000

Europe gave over 95 per cent of the total yield and North and South America about 4 per cent. France alone produced 45 per cent, and France, Italy, and Spain combined 78 per cent. It may not be uninteresting to note that France is the largest importer, as well as the largest exporter of wine in the world.

WHAT THE FAIRS TEACH.

From "North Pacific Rural Spirit."

Our agricultural fairs are indicators of the progress of our agriculture. To those who have attended these institutions for a number of years, the advancement is more than apparent; it is self-evident. The marked improvement in live stock shown, the increased amount of improved machinery, the better quality of farm products and fruits, all show the signs of progress. The farmer himself is a far different person from the farmer who attended the fairs of half a century ago. The man who brings his family to the fairs to-day is well dressed and has all the appearance of thrift, and if you happen to engage him in conversation he will surprise you with his general knowledge of things. The individual with unkempt hair and clothing, trousers thrust in his boots and with a timothy straw in his mouth, which one sees so often in caricatures, is a thing of the past. He is no more, nor ever will be. He is a changed person. Why all this change? The farmer of the present day is a man who reads and thinks. As Secretary Wilson said: "The farmer of the past went to church behind a yoke of oxen, but the farmer of to-day rides in the latest types of vehicles and wears diamonds."

There are few sections of the country where the population fails to grasp the present opportunities, but they are growing increasingly smaller. As the farmer reads and thinks, he grows better live stock, improves his farm and grows better crops, builds better houses and dresses himself and family better—in fact, his standard of living is raised. The difference between farm and city life, as to the greater advantages of the latter, are fast disappearing, and the former will soon be the more desirable of the two. The fairs are good places to study these changes, for, as the farmer progresses, he makes himself more evident by better exhibits of all kinds, and much of the success of our recent fairs should be attributed to the farmers as well as the fair management.

CALIFORNIA'S CEREAL WEALTH.

The Legislature of 1905 passed an Act requiring the Supervisors of the different counties of California, through a statistician to be appointed by them for the purpose, to report certain statistics to the State Agricultural Society once each year, on blanks to be provided by the latter for the purpose. Under this Act the first reports came in the latter part of 1905 and the figures given were to cover that year. All the counties did not report, and some have not reported for 1906. A few Boards of Supervisors seem disposed to ignore the law, in spite of entreaty or protest. But from those that reported some figures are obtainable of more than passing interest. In considering these figures which we take from the returns for 1905, the reader must remember they are the first reports sent in and the statisticians did not have their work so well in hand as they will after some practice and a little study of the conditions. They can at least be regarded as a fair approximate to the facts.

THE CEREAL OUTPUT FOR 1905.

Taking the returns for forty California counties, therefore, out of a total of fifty-seven counties, we find the cereal acreage, and yield and value for 1905 to be as follows:

Wheat, 1,265,810 acres; yield 409,831 tons, or 13,661,034 bushels, valued at $11,105,595.
Barley, 1,186,105 acres; yield 440,995 tons, or 17,639,800 bushels, valued at $9.426,518.
Oats, 190,865 acres; yield 173.200 tons, valued at $4,157,981.
Corn, 47,982 acres; yield 76.197 tons, valued at $866,136.
Rye, 25,669 acres; yield 10,981 tons, valued at $67,934.

This gives a total grain acreage of 2,716,429; a total yield of 1,111,204 tons, of a total value of $25,624,164.

The same reports from the same counties give the hay crop for the same year as follows:

Alfalfa hay, 260,577 acres; yield 1,249,650 tons, worth $15,096,611.
Grain hay, 2.007.922 acres; yield 2,285,323 tons, worth $16,486,987.
Grass hay, 114,766 acres; yield 162,400 tons, worth $716,400.

These give a total hay acreage of 2,383,268; total yield, 3,697,373 tons; total value, $32,299,998.

These figures show the total value of hay and grain to be $57,924,162. It is significant, however, that while the hay acreage is 333,171 less than the acreage of grain, the value of the hay crop is $6,675,834 more than the value of the grain crop.

These figures are aggregated from the returns from forty counties. Taking them as a basis it is safe to add to them one third in lieu of the output of the seventeen delinquent counties. To arrive at an estimate for the whole State, on this basis we find the total grain acreage of the State to be 3,621,905, the total grain yield 1,481,606 tons, and the total value of all grain $34,165,554. The total hay acreage would be 3,177,690, the total hay yield 4,929,830 tons, and the total value of all hay would be $43,066,664. These figures give a grand total acreage of grain and hay in California of 6,799,595, a total yield of 6,411,436 tons, of a total value of $77,232,218.

THE CEREAL OUTPUT FOR 1906.

For the year 1906 there were forty-eight counties that sent in reports, and these show a total cereal acreage, and yield and value as follows:

Wheat, 1,458,284 acres; yield 720,023 tons, or 24,000,767 bushels, valued at $13,289,904.
Barley, 1,750,756 acres; yield 849,490 tons, or 33,979,600 bushels, valued at $16,987,575.
Oats, 314,507 acres; yield 131,126 tons, valued at $3,331,980.
Corn, 71,879 acres; yield 65,106 tons, valued at $1,532,520.
Rye, 21,158 acres; yield 6,629 tons, valued at $286,255.
Buckwheat, 400 acres; yield 300 tons, valued at $7,500.

This gives a total grain acreage of 3,616,984; a total yield of 1,772,674 tons, of a total value of $35,425,734.

The same forty-eight counties give the hay crop for 1906 as follows:

Alfalfa hay, 338,788 acres; yield 1,400,822 tons, valued at $8,713,903.
Grain hay, 1,822,380 acres; yield 2,636,979 tons, valued at $21,628,294.
Grass hay, 54,633 acres; yield 75,376 tons, valued at $570,230.

These give a total hay acreage of 2,215,801, a total yield of 4,113,177 tons, of a total value of $30,912,427.

These figures show the total value of hay and grain to be $66,338,161, and it will be noticed, as was the case in 1905, that the value of the hay crop acre for acre is considerably more than the value of the grain crop. In other words, while the grain crop shows an average return of $9.80 an acre, the hay crop shows an average return of $13.95 an acre. It is the greater yield and value of alfalfa which enlarges this difference, and yet not altogether, as it will be noticed that the average value per acre of grain hay is $10.80, which is $2 an acre more than the average value of grain. It is often a problem with the farmer whether to cut certain foul grain for hay or not. The showing here would seem to be in favor of cutting everything for hay that will not make good, clean grain.

As we have said, the figures heretofore given are computed from the returns from forty-eight counties. This leaves nine counties that have not reported. There are fifty-seven counties in California all told, and as nine is less than one sixth of fifty-seven, it would be conservative to add one sixth to the foregoing figures to arrive at an estimate for the entire State. On this basis we find the total grain acreage of the State to be 4,219,808, the total yield to be 2,068,113 tons, and the total value $41,330,023. The total hay acreage on the same basis would be 2,585,101, the total hay yield 4,798,705 tons, and the total value $36,014,498. These figures give a grand total acreage of hay and grain for 1906 in California of 6,794,909, a total yield of 6,866,818 tons, of a total value of $77,344,521.

The total figures for 1905 were $77,232,595, showing only $111,926 difference in the aggregate value of the cereal crops of the State for the two years, the slight difference being in favor of 1906.

It is worth something to know the acreage and value of the products under consideration, and the foregoing figures returned to us in two successive years, are given as the best estimate that can be made from the resources indicated.

BEANS AND POTATOES.

Returns from the same forty-eight counties, with one sixth added as an estimate for the products of the nine counties that failed to make returns, show the total bean crop of California for 1906 to be 256,751,714 pounds, valued at $8,060,948; for the same year the total crop of Irish potatoes was 355,794,507 pounds, valued at $3,772,446, and the total crop of sweet potatoes was 34,351,835 pounds, valued at $4,171,139.

The total value of all potatoes and beans is $12,250,532. This amount added to the value of cereals gives a total of $89,595,053 as the value of California's leading agricultural staples (exclusive of products of the tree, vine and garden) for 1906.

THE UNIVERSITY FARM.

By PROF. E. J. WICKSON.

The California Legislature of 1905 made an appropriation of $150,000 for the purchase and equipment of a University Farm and to provide instruction in agriculture in connection therewith. The selection and purchase of the farm were made by a commission: George C. Pardee, Benjamin Ide Wheeler, Alden Anderson, B. F. Rush, and Ellwood Cooper. Upwards of seventy sites were carefully examined and reported upon by an expert appointed by the commission, and the commission visited in a body a considerable number of them. A tract of about 780 acres of first-class valley land contiguous to the town of Davisville, in Yolo County, was finally selected by unanimous vote of the commission and purchased for $103,290. The land is upon the established irrigation system of the Yolo Consolidated Water Company, and water rights covering the whole acreage were purchased by the citizens of Davisville for $3,895.53 and donated to the University.

Thus was secured a splendid plant for both demonstrative and experimental agriculture. It is the most important single contribution which the State has ever made to the development of agricultural education. It will supplement all that has been accomplished on the scientific side by furnishing ample opportunity for instruction in farm policy and practice which have not been adequately provided for hitherto. In the future the University students in the agricultural course will be brought face to face with the practical problems of production, and instruction therein will be given concreteness and directness. There will be also the fullest attention paid to the short courses in the various branches of farming which will enable both old and young to devote themselves for a few weeks or months to studies of the best and most profitable ways to handle plants and animals and to satisfy themselves that these advanced ways are best because they embody the latest science involved in each operation and because the quality and market value of the product demonstrate its economic superiority. The instruction on the farm will duplicate neither the instruction nor the equipment at Berkeley. At Berkeley the work will be chiefly analytical—the taking of things to pieces to learn the character and relations of the parts. At the farm the work will be, in a sense, chiefly synthetical—the connection of the parts, the building up of the highest orders of finished products. In this way the University Farm will serve all classes of students, both young and old, and will afford each, according to his needs, instruction which no other State institution provides. It will not duplicate, nor be a substitute for, high school or college, but will be supplementary to all institutions which undertake to associate agriculture in any form with other educational subjects.

This rich inheritance which comes to the College of Agriculture of the University of California must be taken as evidence of full recognition and appreciation of two things. First, the research work and the popular presentation of its results, by Professor Hilgard, and his staff during the last third of a century, have convinced the people of California that the fullest knowledge of California conditions of climate, soils, and cultures must be had for intelligent and profitable pursuit of the industries which are based upon them. Second, that the equipment and facilities of the College of Agriculture for teaching the practical arts in accordance with the scientific demonstration of local conditions were pitiably meager and inadequate. Hence arose the popular demand that the College should undertake instruction in California farm practice on much broader lines and that it should do this under actual farming conditions on an easily accessible and widely representative farm and should adapt such instruction to the needs and requirements both of those already enlisted in agriculture and of those who intend to secure livelihood directly from the soil. That the State should place all this value in the hands of the College of Agriculture is a complete demonstration that the foundation laid by it in agricultural science was recognized as sound and enduring and that the men who had given their lives hitherto to the building of the foundation could best direct the expansion on the practical side of instruction so that agriculture, known to be practicable under California conditions, should be faithfully and accurately taught. It is an incontrovertible decision that agricultural research and instruction shall be henceforth intrusted to the University of California in accordance with the organic act which brought this institution into existence nearly forty years ago.

The Regents of the University have proceeded energetically with the equipment of the University Farm as an instructional adjunct of the College of Agriculture. The balance of the original appropriation is being used for the construction of a fully equipped commercial creamery, a large live stock pavilion which will also serve as a general auditorium, two cottages for residence of instructors and foreman, and the purchase of live stock. The Legislature of 1907 appropriated $132,000 for additional buildings, which will include a grand farmhouse for dormitory purposes and special structures for horticulture and viticulture, as well as barns, sheds, and shops. It will also provide for large and varied plantings of trees and vines, for a system of irrigation to carry water to all parts of the farm, for the compensation of instructors, and for general maintenance. Courses of instruction are now being prepared and instructional outfits being provided for them. As soon as possible a full descriptive announcement of instruction will be published, and it is anticipated that the University Farm will be open for students during the coming autumn.

Berkeley, March, 1907.

RESOURCES

OF THE

STATE OF CALIFORNIA.

(BY COUNTIES.)

ALAMEDA COUNTY.

Alameda County fronts the bay of San Francisco for a distance of 38 miles, with an average width of 25 miles, extending to and beyond the summit of the Contra Costa hills, comprising numerous beautiful valleys, besides the broad Alameda Valley, which last is bounded by the waters of the bay on the one side and the Contra Costa hills on the other, and is one of the richest and most fertile valleys in the State.

The principal stream is Alameda Creek. There are other creeks crossing the county and emptying into the bay, two of which furnish water for the city of Oakland. The country around Hayward is one of the great fruit-raising regions, many millions of pounds being shipped annually.

The soils immediately along the bay in Alameda Valley and the marshes formed by the overflow are heavy, but very fertile when reclaimed. Then comes a broad belt of rich, black adobe that is crossed by deposits of alluvium made by shifting channels of streams running down from the Coast Range. In the Niles region are lighter loams. About Livermore are uplands, bench and valley lands. Between the latter two classes the variation in potash, lime, and phosphoric acid accounts for difference in grape crop. Mission San José is characterized by gravelly, upland, adobe soil, and was evidently chosen by the padres of the old Spanish mission for its exemption from frost, caused by its slight elevation above the surrounding valleys. The Pleasanton section consists of agricultural and grazing lands. The soil is a very rich sediment, producing hay, grain, potatoes, hops, and beets in abundance. At Alvarado the surrounding country is a fine farming and fruit region, and gardening and dairying are largely carried on. The fertile, alluvial soil is finely adapted to fruit-growing.

The average rainfall of the county is about 30 inches.

Alameda County was among the first to begin the planting of orchards and vineyards. This county is divisible into three sections—the cherry district, the apricot district, and the vineyard district.

From Oakland to Hayward is the home of the cherry, and in an ordinary year this crop is good for a profit of a quarter of a million dollars.

The apricot section includes all the region east and south of Hayward, but the center is at Niles. The Alameda apricot is high colored and the flavor exquisite. One of the most popular varieties, the Alameda Hemskirk, was originated here. The other varieties preferred are the Blenheim and the Moorpark. A first-class apricot orchard is easily worth $500 per acre, and some could not be bought for $750 or $800. Apricot trees yield from twelve to twenty tons an acre, worth from $20 to $30 a ton. Thousands of carloads of apricots are shipped annually from this county.

While cherries and apricots are the king and the queen of fruits, there are others which do well, among them being the Bartlett pear. The plum is another fruit which thrives, and the smaller fruits and berries are profitably grown.

In Alameda County are the largest currant patches in the United States. The size of an average currant farm varies from twenty to forty acres. Local canneries pack a great number of cases of this fruit, and thousands of chests of currants are shipped away each year.

Almonds, chestnuts, English walnuts, pecans, beechnuts, and hazelnuts are extensively cultivated.

Alameda is par excellence a vegetable-producing county. It has led in this industry for a long time, and the area devoted to vegetables has been increasing at a rapid rate, since the profit in peas, potatoes, tomatoes, rhubarb, asparagus, and several other vegetables is large enough to tempt the owners of the best soil to go into the business.

There are 8,000 acres devoted to vegetables in the county, not including sugar beets, which would add 4,000 or 5,000 acres more.

Many acres in this county are planted to tomatoes, which prove to be a most profitable crop. It is not unusual to find 100 acres of tomatoes growing upon a single farm.

The potato crop is of increasing importance, since it has been found that there is good money in the big Burbank potatoes and other commercial varieties. The best soil will produce from 75 to 80 sacks to the acre, although record yields of 150 sacks have been produced.

The growing of peas for canning has assumed importance. The output of the San Leandro cannery, located in this county, has reached as high as 1,200 cases per day, and 3½ tons of peas have been grown upon a single acre. These peas are sold for $30 per ton.

One of the prosperous agricultural industries is the growing of rhubarb for the California and Eastern markets.

The hop industry is chiefly located near Pleasanton, and during the picking season employment is given to some 2,000 pickers. The Pleasanton hop yards are the largest under one wire in the world. Over sixteen million pounds of cable and of trellis wire are used for the network that spans the twenty-foot poles to sustain the weight of the full-grown vines.

California was the first State in the Union to manufacture beet-sugar on a commercial scale. In Alameda County it has been manufactured for the past thirty-three years. Within her borders is located not only the pioneer beet-sugar factory of this country, but also one of the largest factories in the world. The annual production of beet-sugar in California exceeds that of any other State. Last year the factories produced 100,000 tons of sugar. The product of the land used for this industry is annually worth $10,000,000. In this State are eight factories engaged in the industry. The amount invested in these factories, including working capital, is $20,000,000. Beets in Alameda County average over 14 per cent sugar of 88 per cent purity, and they yield an average of 15½ tons to the acre. The planting season extends from the first of February to the middle of May. This provides a long period of activity for the factory, which begins operations in August, and has continuously maturing crops of beets to handle. Last year there were in Alameda County over 3,041 acres planted to beets. This land produced 45,000 tons of beets, the value of which was $225,000.

The average annual output of salt recovered from San Francisco Bay, in Alameda County, is 100,000 tons, including both coarse and fine salt.

Oakland is the county seat, located on the bay opposite San Francisco, and has for its immediate neighbors the cities of Berkeley and

Alameda. These three cities are very prosperous and have a rapidly ncreasing population.

The University of California is located near the city of Berkeley, and has an average attendance of 3,500 students.

STATISTICS OF ALAMEDA COUNTY, 1905-6.

General Statistics.

Area, 840 square miles, or 537,600 acres.

Number of farms	2,484
Number of acres assessed	441,480
Value of country real estate	$15,229,950
Of improvements thereon	$6,060,075
Of city and town lots	$46,296,550
Of improvements thereon	$35,914,325
Of personal property	$17,262,356
Total value of all property	$120,763,256
Expended on roads, last fiscal year	$400,000
Expended for bridges, last fiscal year	$150,000
Number of miles of public roads	824
Road levy per $100, 1906	40 cts.
Value of county buildings	$825,000
Miles of streets, towns and cities	439
Railroads, steam—miles, 134.90; assessed value	$2,071,751
Railroads, electric—miles, 158; assessed value	$4,446,400
Electric power plants—5; assessed value	$339,425
Electric power lines—miles, 60; assessed value	$46,800

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	5,253	3,116	$87,256
Barley	17,436	12,242	302,148
Oats	8,476	4,376	137,808
Corn	1,446	786	20,649
Total cereals	32,611	20,520	$547,861
Alfalfa hay	762	2,862	$25,758
Grain hay	60,224	87,754	1,053,048
Total hay	60,986	90,616	$1,078,806

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	34,542	7,243	41,785
Apricot	279,351	68,211	347,562
Cherry	100,801	19,904	120,705
Lemon	750	250	1,000
Olive	3,700	1,000	4,700
Orange	1,200	700	1,900
Peach	21,750	2,160	23,910
Pear	59,889	11,660	71,549
Plum	27,250	4,250	31,500
Prune	154,575	36,500	191,075
Quince	3,750	300	4,050
Almond	47,975	4,200	52,175
Walnut	3,000	2,400	5,400
Total fruit trees	738,533	161,278	897,311

Fruit Trees and Vines—Continued.

		Bearing.	Non-Bearing.	Total.
Table grapes	acres	145	------	145
Wine grapes		4,125	------	4,125
Total acres grapes		4,270	------	4,270
Blackberries	acres	10	------	10
Currants		265	------	265
Gooseberries		25	------	25
Raspberries		15	------	15
Strawberries		12	------	12
Total acres berries		327	------	327

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value
Almonds	602,331	$72,279
Apples (boxes)	43,670	26,202
Apricots	12,971,663	324,275
Asparagus	1,490,500	59,620
Blackberries (crates)	1,810	5,430
Beans, string	334,000	5,010
Beets, table	541,400	4,872
Cabbage	1,601,420	9,608
Celery	35,000	700
Cauliflower	20,000	600
Corn, table	2,972,500	29,725
Currants	801,000	8,010
Cherries	1,201,000	72,060
Gooseberries	54,250	1,620
Grapes, wine (tons)	5,550	124,875
Grapes, table (tons)	265	7,950
Onions	40,000	750
Pears	4,989,750	74,778
Peaches	783,920	11,758
Peas	13,575,000	135,750
Plums	924,250	9,242
Irish potatoes	8,934,000	89,340
Sweet potatoes	37,625	376
Prunes	2,387,975	119,399
Quinces	22,500	225
Raspberries (crates)	1,195	5,955
Strawberries (crates)	650	1,950
Tomatoes (tons)	19,000	133,000
Walnuts	175,000	25,000
Rhubarb	3,805,000	57,000
Dried—	Pounds.	Value.
Apples	53,750	$5,375
Apricots	84,900	5,094
Beans, string	322,000	9,660
Cherries	20,000	2,000
Onions	826,000	8,260
Pears	206,500	16,520
Peaches	15,700	785
Peas	225,025	2,250
Plums	2,575	128
Prunes	450,675	18,055
	Cases.	Value.
Canned fruits and vegetables, all kinds	600,000	$1,500,000

STATISTICS OF ALAMEDA COUNTY, 1905-6—Continued.

Wines, Brandies, Etc.

	Gallons.	Value.
Wine—Burgundy	30,000	$6,000
Cabernet	20,000	5,000
Burger	4,500	1,150
Champagne Sable Blanche	4,500	1,150
Chateau Iquem	1,200	720
Claret	575,000	116,000
Hock	20,000	46,000
Golden Chasselas	2,000	600
Riesling	16,500	3,600
Sauterne	140,000	4,200
White Wine	60,000	24,000
Zinfandel	115,000	28,000
Totals	988,700	$236,420
Beer (barrels)	78,350	391,750
Brandy (gallons)	9,750	4,875

Livestock Industry.

	Number.	Value.
Cattle—Beef	5,000	$150,000
Stock	14,125	310,750
Thoroughbred	300	13,500
Dairy Cows—Graded	9,950	298,500
Guernsey	1	--------
Herefords	30	--------
Holsteins	130	--------
Jersey	101	--------
Polled Angus	1	--------
Red Polled	27	--------
Shorthorns	30	--------
Calves	6,000	48,000
Swine	6,397	41,580
Horses—		
Thoroughbred	511	204,460
Common	22,619	2,488,090
Colts	1,147	57,350
Mules	310	28,470
Sheep—Common	6,917	22,480
Lambs	4,405	13,215
Angora Goats	41	148
Common Goats	59	177
Wool (pounds)	415,000	--------
Mohair (pounds)	350,000	76,902

Dairy Industry.

	No.	Production.	Value.
Creamery products	17	------	$1,031,480
Dairies	87	------	-------
Butter (pounds)	--	2,400,969	720,892
Milk (gallons)	--	3,638,110	727,622

Poultry and Eggs.

	Dozen.	Value.
Chickens	19,750	$88,750
Ducks	800	4,000
Geese	120	720
Turkeys (pounds)	30,225	6,045
Eggs	1,117,523	390,133
Total value		$489,648

Miscellaneous Products.

	Pounds.	Value.
Hops	300,000	$33,000
Garden and flower seeds	------	30,000
Sugar beets (tons)	45,000	225,000

Manufactories.

	Number of Employés.	Value of Product.
Bookbinderies	----	$50,000
Paper boxes	----	30,000
Wood boxes	----	474,000
Boat building	500	1,807,725
Brooms	----	31,467
Cigars	350	1,284,100
Clothing	600	1,987,330
Acids, etc.	140	450,000
Confectionery	500	1,300,820
Chemicals, paste, etc.	----	750.000
Crackers	20	100,000
Flouring mills (milling, all kinds)	350	2,551,567
Farming implements, etc.	50	116,495
Jewelry	100	300,000
Leather goods	200	500,000
Job printing	375	685,180
Machinery	6,500	11,224,958
Matches	20	55,000
Meat products	500	1,726,556
Hides		250,000
Lard		250,000
Meat packed		250,000
Tallow		100,000
Pickles, vinegar, etc.	200	750,000
Sewer pipe	150	500,000
Planing mills	750	2,450,900
Potteries, sewer pipe, etc.	500	2,000,000
Salt	225	375,000
Soap	68	250,000
Sugar, beet	50	475,750
Tanneries	30	155,844
Tin and galvanized iron, stoves, etc.	35	180,000
Paints, oils, etc.	150	1,000,000
Yeast	10	20,000
Wood turning and carving	12	50,000
Cotton, silk, hemp and jute	600	1,060,492
Wagons and carriages	25	115,150

Productions Shipped Out of State.

	Employés.	Value of Product.
Crushed rock	450	$855,178
Felting, roofing material and paraffine paints	450	600,000
Unsegregated	178	650,000

Summary.

Total manufacturing	$38,331,026
Total agriculture	13,158,370
Total	$51,489,396

BUTTE COUNTY.

Butte County has an area of 1,777 square miles, and has three sections—mountain, foothill, and plain. It is situated in the northern part of California, yet is warmer in winter than Florida. There is an abundance of rain, and the supply of water for power and irrigation is unlimited. The county has the Sacramento River on the west, navigable for steamers all the year. The Feather River and its three great branches drain an area of 4,000 square miles.

The California and Oregon Railroad, a part of the Southern Pacific system, traverses the county north and south. The Butte County Railroad, the Northern Electric, and the Western Pacific Railroad are in the northern and eastern parts.

Butte County produces all kinds of citrus and decidous fruits. At an elevation of 3,000 feet, on the Cohasset ridge, are grown the finest of apples without irrigation. Mr. Polk received a silver medal for apples at the St. Louis World's Fair.

The county produces the best of farm products.

The Government Plant Introduction Garden is located in Butte County.

The Diamond Match Company of Chico employs 500 men.

Oroville, the county seat, is the center of the largest dredge mining field in the world. There are 45 dredges in operation, employing 2,500 men.

The important towns of Butte County are Chico, Oroville, Gridley, Biggs, Stirling City, Honcut, Magalia, and Paradise.

STATISTICS OF BUTTE COUNTY FOR 1906.

General Statistics.

Area, 1,727 square miles, or 1,100,800 acres	
Number of farms	1,553
Number of acres assessed	879,248
Value of country real estate	$12,684,560
Of improvements thereon	$1,984,042
Of city and town lots	$2,360,030
Of improvements thereon	$3,027,255
Of personal property	$4,142,630
Total value of all property	$25,765,310
Expended on roads, last fiscal yr.	$58,827
Expended for bridges, last fiscal year	$34,282
Number of miles of public roads	1,600
Road levy per $100, 1906	40 cts.
Value of county buildings	$147,000
Irrigating ditches—miles, 343¾; cost	$958,640
Railroads, steam—miles, 91; assessed value	$1,130,687
Railroads, electric—miles, 22.89; assessed value	$38,005
Electric power plants—4; assessed value	$96,500
Electric power lines—miles, 97; assessed value	$32,250
Number of acres irrigated	9,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons	Value.
Wheat	77,656	30,362	$771,529
Barley	37,212	22,014	430,504
Oats	4,118	5,000	150,000
Corn	950	1,390	41,060
Total cereals	119,936	58,766	$1,393,093
Alfalfa hay	6,031	44,328	$145,968
Grain hay	48,357	64,785	647,850
Grass hay	430	723	6,690
Total hay	54,818	89,836	$800,508

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	41,295	11,695	52,990
Apricot	16,014	505	16,519
Cherry	7,479	1,071	8,550
Fig	9,450	826	10,276
Lemon	1,011	247	1,258
Nectarine	2,127	21	2,148
Olive	60,000	7,593	67,593

STATISTICS OF BUTTE COUNTY FOR 1906—Continued.

Fruit Trees and Vines—Continued.

	Bearing.	Non-Bearing.	Total.
Orange	148.887	39,435	188.322
Peach	186,352	52,753	240,105
Pear	35.359	5,287	40.646
Plum	6.785	210	6,995
Prune	111,059	19,397	130.496
Quince	1.020	23	1,043
Other kinds	5.000	----	5,000
Almond	79,190	19,304	98,494
Chestnut	193	30	223
Pecan	102	8	110
Walnut	2.626	444	3,070
Total fruit trees	713,449	158,851	873,838

		Bearing.	Non-Bearing.	Total.
Raisin grapes	acres.	333	-----	333
Table grapes		237	37	274
Wine grapes		174	72	246
Total acres grapes		744	109	853

		Bearing.	Non-Bearing.	Total.
Blackberries	acres.	87	----	87
Currants		10	----	10
Gooseberries		5	----	5
Loganberries		22	----	22
Raspberries		40	----	40
Strawberries		19	----	19
Total acres berries		183	----	183

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	2.318.000	$34.760
Apricots	31.000	1.240
Asparagus	2,750	1.750
Blackberries	301,475	24.086
Beans	112,850	4.585
Beets	28,580	286
Cabbage	144.500	2,890
Celery	1.200	150
Cauliflower	8.000	320
Corn	232.020	3,480
Currants	9.050	724
Cherries	134.630	8.075
Figs	125,100	1,777
Gooseberries	1.000	40
Grapes	816.900	16,340
Grape-fruit	496.300	4.965
Lemon (boxes)	1.090	2,180
Loganberries	116.240	8,137
Nectarines	177.000	3,540
Onions	2,500	50
Orange (boxes)	466 079	559,113
Olives	1,446,000	44,880
Pears	1,993,150	28,797
Peaches	2,967,215	70,827
Peas	30,950	619
Persimmons	15.800	574
Plums	154,700	1,547
Irish potatoes	1,348,100	13,481
Sweet potatoes	230.350	2,305
Prunes	2.025.500	20.255
Quinces	81,400	1.628
Raspberries	21,835	1,528
Strawberries	38.550	30,840
Tomatoes	520,500	5,205
Total value		$1,600,634

Fruits, Vegetables, Etc.—Continued.

Dried—	Pounds.	Valu
Almonds	119.580	$17,91
Apples	4.000	20
Apricots	1.000	12
Beans	36,600	106,71
Chestnuts	7.900	79
Figs	790.350	22,71
Nectarines	2,800	28
Onions	191,000	1,81
Pears	114,470	9,15
Peaches	2,326,277	232,62
Plums	52.930	3,69
Prunes	7,084,900	106,27
Raisins	370,275	18,51
Walnuts	66,800	6,68
Totals	11,167,882	$527,48

Canned—	Cases.	Value.
Apricots	5,600	$20,000
Blackberries	325	1,137
Pears	5,000	12,500
Peaches	70.200	210,600
Tomatoes	1,550	2.325
Totals	82,675	$246,562

Wine—Salmon.

Butte County reports an output of 6,100 gallons of claret wine, worth $3,050; and 20,000 gallons of vinegar, worth $200.

It also reports a catch of 160,000 pounds of salmon, worth $6,000.

Livestock Industry.

	Number.	Value.
Cattle—Beef	5.240	$157,200
Stock	29,849	498,435
Dairy Cows—Graded	1,500	60,200
Guernsey	27	1,515
Herefords	127	3,810
Holsteins	164	4,920
Jersey	115	5,750
Polled Angus	50	1,500
Red Polled	42	1,260
Shorthorns	1,818	32,720
Calves	5,383	45,361
Swine	19,861	118,16
Horses—		
Thoroughbred	144	150,32
Standard-bred	139	41,78
Common	9,397	971,36
Colts	1,171	46,84
Mules	2,975	446.25
Sheep—Common	98,910	395,64
Lambs	21,050	52,62
Angora Goats	1,506	6,21
Common Goats	303	60
Total stock all kinds	199,771	$3,038,28
Wool (pounds)	747,322	$101,64
Mohair (pounds)	3,280	72

Dairy Industry.

	No.	Production.	Value
Creameries	1	28.000	$8,40
Butter (pounds)	--	58,750	14,64
Cream (gallons)	--	480	48

STATISTICS OF BUTTE COUNTY FOR 1906—Continued.

Poultry and Eggs.

	Dozen.	Value.
Chickens	58,183	$290,915
Ducks	209	1,254
Geese	42	504
Turkeys	1,621	44,300
Eggs	2,949,150	737,287
Total value		$1,074,260

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Brick	1	6	350,000	$36,400
Cigars	3	14	500,000	15,000
Confectionery (pounds)	4	8	14,500	2,900
Flouring mills (barrels)	2	14	17,295	70,000
Repair shops	8	500	------	------
Matches	1	5	------	------
Meat products--				
Hides (pounds)		----	126,391	44,202
Lard (pounds)		----	24,848	2,182
Tallow (barrels)		----	1,024	12,288
Olive oil (gals.)		----	126,300	378,900
Pickled olives (gals.)		----	42,000	21,000

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 1766		
Beeswax	2,000	$500
Honey	47,540	4,754
Hops	384,000	57,600
Syrup (gallons)	100	25
Sugar beets (tons)	7,669	34,510
Melons (acres)	100	50,000
Pumpkins (tons)	2,515	3,862

Forest Products.

		Amount.	Value.
Area of timber lands	acres.	350,000	------
Cedar		35,000	------
Pine		140,000	------
Fir		175,000	------
Sawmills (number)		14	$270,000
Fuel, wood (cords)		91,117	410,026
Laths		190,000	200
Lumber--Pine (feet)		41,400,000	548,000
Fir (feet)		12,000,000	144,000
Piles		2,200	17,785
Posts (pieces)		4,850	4,300
Railroad ties (pieces)		5,521,600	100,432
Sash and door factories (number)		1	1,500
Shakes		405,000	4,050
Shingles		400,000	25,000

Power used for mills and manufactories in county: Steam--number, 14; electrical--number, 4.

Productions Shipped Out of State.

	Amount.
Wheat	10,000 tons
Almonds	100,000 lbs.
Apples, fresh	20,000 boxes
Apricots, canned	5,000 cases
Cherries, fresh	50,000 boxes
Grape-fruit	800 boxes
Oranges	300,650 boxes
Peaches, dried	135,000 lbs.
Peaches, canned	50,000 cases
Pears, fresh	31,250 lbs.
Pears, dried	75,000 lbs.
Pears, canned	2,500 cases
Prunes, dried	5,112,370 lbs.
Olive oil	80,000 gals.
Olives, pickled	25,000 gals.

CALAVERAS COUNTY.

Calaveras is one of the central counties of the State, lying east of the San Joaquin and Sacramento valleys, and west of the summit of the Sierras.

The chief industries of this county are mining and lumbering. Containing 160,000 acres of excellent timber land, it affords a great opportunity for development in the lumber line. It was made famous by its enormous output of gold, ranking among the leading mining counties of the State.

The great Mother Lode passes through the central portion of the county, and contains some of the richest gold mines of the State, viz: the Gwin, the Angels, the Lightner, the Utica, and the Melones. East of this lode lies our great timber section, wherein are the *Sequoia gigantea*, the largest trees in the world. West and south of the mineral lode is the farming portion of the county.

The principal rivers in Calaveras County are the Mokelumne, forming the boundary line between Calaveras and Amador counties; the Middle Fork, the South Fork, the Licking Fork, and Blue Creek, principal branches of the Mokelumne; the Calaveras River with its tributaries, viz: Calaveritas, San Antone, San Domingo, and O'Neal's Creek, drains the central portion of the county; and the Stanislaus (being the boundary line between Calaveras and Tuolumne counties) with its tributaries.

Three electric power lines run through Calaveras County and extend to nearly every town in the county.

An abundance of rainfall gives this county ample water.

Agricultural pursuits are neglected, owing to the great mining and timber resources.

STATISTICS OF CALAVERAS COUNTY, 1905-6.

General Statistics.

Area, 990 square miles, or 633,600 acres.

Number of farms	2,000
Number of acres assessed	481,762
Value of country real estate	$3,101,340
Of improvements thereon	$1,332,285
Of city and town lots	$201,490
Of improvements thereon	$651,525
Of personal property	$859,720
Total value of all property	$6,146,360
Expended on roads, last fiscal yr.	$20,464
Expended on bridges, last fiscal year	$7,009
Number of miles of public roads	400
Road levy per $100, 1906	33.2 cts.
Value of county buildings	$45,000
Irrigating ditches—miles, 780; cost	$752,000
Railroads, steam—miles, 20.11; assessed value	$250,585
Electric power plants—1; assessed value	$50,000
Electric power lines—miles, 120; assessed value	$60,000
Number of acres irrigated	13,700

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	445	307	$8,420
Barley	505	249	5,040
Oats	1,041	495	12,520
Corn	97	71	2,130
Total cereals	2,088	1,122	$28,110
Alfalfa hay	897	2,720	$21,140
Grain hay	10,335	14,238	166,225
Grass hay	7,707	11,279	107,038
Total hay	18,939	28,237	$294,403

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	14,137	2,201	16,338
Apricot	2,339	180	2,509
Cherry	788	110	898
Fig	2,070	8	2,078
Lemon	26	14	40
Nectarine	220	3	223

STATISTICS OF CALAVERAS COUNTY, 1905-6—Continued.

Fruit Trees and Vines—Continued.

	Bearing.	Non-Bearing.	Total.
Olive	8,262	120	8,382
Orange	1,028	100	1,128
Peach	13,461	1,192	14,653
Pear	4,039	202	4,241
Plum	3,338	154	3,492
Prune	7,190	255	7,445
Quince	412	7	419
Other kinds	77	------	77
Almond	9,035	1,301	10,336
Chestnut	82	20	102
Pecan	------	5	5
Walnut	1,581	380	1,961
Total fruit trees	68,085	6,252	74,337

		Bearing.	Non-Bearing.	Total.
Raisin grapes	acres.	14	2	16
Table grapes		220	48	268
Wine grapes		689	117	806
Total acres grapes		923	167	1,090

		Bearing.	Non-Bearing.	Total.
Blackberries	acres.	26	------	26
Currants		11	------	11
Gooseberries		2	------	2
Loganberries		4	------	4
Raspberries		15	------	15
Strawberries		31	------	31
Total acres berries		89	------	89

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	687,913	$13,341
Apricots	27,440	1,732
Asparagus	15,030	504
Blackberries	63,695	3,636
Beans	105,700	1,771
Beets	60,175	244
Cabbage	224,150	2,354
Celery	3,010	301
Cauliflower	46,000	570
Corn	138,425	2,462
Currants	2,300	19
Cherries	20,110	1,020
Figs	174,685	2,254
Gooseberries	1,000	50
Grapes	3,846,030	40,173
Limes (boxes)	1	5
Lemons (boxes)	177	735
Loganberries	25,180	1,753
Nectarines	1,110	34
Onions	95,300	1,789
Oranges (boxes)	776	2,754
Olives	105,745	4,220
Pears	194,804	3,238
Peaches	530,461	13,023
Peas	32,650	918
Persimmons	100	5
Plums	164,435	2,167
Irish potatoes	585,300	10,811
Sweet potatoes	10,000	200
Prunes	318,275	4,794
Quinces	23,560	522
Raspberries	20,000	600
Strawberries	58,760	2,423
Tomatoes	352,785	5,175
Total value		$125,599

Fruit, Vegetables, Etc.—Continued.

Dried—	Pounds.	Value.
Almonds	89,480	$2,335
Apples	2,210	100
Chestnuts	700	65
Figs	8,715	400
Grapes	1,075	82
Onions	200,930	2,510
Pears	350	32
Peaches	2,570	206
Plums	1,800	150
Prunes	251,230	6,740
Raisins	6,250	312
Walnuts	48,850	5,373
Totals	614,160	$18,305

Canned—	Cases.	Value.
Apples	54	$200
Apricots	26	156
Blackberries	44	220
Beans	9	27
Corn	5	20
Cherries	5	18
Figs	16	80
Grapes	14	42
Nectarines	4	20
Pears	50	200
Peaches	125	600
Plums	20	80
Strawberries	5	25
Tomatoes	183	632
Totals	560	$2,320

Wines, Brandies, Etc.

Number of wineries, 16; number of distilleries, 4; number of breweries 1.

	Gallons.	Value.
Wine—Claret	56,050	$22,420
Port	900	900
Sherry	800	800
Zinfandel	2,000	800
Totals	59,750	$24,920
Brandy	800	800
Vinegar	1,112	343

Livestock Industry.

	Number.	Value.
Cattle—Beef	4,051	$101,250
Stock	22,705	272,460
Thoroughbred	3	225
Dairy Cows—Graded	401	16,040
Jersey	4	200
Calves	10,234	61,404
Swine	3,336	23,352
Horses—		
Standard-bred	54	5,400
Common	3,277	16,385
Colts	423	10,575
Mules	264	26,400
Sheep—Imported	15	150
Common	11,016	33,048
Lambs	5,015	12,537
Angora Goats	54	108
Common goats	2,625	5,250
Total stock all kinds	63,473	$584,784
Wool (lbs.)	98,684	$16,973

STATISTICS OF CALAVERAS COUNTY, 1905-6—Continued.

Dairy Industry.

	Production.	Value.
Creameries, 2.		
Butter (pounds)	55,900	$16,770
Cheese (pounds)	2,300	285
Cream (gallons)	2,100	2,940

Poultry and Eggs.

	Dozen.	Value.
Chickens	3,637	$21,822
Ducks	37	222
Geese	26	182
Turkeys	340	8,500
Eggs	351,585	87,896
Total value		$118,622

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	160,000	--------
Sawmills (number)	8	$75,000
Charcoal (sacks)	6,300	1,890
Fuel, wood (cords)	12,603	53,512
Lumber—Pine (feet)	6,000,000	120,000
Pickets (pieces)	50,000	1,750
Posts (pieces)	17,510	1,760
Shakes	200,000	10,000
Total value		$283,912

Power used for mills and manufactories in county: Steam—number, 17; electrical—number, 9; water—number, 18.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 248	------	$864
Beeswax	15	4
Honey	5,440	1,360

Manufactories.

	No.	No of Employés.	Quantity Produced.	Value of Product.
Carriages and wagons	3	10	85	$18,000
Cigars	1	1	60,000	2,500
Foundries and iron works	1	35	------	75,000
Meat products—				
Hides (lbs.)		----	213,260	139,176
Lard (lbs.)		----	46,676	5,654
Tallow (bbls.)		----	275	1,807
Olive oil (gals.)		----	2,000	4,000
Pickles (gals.)		----	9,706	4,853
Planing mills		8	------	------
Ice plants	5	10	------	------

COLUSA COUNTY.

Colusa County, when a few years ago it included what is now known as Glenn County, was the banner county for wheat-raising. As it is, it still raises large crops of wheat and barley; but as continued grain-raising finally exhausts the soil, the farmers are at last face to face with the fact that the soil is becoming exhausted for grain and needs a rotation of crops. Fortunately there is one thing that will replenish the soil with nitrogen and restore all its wasted vigor, namely: alfalfa. Attention is therefore being attracted to irrigation, and several canals are already in existence, with more to follow in the next few years.

Colusa County is situated in a direct line northerly from San Francisco, the southern line of the county being about one hundred miles from the metropolis. The Sacramento River flows through the entire length of the county and will be the source from which prosperity will spring, for its supply of water is abundant enough to irrigate every acre of land, not only in this county but in the Sacramento Valley.

Thus far the land has been owned by a few people and the small farmer could not compete in grain-raising; nor did the big owner fare as well as he might have done on a very much smaller tract devoted to diversified, if not intensive farming. Gradually some of these enormous tracts are coming on the market, and it is only a question of time until Colusa County will exhibit a sadly belated, but vigorous boom.

The soil is a rich alluvium, on which almost anything grows to perfection. Alfalfa grows like weeds and six crops in one year is nothing unusual.

The ground in several parts of the county is admirably adapted to raisin grapes, even without irrigation; and lands to be had at $60 an acre are this season netting around $160 per acre. Planting and cultivation for three years, until the grapes come into bearing, cost about $40 an acre. These flattering results are inducing new vineyards to be put out, especially in the southern half of the county around College City, Arbuckle, and Williams.

Colusa County oranges command a premium at the best hotels in San Francisco, and at the Midwinter Fair there took first prize. While this industry is only in its infancy, it is growing with rapid strides.

Next to grapes, the largest fruit crop is prunes, and no other part of the State can grow a better prune than does Colusa County.

Dairying is also on the increase, being a well-paying undertaking. The county seat has a creamery, run on the coöperative plan.

Besides the many opportunities in agriculture and viticulture, Colusa County in its western part contains the famous Colusa sandstone quarries. This sandstone stood the test of the San Francisco fire better than any other stone. (See the Kohl building, Flood building, Ferry building, and others.) There are also deposits of gold, copper, cinnabar, and chromic iron, as well as quicksilver, salt, and rubble.

Cook's Springs, and its celebrated Cook's mineral water, Fout's Springs, and others add to the wonderful variety of resources of this highly blessed part of California.

Fish abounds in the river, and geese and ducks are so abundant in winter that it would be dangerous to express it in figures.

The average rainfall is 20 inches, coming between November and April, and insuring cereal and grape results without irrigation.

Besides the Sacramento River, there is Stony Creek, which is to be the source of supply for the proposed national irrigation scheme called the "Orland project."

Climatically Colusa County is highly favored. Sheltered from sea fogs, the number of sunshiny days (almost continuous in one stretch) foots up over two hundred. While the summers are hot during the middle of the day, it is a dry heat which one does not feel nearly as much as a twenty degrees lower temperature in damper climes. Labor can be pursued without hindrance even during the hottest days, and the cool nights are bracing and invigorating. As to the winters, the fact of successful orange culture speaks more strongly than any thermometer readings could.

With a population of about 15,000 on an area big enough to support 600,000, Colusa's future importance is bound to become manifest. Compared with the size of Belgium for instance, Colusa County could easily support 600,000 people, if populated as thickly as is the kingdom of Belgium. In fact, that kingdom does not have as large an arable percentage of land as has Colusa County.

In the foothills to the west lies land admirably adapted to apple-growing. This year an orchardist near Sites took 670 pounds of Ben Davis apples from one of his oldest trees, or over $20 worth. The largest of these apples measured 13 inches around and 4 inches high.

STATISTICS OF COLUSA COUNTY, 1905-6.

General Statistics.

Area. 1,080 square miles, or 691.200 acres.

Number of farms	690
Number of acres assessed	609,596
Value of country real estate	$8,605,316
Of improvements thereon	$593.495
Of city and town lots	$286.380
Of improvements thereon	$662,220
Of personal property	$1,398,402
Total value of all property	$11,545,813
Expended on roads, last fiscal yr.	$30,466
Expended for bridges, last fiscal year	$6,894
Number of miles of public roads	1,255
Road levy per $100, 1906	35 cts.
Value of county buildings	$100,000
Irrigating ditches—miles, 12; cost	$2,300
Railroads, steam—miles, 55.93; assessed value	$602,794
Electric power plants—1; assessed value	$3,500
Electric power lines—miles, 16; assessed value	$1,280
Number of acres irrigated	582

Fish Industry.

	Pounds.	Value.
Black bass	16,091	$1,609

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Asparagus	60,000	$3,000
Blackberries	7,000	350
Beets	5,000	100
Cabbage	40,000	600
Celery	20,000	500
Corn	25,000	300
Grape-fruit	1,980,000	9.900
Oranges (boxes)	1,500	3,000
Pears	641,892	6,420
Irish potatoes	137,500	1,375
Sweet potatoes	31,050	465
Tomatoes	102,000	1,530
Total value		$25,540

Dried—	Pounds.	Value.
Almonds	66,800	$8,350
Beans	141,200	4,236
Figs	13,500	540
Onions	160,000	2,000
Prunes	3,078.600	100,035
Raisins	1,790,000	71,600
Walnuts	4,000	500
Totals	5,254,100	$187,261

STATISTICS OF COLUSA COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Tons.	Value.
Wheat	19,051	$400,071
Barley	65,777	1,249,763
Oats	209	4,807
Rye	42	924
Corn	1,931	38,620
Total cereals	87,010	$1,694,185
Alfalfa hay	2,125	$12,750
Grain hay	27,600	220,800
Grass hay	300	1,200
Total hay	30,025	$234,750

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		6,820	990	7,810
Apricot		18,900	2,000	20,900
Cherry		1,050	350	1,400
Fig		3,875	2,075	5,950
Lemon		550	200	750
Olive		4,000	2,395	6,395
Orange		4,550	2,275	6,825
Peach		10,100	3,975	14,075
Pear		9,875	1,965	11,840
Prune		78,000	3,081	81,081
Almond		23,320	5,120	28,440
Walnut		2,150	1,200	3,350
Total fruit trees		163,190	25,626	188,816
Raisin grapes	acres.	410	20	430
Table grapes		---	----	40
Wine grapes		---	----	50
Total acres grapes		410	20	520
Blackberries	acs.	20	----	20
Loganberries		10	----	10
Total acres berries		30	----	30

Livestock Industry.

	Number.	Value.
Cattle—Beef	2,125	$53,125
Stock	20,600	257,500
Dairy Cows—Graded	2,640	79,200
Calves	5,772	57,720
Swine	23,675	94,700
Horses—Thoroughbred	3	750
Common	3,593	107,790
Colts	1,164	23,280
Mules	3,871	232,260
Sheep—Common	47,600	95,200
Lambs	19,300	24,125
Angora Goats	5,000	10,000
Total stock all kinds	135,343	$1,035,650
Wool (pounds)	476,300	$71,445
Mohair (pounds)	20,000	5,000

Dairy Industry.

	No.	Production.	Value.
Creameries (pounds)	1	258,903	$54,956
Skimming stations	4	------	------

Mineral Water.

	Gallons.	Value.
Cook's Mineral Water Co. (18 employés) — cases, 15,327; 50 bottles each	191,587	$61,308

Poultry and Eggs.

	Dozen.	Value.
Chickens	1,830	$9,150
Turkeys	1,540	27,720
Eggs	198,765	35,777
Total value		$72,647

Forest Products.

	Amount.	Value.
Fuel, wood (cords)	922	$5,532
Lumber, pine (feet)	300,000	6,000
Total value		$11,532

Power used for mills and manufactories in county: Steam—number, 2, sawmill and flour mill.

Miscellaneous Products.

	Pounds.	Value.
Bee (hives)—No., 873	- ----	$873
Broomcorn	364,000	13,650
Honey	21,815	2,181
Alfalfa seed	60,000	6,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Cigars	2	4	210,000	$10,500
Flouring mills (barrels)	1	6	15,000	60,000
Lime (barrels)	--	--	225	506
Hides (pounds)	--	--	2,745	10,980
Lard (pounds)	--	--	72,200	9,025
Tallow (bbls.)	--	--	132	1,650
Sandstone (cubic feet)	2	46	131,484	65,748
Fruit-packing house	1	66	--------	--------

Productions Shipped Out of State.

	Amount.
Barley	59,200 tons
Hay	900 tons
Wheat	17,531 tons
Almonds	36,200 lbs.
Figs, dried	13,500 lbs.
Prunes, dried	3,078,000 lbs.
Raisins	1,790,000 lbs.
Beans, dried	94,132 lbs.
Wool	476,300 lbs.
Rolled barley	800 tons
Wild game—ducks and geese	101,305 lbs.

CONTRA COSTA COUNTY.

Contra Cosa is one of the central counties, its shore line being within 14 miles of San Francisco. It possesses unusually good traveling facilities, both by rail and by steamer. The county has 70 miles of water-front, nearly all of which is upon deep water, navigable by all vessels engaged in commerce. Over three fourths of its area is cultivated, the balance being used for grazing. The only mountain of any size is Mount Diablo, which is 3,896 feet in height and almost in the geographical center of the county.

About two thirds of the area is rolling and hilly. Lying between the hills are some of the most fertile and beautiful valleys in the State, which are drained and watered by many streams, the banks of which are bordered by oak, sycamore, laurel, willow, etc., while the hills are dotted with oaks, many of which are of large size.

The farming lands in the eastern section are between the foothills and the San Joaquin River. The soil is of a rich alluvial nature, and produces wheat, barley, alfalfa, fruit, and vines. To the northward and between the uplands and the San Joaquin River is a body of tule lands, a large portion of which has been reclaimed, and is some of the most productive land in the State, being a rich deposit of sediment and decomposed vegetation. Alfalfa, asparagus, potatoes, beans, etc., are produced on the largest scale on such lands, the asparagus being shipped East by the carload during the early spring.

The average rainfall is from 18 to 23 inches, which is ample for all purposes of agriculture, horticulture, etc.

In depth, the soil throughout the county shows a remarkable continuity of rich alluvial deposits underlaid by limestone or clay. There is an occasional change to a coarse sandy and gravelly heavy loam of black or brown tint. It has great power for enduring drought, and is easy to work, giving large returns. The soil in the uplands is in character similar to that of the lowlands, and being drier, is for some purposes even better.

Irrigation is not required to insure crops; the abundant rainfall, the absence of evaporating heat, and the moisture-laden breezes from the ocean furnish abundant humidity for all forms of vegetable life without recourse to artificial irrigation.

The many beautiful valleys and the rolling hills are strikingly similar in general characteristics to the gentle slopes of sunny France. Scattered in all directions are numerous small vineyards and orchards that produce rich results. Fruit-growing has proved successful and remunerative.

Grain-raising is very prominent in this county. A very large acreage is planted to wheat, oats, barley, and hay.

The raising of sugar-beets is a growing industry.

Vegetables of all kinds are raised very profitably and on an extensive scale; one very large tract of land is used entirely for the production of asparagus for early Eastern shipment. Potatoes, beans, etc., are also a prolific and profitable crop, especially in the central portion.

Natural feed is abundant, both on the hillsides and at a higher elevation.

Stock-raising is a leading industry, as the reclaimed lowlands for summer grazing and the rolling hills for winter, close together, create conditions whereby a failure is impossible. The stock farms have produced some of the most famous trotting and pacing horses. In addition to the raising of horses, much attention is given to blooded cattle, sheep, and hogs.

Large dairies are conducted, and in the western end the product mostly shipped to the cities is milk, while in the central and eastern parts butter is the main production. Low freight and express rates give unusual advantages.

Contra Costa County is well adapted to poultry-raising. Feed can be obtained cheaper than in other sections where the industry is thriving. The central part of the county is only a few hours' drive from Oakland and suburbs. The demand for eggs is always greater than the supply.

The only important mining industry is the coal mines of Mount Diablo, although some little mining for precious metals has been done.

The terminus of the Santa Fé railroad is located at Point Richmond, and many substantial improvements in the way of wharves, etc., on a very extensive plan, have been constructed.

Port Costa, the shipping point for the bulk of the grain raised in California, has extensive warehouses.

At Pinole are located large stockyards; near Vallejo Junction is the largest smelting works in the State; at Vallona are extensive lumber yards, where ships from Oregon and Puget Sound discharge. At Crockett are flouring-mills; also agricultural works.

STATISTICS OF CONTRA COSTA COUNTY, 1905-6.

General Statistics.

Area, 877 square miles, or 561,280 acres.

Number of farms	1,592
Number of acres assessed	561,267
Value of country real estate	$10,202,010
Of improvements thereon	$3,043,685
Of city and town lots	$2,078,325
Of improvements thereon	$1,515,040
Of personal property	$4,751,785
Total value of all property	$21,590,845
Expended on roads, last fiscal yr.	$64,229
Expended for bridges, last fiscal year	$2,301
Road levy per $100, 1906	35 cts.
Value of county buildings	$425,000
Railroads, steam—miles, 141.33; assessed value	$2,255,581
Electric power plants—5; assessed value	$34,500
Electric power lines—miles, 96; assessed value	$38,750
Number of acres irrigated	10,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	32,790	------	--------
Barley	44,860	------	--------
Oats	17,032	------	--------
Corn	5,000	------	--------
Hay	124,190	274,580	$2,454,150

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		18,195	10,000	28,195
Apricot		69,000	15,200	84,200
Cherry		24,300	9,035	33,335
Fig		3,060	1,100	4,160
Lemon		600	150	750
Nectarine		350	85	435
Olive		28,215	5,120	33,335
Orange		3,050	250	3.300
Peach		35,685	13,000	48,685
Pear		110,000	12,000	122,000
Plum		23,730	1,115	34,845
Prune		69,230	13,055	82,285
Quince		3,000	1,080	4,080
Other kinds		20,095	5,075	25,170
Almond		216.275	101,830	318.105
Chestnut		150	------	150
Pecan		600	------	600
Walnut		15,915	12,990	28,905
Raisin grapes	acres.	350	150	500
Table grapes		2,365	1,100	3,465
Wine grapes		6,080	2,500	8,580
Blackberries	acres.	60	------	60
Currants		40	------	40
Gooseberries		20	------	20
Loganberries		9	------	9
Raspberries		10	------	10
Strawberries		60	------	60

STATISTICS OF CONTRA COSTA COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	345,600	$5,160
Apricots	320,660	12,429
Asparagus	550,000	11,000
Blackberries	56,000	10,000
Beans	26,000	1,100
Beets	35,000	150
Cabbage	150,000	850
Celery	500,000	9,000
Corn	61,729	650
Currants	10,000	325
Cherries	120,000	12,000
Figs	20,025	450
Gooseberries	2,100	50
Grapes	28,090,000	385,150
Grape-fruit	1,100	50
Lemons (boxes)	250	460
Loganberries	1,700	95
Onions	1,200,000	6,000
Oranges (boxes)	1,100	2,200
Pears	2,450,975	24,575
Peaches	237,850	2,478
Peas	17,000	239
Persimmons	32,000	500
Plums	124,560	1,350
Irish potatoes	55,000,000	29,000
Sweet potatoes	50,140	550
Prunes	271,500	--------
Quinces	18,610	189
Raspberries	1,700	95
Strawberries	55,000	1,565
Tomatoes	245,250	18,524

Dried—	Pounds.	Value.
Almonds	2,330,400	$256,025
Apples	4,600	285
Beans	650,000	18,000
Chestnuts	1,200	100
Corn	210,000	3,500
Figs	3,100	175
Pears	150,550	8,475
Peaches	154,445	12,465
Peanuts	3,500	160
Plums	4,600	190
Prunes	1,364,750	35,895
Raisins	13,000	600
Walnuts	11,000	990

Dairy Industry.

	No.	Production.	Value.
Creameries (lbs.)	35	347,625	$299,166
Butter (pounds)	--	277,000	55,400
Cheese (pounds)	--	123,000	8,364

Poultry and Eggs.

	Dozen.	Value.
Chickens	30,120	$120,480
Ducks	1,325	5,300
Geese	42	620
Turkeys	60	1,800
Eggs	345,000	72,450

Wines, Brandies, Etc.

Number of wineries, 60; number of distilleries, 1; number of breweries, 2,

	Gallons.	Value.
Wine—Angelica	4,000	$2,400
Burgundy	3,000	600
Cabernet	4,500	900
Chateau Iquem	900,000	153,000
Muscatel	5,500	2,250
Port	8,000	4,800
Riesling	8,000	1,375
Sauterne	14,000	3,500
Sherry	9,000	5,400
Tokay	2,000	1,200
Zinfandel	685,000	116,450
Beer (barrels)	7,000	22,750
Brandy	12,000	36,000
Cider	3,000	900

Fish Industry.

	Pounds.	Value.
Salmon	798,235	$31,929
Other kinds	682,340	34,117

Livestock Industry.

	Number.	Value.
Cattle—Beef	4,960	$199,000
Stock	19,550	925,600
Thoroughbred	690	35,000
Dairy Cows—Graded	8,938	265,140
Angus	25	1,850
Ayrshire	50	3,300
Devon	275	22,600
Guernsey	160	13,000
Herefords	475	35,175
Holsteins	785	77,350
Jersey	700	69,500
Shorthorns	582	40,740
Calves	3,460	28,600
Swine	16,487	115,409
Horses—		
Thoroughbred	173	86,500
Standard-bred	829	145,900
Common	7,942	549,409
Colts	1,900	73,000
Mules	403	11,960
Sheep—		
Imported or fine	490	3,022
Common	5,895	20,368
Lambs	4,562	5,286
Common Goats	404	805
Wool (pounds)	40,000	7,170

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 900	------	$2,700
Flowers and plants (acres)	200	12,000
Honey	10,000	800
Alfalfa seed	2,500	275
Garden seed	125,000	7,500

Contra Costa County reports an output of 4,200 cords of wood, worth $37,800; and 410,000 barrels of lime, valued at $8,200.

DEL NORTE COUNTY.

Del Norte, as its name implies, is at the far north. It is situated in the northwest corner of the State. A county of scenery unsurpassed in its grandeur, its vast redwood forests, its clear winding streams, its green fertile fields, its giant redwoods, its mountains laden with precious ores, and its rich dairy lands make it one of the most desirable places for the home-seeker.

Chief among Del Norte's industries is the dairying interest. Scattered throughout the coast portion are modern, well-equipped creameries where the product of thousands of cows is turned into butter. This industry, with the coming of better facilities for shipment, will place Del Norte in the foremost rank as a butter-producing county. Farming is carried on to a considerable extent. A large portion of the soil is especially adapted to the culture of the apple, there being a total absence of the codling-moth pest. Pears, plums, cherries, and small fruits and berries of every description bear luxuriantly. On the Klamath River, in the southern part of the county, as well as on the Smith River, in the northern part, large, well-equipped salmon canneries are operated with great success. The center of trade lies in Crescent City, the county seat, nestled on a crescent-shaped beach, where the products of the county come for shipment, generally finding their market in San Francisco, the products in the main being lumber, butter, and from the farm.

Smith River is a small town in the center of the beautiful valley of the Smith River, where such business is carried on as is usually conducted in a farm and dairy district.

Requa, a small town near the mouth of the Klamath River, is a trading post for that district.

The arable portion of the county is confined generally to the coast portion, commencing at its northern boundary and extending through its entire length, excepting a few miles to the southward of Crescent City. The arable land may be divided into three classes: First, that formed by the disintegration of sands, which with the aid of fertilization and rotation produces good crops, and is especially adapted to the growth of apples, an industry yet in its infancy. Second, those lands formed by the constant washing of rich vegetable matter and the detritus carried by streams from the mountainsides and distributed in the valleys to a great depth, known as sediment lands. Third, marsh or lake lands, a large area of which borders on Lake Earl, at times partly inundated by the overflow of the lake, but which by a system of reclamation will constitute the most valuable land in the county for dairying purposes.

The redwood timber belt, comprising 200,000 acres, commences at the north boundary line and extends in an unbroken forest to the southern boundary of the county. It can be reasonably said that no grander or finer forest exists in the world. Its immensity can be better imagined when it is stated that a single tree yields sufficient clear lumber to build a modern cottage and finish it from cellar to garret, or more particularly, when it is stated that from a tract consisting of 160 acres there have been taken 27,802,121 feet, or an average of 173,763 feet per acre. East of the redwood belt are large tracts of sugar pine and fir.

Deposits of valuable ore lie in the hills of Del Norte, but not until recent years have those with means to develop mines turned their attention to this county.

Covering the entire expanse of coast line from Humboldt Bay to the Columbia River, the roadstead at Crescent City is the only point affording opportunity for a haven of refuge, and with assistance from the United States Government in the construction of a seawall from the United States lighthouse, to the westward of Crescent City, to an outlying rock, a distance of 2,000 feet, Crescent City harbor will be made a safe and secure refuge for the innumerable water-craft now plying along the coast. The present shipping is carried on over a wharf or pier, built on wooden piles, extending out to a depth of sixteen feet at low water.

Few counties on the Pacific coast afford a more varied opportunity for the pleasure-seeker, or those in quest of rest and recreation. This point may be reached from Grant's Pass in Oregon, the nearest railroad point, thence by stage road over mountain and through dale, the entire journey replete with grand scenery.

Del Norte County is almost devoid of railroad facilities, there being but fifteen miles in operation. However, the wonderful resources of the county have attracted the attention of the railroad corporations, and they have made a survey from the Southern Pacific system in Grant's Pass, Oregon, to Crescent City, this being the only natural pass from the great valleys of the interior to the coast.

STATISTICS OF DEL NORTE COUNTY, 1905-6.

General Statistics.

Area, 1,546 square miles, or 989,000 acres.

Number of farms	745
Number of acres assessed	214,906
Value of country real estate	$2,629,432
Of improvements thereon	$105,641
Of city and town lots	$82,805
Of improvements thereon	$116,120
Of personal property	$334,588
Total value of all property	$3,273,445
Expended on roads, last fiscal yr.	$8,160
Expended for bridges, last fiscal year	$4,165
Number of miles of public roads	135
Road levy per $100, 1906	30 cts.
Value of county buildings	$21,000
Railroads, steam—miles, 14; assessed value	$20,000
Electric power plants, 1; assessed value	$5,000
No irrigation; annual average precipitation	80 inches

Poultry and Eggs.

	Dozen.	Value.
Chickens	400	$1,400
Eggs	500	125
Total value		$1,525

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	3,500	500	4,000
Apricot	200	----	200
Cherry	250	----	250
Peach	300	----	300
Pear	150	----	150
Plum	500	----	500
Prune	250	----	250
Other kinds	1,000	----	1,000
Total fruit trees	6,050	500	6,550
Raisin grapes (acres)	2	----	2
Blackberries (acres)	5	----	5
Currants (acres)	2	----	2
Raspberries (acres)	5	----	5
Strawberries (acres)	7	----	7
Total acres berries	19	----	19

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	------	$2,000
Irish potatoes	300,000	1,500
Strawberries	3,750	650
Totals	303,750	$4,150

STATISTICS OF DEL NORTE COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	25	24	$864
Barley	300	262	7,860
Oats	1,500	1,220	36,600
Total cereals	1,825	1,506	$45,324
Grain hay	1,000	2,000	$20,000
Grass hay	1,000	1,500	15,000
Total hay	2,000	3,500	$35,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	500	$12,500
Stock	750	6,750
Thoroughbred	100	5,000
Dairy Cows—Graded	3,500	45,000
Calves	1,000	5,000
Swine	1,000	3,000
Horses—		
Thoroughbred	5	1,000
Standard-bred	10	2,000
Common	350	15,000
Colts	100	3,000
Sheep—Common	1,500	4,000
Lambs	500	1,000
Angora Goats	250	2,500
Wool (pounds)	20,000	4,000
Mohair (pounds)	2,500	800

Dairy Industry.

	No.	Production.	Value.
Creameries	8	------	------
Butter	--	------	1,575,000

Fish Industry.

		Value.
Salmon—4,000 cases (48 lbs. to case)		$20,000
Barreled	350 barrels	3,500
Fresh Salmon	50 tons	2,500
Total value		$26,000

Forest Products.

		Amount.	Value.
Area of timber lands	acres	146,000	From $10 to $150 per acre, according to location and kind of timber.
Cedar		16,000	
Pine		30,000	
Redwood		100,000	
Sawmills (number)		2	$150,000
Lumber—Cedar (feet)		100,000	9,000
Pine (feet)		5,000,000	25,000
Redwood (feet)		24,000,000	360,000
Pickets (pieces)		1,000,000	10,000
Shingles		8,000,000	10,000

Manufactories.

	Quantity Produced.	Value of Product
Hides	40 tons	$6,200
Lard	7½ tons	1,050
Meat packed	100 tons	24,000
Veal	16 tons	1,920

EL DORADO COUNTY.

El Dorado, the "Old Empire county," is situated about the middle of the eastern tier of counties. It is a county of hills and valleys, extending from the low foothills in the west to the summit of the Sierras in the east. There are no broad tracts of prairie land, nor great plateaus. The soil is fertile, and supports a large variety of agricultural and horticultural products. Large forests of the finest sugar and yellow pine, fir, and spruce cover the mountains. Fruit-raising, lumbering, stock-raising, dairying, poultry-raising, bee-culture, farming, slate-quarrying, mining for base and precious metals, and the manufacture of wines and brandy are among the industries.

That famous summer resort, Lake Tahoe, is partly included within the boundaries of the county, and a number of other summer resorts have their pleasure-seekers every summer. Tourists and campers find the mountains of this county an ideal place to spend their time.

Placerville, the "Hangtown" of early days, is the county seat. It is on the western slope of the Sierra Nevadas, at an altitude of about 1,800 feet, and was, till a short time ago, the terminus of a branch of the Southern Pacific system. It has a good grammar school, and a new county high school. Religious denominations are well represented. Business and residence places are lighted by electricity from the American River Electric Power Company, whose plant is on the South Fork of the American River, about four miles from town.

Fruit-growing is one of the oldest industries, and as it has been systematized during late years, promises to be of more importance in the future. Apples, peaches, pears, plums, prunes, and grapes are grown, and owing to their superior flavor and splendid shipping qualities find a ready market in the East. With the climate and soil and irrigating facilities, this industry will become one of El Dorado's best.

The water supply is sufficient for all needs. There are several ditch systems that bring water from the snows of the Sierras. Besides these there are many smaller systems that distribute water to all parts of the county.

The Sacramento and Placerville Railroad has been extended by the El Dorado Lumber Company to the new town of Camino, where there is located a box factory and the company's planing mill, lumber yards, and dry kiln. From this point the company's narrow-gauge road runs into the lumber belt. The Caldor and Diamond Railroad is a lumber road, and runs from Diamond Springs into the timber belt.

It was at Coloma that James W. Marshall, in January, 1848, made his famous discovery of gold. Since then mining has been one of the leading of El Dorado's industries. Cinnabar and copper are found in several localities, and in several places prospects of the latter metal are being developed.

Slate-quarrying is an important and rapidly growing industry. The manufacture of slate for roofing and other purposes is conducted on a arge scale. The quarries at Slatington are being extended, as the apacity of the plant is not equal to the demand. The quality of the late is equal to the best produced in the East.

Limestone and marble of good quality are found, and a large quantity f lime is manufactured.

The ranges in the mountains are ideal pastures, and thousands of attle spend the summer there, migrating in the winter to the lower ountry till the snows of the high altitudes have melted and the feed started again. Dairymen go with their herds, and all summer the lairy products are sent out of the hills.

With the abundant rainfall irrigation is not necessary in most sections, though irrigation increases the productive capacity of the land.

STATISTICS OF EL DORADO COUNTY, 1905-06.

General Statistics.

Area, 1,796 square miles, or 1,049,440 acres.

Number of farms	1,600
Number of acres assessed	667.945
Value of country real estate	$2,282.280
Of improvements thereon	$724.090
Of city and town lots	$164.905
Of improvements thereon	$479,350
Of personal property	$654,005
Total value of all property	$5,085,925
Expended on roads, last fiscal year	$13,285
Expended for bridges, last fiscal year	$2,765
Number of miles of public roads	700
Road levy per $100, 1906	36 cts.
Value of county buildings	$85,000
Irrigating ditches—miles, 352; cost	$113,655
Railroads, steam—miles, 81; assessed value	$616,085
Electric power plants, 1.	
Electric power lines—miles, 80; assessed value	$103.520
Number of acres irrigated	15,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	4,600	3,000	7.600
Apricot	900	450	1,350
Cherry	3,150	375	3,525
Fig	1,500	400	1,900
Nectarine	1,500	600	2.100
Olive	5,000	800	5,800
Orange	1,000	------	1,000
Peach	116,000	15.000	131,000
Pear	6,500	25,000	31,500
Plum	2,500	600	3.100
Prune	15,000	2,000	17,000
Quince	200	------	200
Other kinds	18,000	3.000	21.000
Almond	2,600	1,200	3,800
Chestnut	150	50	200
Walnut	550	700	1,250
Total fruit trees	179,150	53,175	232,325

		Bearing.	Non-Bearing.	Total.
Raisin grapes	acres.	175	----	175
Table grapes		385	60	445
Wine grapes		2,150	500	2.650
Total acres grapes		2,710	560	3,270

Fruit Trees and Vines—Continued.

		Bearing.	Non Bearing.	Total.
Blackberries	acres.	8	3	11
Currants		3	--	3
Loganberries		5	3	8
Raspberries		3	1	4
Strawberries		4	2	6
Total acres berries		23	9	32

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	137,500	$2,000
Blackberries	1,800	200
Cabbage	8,000	125
Currants	1,600	160
Cherries	16,000	480
Figs	8,000	240
Grapes	200,000	3,500
Loganberries	2,000	150
Onions	60,000	600
Pears	500,000	7,500
Peaches	192.000	5,760
Plums	447,000	6,720
Irish potatoes	300,000	4,500
Prunes	520.000	13.000
Tomatoes	280.000	2,800
Totals	2,673,900	$47.735

Dried—	Pounds.	Value.
Apples	3,200	$160
Figs	3,000	150
Pears	25,000	1,500
Peaches	4.000	360
Plums	12,000	840
Prunes	200,000	4,000
Walnuts	3,000	360
Totals	250,000	$7.370

Owing to late spring rains and shortage of peach and general fruit crop, there was no fruit canned, but all was shipped fresh or dried.

Wines, Brandies, Etc.

Number of breweries, 1.

	Amount	Value.
Beer (barrels)	1,500	$14,850
Vinegar (gallons)	20,000	3,000

STATISTICS OF EL DORADO COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	425	100	$3,000
Grain hay	----	20,000	$240,000
Grass hay	----	800	5,600
Total hay		20,800	$245,600

Livestock Industry.

	Number.	Value.
Cattle—Beef	1,000	$20,000
Stock	7,000	107,000
Calves	2,560	25 640
Swine	700	4,200
Horses—		
Standard-bred	30	1,200
Common	2,500	60,000
Colts	500	5,000
Mules	50	1,500
Sheep—Common	1,200	3,000
Common Goats	800	1,600
Total stock all kinds	16,340	$229,140

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	250,000	
Pine (acres)	250,000	$2,000,000
Sawmills (number)	6	100,000
Charcoal (sacks)	500	250
Fuel, wood (cords)	3,500	8,750
Laths	20,000	75
Lumber—Pine (feet)	80,000,000	800,000
Piles (number)	3,000	10,000
Posts (pieces)	10,000	1,000
Sash and door factories (number)	1	7,500
Shakes	1,000,000	6,000
Stave bolts (cords)	15	75
Total value		$2,933,650

Dairy Industry.

	Pounds.	Value.
Butter	200,000	$4,500

Poultry and Eggs.

	Dozen.	Value.
Chickens	1,200	$7,200
Ducks	50	250
Turkeys	50	1,200
Eggs	300,000	4,500
Total value		$13,150

Mineral Products.

	Pounds.	Value.
Asbestos	------	$2,625
Copper	160,000	24,960
Gold	------	384,735
Limestone	21,000	5,775
Silver	------	2,525
Slate	------	40,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Cigars	2	6	300,000	$12,000
Confectionery (pounds)	1	5	14,000	4,000
Foundries and iron works (tons)	2	20	90	8,500
Lime (barrels)		----	9,260	6,946
Hides		----	----	2,400
Lard (pounds)		----	3,000	300
Tallow (barrels)		----	100	400
Olive oil		----	----	1,600
Planing mills	2	20	---	18,000

Productions Shipped Out of State.

	Amount.
Grapes, fresh	4,800 pounds
Pears, fresh	8,640 boxes
Plums, fresh	19,200 boxes

FRESNO COUNTY.

Fresno extends across from the high Sierras to the mountains of the Coast Range, and in this center of the valley every form of industry in any of the counties that make the watershed of the San Joaquin is found in a greater or less degree.

Its mountains contain lumber and minerals and fine scenery; its level plains grow cereals and fruits, and vines and vegetables; it raises cattle, and its western borders overflow with petroleum. But in addition to this diversity of interests, it has, as a great mainstay, the raisin industry, with Spain as its only competitor.

The average rainfall is 10 inches. Fresno is a wonderful example of what irrigation has done and can do. The San Joaquin River forms the northern and eastern boundary line, but the stream is not so well located for irrigation purposes as is Kings River, which, rising in the Sierras, passes south, and then west and north, in a wide curve, through the center of the farming district, carrying through the summer a volume of water equal to 8,500 cubic feet per second.

The region is a network of streams of water, that is drawn off on the vineyards, deciduous or citrus fruit orchards, or alfalfa fields. The cost of water is low. The perpetual water right, included with the purchase price of the land, is about $6.25 per acre.

Though great as the raisin and fruit industry is, wheat is grown on vast areas, the ranches running in the thousands of acres and the product in good years amounting to millions of bushels, a considerable portion being worked into flour in Fresno. Barley is grown in large quantities, and so is alfalfa. There are creameries and skimming stations, and butter and cheese are exported. An unlimited market for dairy products, with the fact that one acre of alfalfa will keep one cow in green feed, offers the farmer of limited means an opening for immediate and profitable returns. Sheep by the thousands roam over the foothills.

Deciduous fruit shipments, green and dried, represent several million dollars. Citrus fruit growing is a developing industry. Watermelons are exported in hundreds of carloads. The vineyards cover thousands of acres, most of which are in raisin grapes, and the remainder in wine or table varieties. There are many large wineries. Excellent port, brandy, sherry, and angelica are made, as well as other varieties.

At the head of the long list of valuable products stands the raisin. When a vineyard is in full bearing it produces about 4,000 pounds of green grapes to the acre, which will dry to over one ton of raisins. The average product of five-year-old vineyards is a ton of raisins to the acre. The California raisin has possession of the American market, and is extensively shipped abroad.

The growing of nursery stock is a remunerative occupation. Honey is produced in considerable quantity, and more so with the increased production of alfalfa. Alfalfa honey equals in quality clover honey of the East. Gold is mined in the mountains, and millions of feet of lumber cut annually, most of which is floated down in flumes. There are large planing mills and many lumber yards in the City of Fresno.

The growth of the dairy business dates back less than six years, when smaller interests merged and became what may be properly called a large clearing-house for butter-fat. Before this, dairying was conducted in a desultory way by ranchmen who gave their time to grain, vineyards, or other possessions, and, these permitting, the cows received attention later on. Now the farmers find it advisable to attend to their cows.

The calves and hogs fed on the skimmed milk are as much a part of the dairy product as the cream itself.

Along the river bottoms of the Kings and San Joaquin sheep-raising flourishes. Here, between October and April, scores of bands of sheep are herded every year. The section is fertile and rich in herbage, upon which the animals thrive until the dry season sets in, when they are driven into the mountains.

The raising of hogs, cattle, horses, and mules has advanced both as to numbers and as to quality in breeding. Large numbers of cattle are being received continually from Arizona, to be fattened and either slaughtered here or reshipped to San Francisco and elsewhere.

Thoroughbred, standard-bred, and high-class draft stallions have been brought into the county, and great interest is manifested among horsemen in raising the grade of the runner, the trotter, and the work horse. Some of the best roadsters in the State are in Fresno, and very promising youngsters in the running line are also attracting attention, while the production of the heavier breeds has met with equal success.

In a general mention of the varied resources there must be consideration of the mule. In this valley he finds an environment peculiarly adapted to his exacting requirements, and speedily attains the highest degree of mulish perfection.

STATISTICS OF FRESNO COUNTY, 1905-6.

General Statistics.

Area, 5,606 square miles, or 3,587,840 acres.	
Number of farms	15,000
Number of acres assessed	1,963,254
Value of country real estate	$18,256.345
Of improvements thereon	$3,655.452
Of city and town lots	$4,359,426
Of improvements thereon	$4.450,773
Of personal property	$5,409,366
Total value of all property	$36,131.362
Expended on roads, last fiscal yr.	$65,332
Expended for bridges, last fiscal year	$24,500
Number of miles of public roads	2.000
Road levy per $100, 1906	40 cts.
Value of county buildings	$500,000
Irrigating ditches—miles, 2,500; cost	$2,500,000
Railroads, steam—miles, 261.92; assessed value	$3,677,082
Railroads, electric—miles, 16¼; assessed value	$31,750
Electric power plants (in city), assessed value	$14,500
Electric power lines—	
In city—assessed value	$11,000
Outside—assessed value	$29,228
Number of acres irrigated	709,920

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	20,000	10,000	$2,200,000
Barley	15,000	5,000	750,000
Corn	4,000	3,500	87,500
Total cereals	39,000	18,500	$3,037,500
Alfalfa hay	65,000	20,000	$1,200,000
Grain hay	20,500	20,000	200,000
Total hay	85,500	40,000	$1,400,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	3,500	1,850	5,350
Apricot	15,000	10,000	25,000
Fig	75,000	50,000	125,000
Lemon	8,000	8,000	16,000
Nectarine	15,000	40,000	55,000
Olive	30,500	5,000	35,500
Orange	60,000	20,000	80,000
Peach	150,000	90,000	240,000
Pear	14,000	3,000	17,000
Plum	4,000	----	4,000

STATISTICS OF FRESNO COUNTY, 1905-6—Continued.

Fruit Trees and Vines—Continued.

		Bearing.	Non-Bearing.	Total.
Prune		10,000	9,000	19,000
Almond		5,000	500	5,500
Walnut		225	50	275
Total fruit trees		----	----	627,725
Raisin grapes	acres.	50,500	5,000	55,500
Table grapes		3,000	500	3,500
Wine grapes		9,000	3,000	12,000
Total acres grapes		----	----	71,000
Blackberries	acres.	50	----	50
Loganberries and Raspberries		30	----	30
Total acres berries		80	----	80

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	250,000	$5,000
Apricots	150,000	3,000
Blackberries	70,000	4,900
Beans	1,500,000	32,240
Corn	700,000	7,000
Nectarines	45,000	775
Oranges (boxes)	50,000	37,500
Pears	100,000	20,000
Peaches	6,000,000	90,000
Plums	90,000	1,200
Irish potatoes	1,500,000	45,000
Sweet potatoes	400,000	12,000
Prunes	5,000	10,000
Raspberries	40,000	3,600
Total value		$272,215

Watermelons, 250 cars.

Dried—	Pounds.	Value.
Apples	5,000	$400
Apricots	1,500,000	90,000
Figs	1,800,000	50,000
Onions	1,250,000	7,500
Peaches	12,000,000	850,000
Prunes	25,000	750
Raisins	60,000,000	3,000,000
Strawberries	60,000	3,000
Walnuts	4,500	450
Total value		$4,002,100

Dairy Industry.

	No.	Production.	Value.
Creameries	4	2,500,000	$750,000
Skimming stations	8		
Cheese (pounds)		6.000	1,200
Cream (gallons)		120,000	12,000

Wines, Brandies, Etc.

Number of wineries, 17; number of distilleries, 10; number of breweries, 1.

	Gallons.	Value.
Wine—All kinds	12,000,000	$2,300,000
Brandy	600,000	250,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	9,000	$270,000
Stock	70,000	1,400,000
Thoroughbred	100	100,000
Dairy Cows - Graded	25,000	1,000,000
Calves	9,000	90,000
Swine	15,000	75,000
Horses—		
Thoroughbred	75	37,500
Standard-bred	70	14,000
Common	15,000	750,000
Colts	1,800	72,000
Mules	3,000	30,000
Total stock all kinds	148,045	$3,838,500
Wool (pounds)	1,500,000	$225,000

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	40,000	$400,000
Sawmills (number)	6	250,000
Pine lumber (feet)	70,000,000	1,400,000
Total value		$2,050,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	2	20	----------	$16,000
Brick	2	--	10,000,000	60,000
Cigars	3	20	435,000	22,750
Flouring mills (barrels)	2	40	50,000	200,000
Olive oil (gals.)	-	20	15,000	40,000
Pickled olives (gallons)	-	--	75,000	60,000

Productions Shipped Out of State.

	Amount.
Apples—Dried, 400 cars or	800,000 lbs.
Figs—Dried, 200 cars or	400,000 lbs.
Lemons and oranges—200 cars	72,000 boxes
Nectarines—Dried, 75 cars or	150,000 lbs.

GLENN COUNTY.

This county occupies a position about the center of the Sacramento Valley, extending from east of the river to the summit of the coast mountains, and embracing a great variety of soil, productions, and climate. The elevation of Willows, the county seat, is 136 feet, while the higher peaks of the mountains reach 7,000 feet.

The statistics show the several industries and productions, but the hidden wealth of the western section is being gradually revealed. Material for cement abounds the whole length of the county, as can be seen along Stony Creek. Building-stone is also abundant; a mountian of it extends from the south line of township 18, range 6 west, to the north line of township 20, range 6 west. A vast body of marble approaching alabaster in fineness was recently discovered in township 18, range 6 west. Prospecting for gold in the lower mountain ranges is lively at present, and many assays from ledges develop gold from cents to $55 per ton. Several ledges are being worked, and get better as they go down. With a railroad this western section could supply the Pacific Coast with stone and cement for generations.

An up-to-date sugar refinery began operations this season. This means that much of the wheat land will be put into sugar beets next year. The big wheat ranches are being cut up and sold as there is a demand, and all the new settlers who try diversified farming are meeting with success.

Glenn County is a safe locality for people of small means who are able to do their own work, and for such there is always a welcome. Land values are increasing slowly, but there are bargains to be had every day; prices range from $5 to $100 per acre.

STATISTICS OF GLENN COUNTY, 1905-6.

General Statistics.

Area, 1,460 square miles, or 934,514 acres.

Number of farms	913
Number of acres assessed	639,523
Value of country real estate	$7,823,477
Of improvements thereon	$578,146
Of city and town lots	$166.825
Of improvements thereon	$209,100
Of personal property	$1,163,474
Total value of all property	$9,941,022
Expended on roads, last fiscal yr.	$23,865
Expended for bridges, last fiscal year	$27,991
Number of miles of public roads	414
Road levy per $100, 1906	30 cts.
Value of county buildings	$125,000
Irrigating ditches, cost	$16,800
Railroads, steam—miles, 45.70; assessed value	$743,091
Electric power lines—miles, 32; assessed value	$9,000
Number of acres irrigated	3,490

Dairy Industry.

	No.	Production.	Value
Creameries (lbs.)	2	107,965	$21,485
Butter (pounds)	--	61,000	10,800

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	35,478	17,384	$347,680
Barley	47,915	23,958	439,344
Oats	725	212	8,650
Rye	4	3	75
Corn	350	212	4,240
Total cereals	84,472	41,943	$799,989
Alfalfa hay	1,685	6,740	$40,440
Grain hay	8,094	8,905	71,240
Total hay	9,779	15,645	$111,680

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 310	......	$1,240
Broomcorn	38,000	380
Honey	1,620	162
Alfalfa seed	11,550	1,270
Sugar beets (tons)	65,550	278,587

Glenn County reports two cigar factories, with three employés. The output is 180,000 cigars, worth $7,600.

STATISTICS OF GLENN COUNTY, 1905-6—Continued.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	2,430	700	3,130
Apricot	3,670	375	4,045
Cherry	350	35	385
Fig	1,500	925	2,425
Lemon	1,500	540	2,040
Nectarine	87	------	87
Olive	1,230	375	1,605
Orange	4,560	1,515	6,075
Peach	4,300	470	4,770
Pear	2,700	220	2,920
Plum	1,350	180	1,530
Prune	6,100	45	6,145
Quince	215	5	220
Almond	5,310	600	5,910
Chestnut	16	------	16
Pecan	45	10	55
Walnut	1,500	480	1,980
Total fruit trees	38,863	6,475	43,338
Table grapes (acres)	45	35	80
Blackberries (acres)	25	5	30
Loganberries (acres)	18	7	25
Raspberries (acres)	20	-- ---	20
Strawberries (acres)	10	3	13
Total acres berries	73	15	88

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	57,320	$570
Apricots	22,020	440
Blackberries	14,000	560
Beans	9,500	285
Corn	68,000	750
Cherries	7,000	350
Figs	75,000	1,125
Grapes	85,000	850
Lemons (boxes)	1,250	3,750
Loganberries	18,000	760
Nectarines	2,150	43
Onions	250,000	2,500
Oranges (boxes)	2,260	5,650
Olives	12,300	369
Pears	136,500	2,730
Peaches	52,400	1,048
Peas	6,400	192
Persimmons	5,800	116
Plums	28,350	566
Irish potatoes	340,000	3,400
Sweet potatoes	38,000	470
Quinces	2,750	55
Raspberries	11,000	550
Strawberries	10,080	504
Tomatoes	150,500	2,257
Total value		$29,890

Dried—	Pounds.	Value.
Almonds	22,000	$2,750
Apples	5,250	420
Prunes	305,000	7,000
Totals	327,250	$10,170

Livestock Industry.

	Number.	Value.
Cattle—Stock	11,961	$179,423
Thoroughbred	18	900
Dairy Cows—Graded	1,214	30,345
Calves	4,507	45,073
Swine	5,424	16,272
Horses—		
Thoroughbred	2	4,500
Standard-bred	36	7,200
Common	2,021	80,655
Colts	556	13,910
Mules	2,805	185,765
Sheep—		
Imported or fine	18	375
Common	44,620	89,240
Angora Goats	6,335	12,670
Total stock all kinds	79,517	$466,328
Wool (pounds)	364,960	$54,075
Mohair (pounds)	44,345	11,084

Poultry and Eggs.

	Dozen.	Value.
Chickens	1,876	$5,628
Ducks	38	152
Geese	4	32
Turkeys	368	7,750
Eggs	69,040	10,356
Total value		$23,918

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	72,092	$350,460
Sawmills (number)	2	7,000
Fuel, wood (cords)	9,130	36,520
Lumber—Pine (feet)	550,000	8,250
Posts (pieces)	3,800	570
Shakes	110,000	770
Total value		$403,570

Power used for mills and manufactories in county—Steam, 2.

Productions Shipped Out of State.

	Amount.
Barley	16,972 tons
Corn	112 tons
Broomcorn	38,000 lbs.
Hay	1,011 tons
Wheat	13,911 tons
Almonds	19,000 lbs.
Cattle	3,670
Hides	825
Horses	210
Sheep	23,500
Swine	4,400
Wool	364,960 lbs.
Butter	42,680 lbs.
Mules	350
Chickens	811 doz.
Turkeys	16,800 lbs.
Eggs	17,235 doz.

HUMBOLDT COUNTY.

Humboldt is, with the exception of Del Norte, the most northerly county of California. The sinuosities of the Pacific coast-line extend some 175 miles. From north to south the county extends 108 miles, while in width it averages about 40 miles.

The topographical features of Humboldt are varied and picturesque. The surface is extremely rugged, numerous spurs of the Coast Range intersecting the county in all directions, rising in many places to absolute grandeur.

Besides a number of smaller streams, the county is drained by two rivers of importance—the Klamath and the Eel.

The soil of the bottom lands and on the hills next the coast is black; that on the bottoms is of a sedimentary composition and somewhat argillaceous, while that on the hills is more of a sandy loam. The soil on the interior hills is composed of disintegrated rock, mixed with organic matter and decayed vegetation.

Humboldt needs no irrigation. The annual rainfall averages 46 inches, and crops have never been known to fail for want of moisture.

Fruit of all kinds does well, particularly apples, pears, prunes, peaches, cherries, apricots, and berries. Strawberries and raspberries grow in abundance, and a small area of land in these fruits, well cultivated, brings a generous return. Raspberries, cherries, strawberries, etc., ripen later than in the warmer sections of the State, thus giving the Humboldt product an advantage in the market.

The yield of all kinds of fruit is generous, and in many instances prodigious, particularly that of apple, plum, and prune trees. Eel River Valley is one of the finest sections on the coast for the production of apples of the most delicate flavor and juiciness. The climate, neither too hot nor too cold, has doubtless much to do with the result.

In the Klamath River country climate and soil are well adapted to horticultural pursuits. Peaches are grown as large as a teacup, and of most luscious flavor. The grapes grown here are of fine flavor and firm flesh. The varieties for table use are particularly good.

Dairying has made remarkable advances in the last two decades. Prior to 1880 it was mainly dependent upon the native grasses of the seaward slope, but with the introduction of clover as the staple food for the herds, a complete revolution occurred, and the establishment of creameries with their improved machinery for handling the milk completed the transformation. There has been great improvement in the herds, which now include the best milk and butter breeds. The output of cheese is nearly all consumed locally. The shipments of condensed milk and cream amount to more than a million pounds annually and butter to half a million pounds. By reason of having green feed at all times, the shipments are continuous throughout the year, thus enabling butter-producers to reap the advantage of high prices at times when other sections are non-productive. And the cool, equable climate being ideal for butter-making, the quality of the product is superior, and it commands top prices.

Stock-raising is an important industry, as the excellent pasturage furnishes the most favorable conditions. The large ranges in the eastern portion are dotted with countless herds of sheep and cattle, and every farm and dairy in the region nearer the coast adds its quota. Hogs are raised in large numbers, and each creamery has a drove of them being fattened on the skimmed milk and other waste products.

The wool industry is a very important one. In quality Humboldt wool is the choicest on the coast. The stock is good and the wool clean.

Humboldt has the banner record for the production per acre of oats and corn, according to the United States census reports. At the Chicago World's Fair, wheat grown "on the hills" of Humboldt took first prize, and showed the record yield per acre—from 60 to 100 bushels for various samples. All the other crops of temperate climes grow in like proportion. As a rule, any vegetable product that is suitable for cultivation here will grow thriftier, larger, and more to the acre than in almost any other locality. The principal agricultural crops are hay, oats, potatoes, peas, barley, wheat, corn, lentils, seeds, etc. Oat hay is grown universally throughout the county, and is mostly used for local consumption. Oats is the principal grain product. Potatoes are produced largely, and figure among the exports at from 3,000,000 to 5,000,000 pounds annually. Field peas, dried, are an important product. Barley, wheat, corn, lentils, and seeds are regular elements in the products, but occupy a comparatively unimportant place, because the land has been found more valuable for other purposes.

The manufacture of redwood lumber is the most important industry. With a supply of standing timber estimated at over 45,000,000,000 feet, the greater part of which is fairly accessible, the question of a cessation is a matter of remote future consideration. The annual export of lumber of all kinds is above 250,000,000 feet. This is the product of large plants, which are operated nearly continuously. Some smaller plants, limited in capacity, saw almost entirely for the local trade.

Of the subordinate branches of this industry, the most important is the making of shingles. Redwood shingles are a superior article, and in the last few years efforts to introduce them in the Eastern market have been quite successful.

Humboldt County is at present without direct rail connection with the outer world, but this disadvantage is more than made up by its possession of the only safe and commodious harbor, accessible to vessels of all but the deepest draft, between San Francisco and the Columbia River. Humboldt Bay is 14 miles in length and from one-half mile to 4 miles in width. It has a tidal area of 28 miles and 35 lineal miles of navigable channels. It is situated near the center of the coast line of the county, and extends nearly parallel therewith, being separated from the ocean by two narrow peninsulas of sand. Being so completely landlocked, this harbor is of the utmost importance to the coast.

Trinidad, 18 miles north of Humboldt Bay, is a deep open port, well sheltered from all winds except those from the south to the west. Shelter Cove, near the southern boundary of the county, is an open roadstead affording excellent shelter from the northerly winds of summer.

There are lines of railroad, with an aggregate length of 150 miles.

All of them, either directly or through connections, terminate at tide water on Humboldt Bay.

Good wagon roads connect all points of any importance. The road north along the coast gives connection with Crescent City, the county seat of Del Norte County (100 miles north of Eureka), and there are two roads giving overland connection with Mendocino County—one in the interior leads to Willits, the northern terminus of the S. F. & N. P. Railway; the other is along or near the coast.

But little attention has been paid to manufactures aside from that of lumber. There are tanneries. The bark is furnished by the near-by forests.

In 1901 a woolen mill was erected and put in operation at Eureka. It has been very successful; operates steadily, usually on overtime. The larger portion of its product is shipped to the Eastern market.

There is one fruit cannery, and a preserving and canning plant.

There are sash and door factories and planing mills in Eureka, and at Samoa, Arcata, and Fortuna.

At Arcata there is an extensive stave factory which prepares staves and barrel-heads for shipment to San Francisco.

Shipbuilding has for years been a most important industry. A quality of pine excellently adapted to this purpose is plentiful throughout the forest region, and the bay shore offers abundant yard-room for the purpose.

In the northeastern portion, along the Klamath and Trinity rivers, placer mining for gold is the leading industry. While no excessively rich "strikes" have been noted, "pay ground" is unlimited in extent, and water abundant for profitable working.

Granite and sandstone are plentiful for building purposes. Mineral paint has been produced in commercial quantities. Lime is burned at Jacoby Creek. Mineral water is plentiful, and is an article of commercial export. As the result of a prospecting well sunk at Briceland (a small town near Garberville) some years ago, that place has since been lighted and heated by natural gas.

Fishing is quite an important industry, salmon being the principal variety, although halibut, rock-cod, flounders, perch, sea-trout, shad, herring, etc., are plentiful.

The public schools stand high in efficiency.. In design and general appearance, the buildings range from the ordinary rural school house to the fine and costly buildings in the towns and cities. They are so distributed over the county as to give practically every one good school facilities.

The United States Government maintains in Eureka a custom house, land office, and weather bureau. On the north spit, near the entrance to Humboldt Bay, is located an efficient life-saving station, and the Government also maintains a system of harbor lights. At Trinidad, on Table Bluff, just south of Humboldt entrance, and at Cape Mendocino, are well-kept lighthouses, the Mendocino light being one of the most important on the coast. At Price Creek, near Grizzly Bluff, a Government fish hatchery is maintained. On both sides of the Trinity River, in the northeastern portion of the county, is the Hoopa Indian Reservation, covering a tract about seven and a half miles square.

Eureka is the county seat and principal business center. It has about three miles of water frontage on Humboldt Bay. Its streets are broad, well drained and graded, and many of them are graveled, macadamized, or paved with bitumen. There is a sufficient water supply; an excellent volunteer fire department; electric light and power, and gas plants; the usual proportion of schools, churches, and benevolent and secret associations and societies. An electric trolley street railroad, now in operation, is rapidly extending its system to cover all the more important thoroughfares. Ocean-going steamers, local railroads and ferries, the telegraph and telephone, furnish means of communication with the world.

STATISTICS OF HUMBOLDT COUNTY, 1905-6.

General Statistics.

Area 3,507 square miles, or 2,224,480 acres.

Number of acres assessed	1,538,300
Value of country real estate	$14,464,410
Of improvements thereon	$1,056,995
Of city and town lots	$4,181,265
Of improvements thereon	$2,589,410
Of personal property	$2,711,537
Total value of all property	$25,432,460
Number of miles of public roads	1,150
Road levy per $100, 1906	40 cts.
Value of county buildings	$280,000
Railroads, steam—miles, 124.70; assessed value	$1,005,760
Railroads, electric—miles, 9; assessed value	$48,850
Electric power plants—2; assessed value	$144,692
Electric power lines—miles, 202½; assessed value	$31,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Barley	600	600	$15,000
Oats	2,500	1,600	48,000
Total cereals	3,100	2,200	$63,000
Alfalfa hay	175	800	$9,600
Grain hay	5,000	7,000	84,000
Grass hay	10,000	15,000	150,000
Total hay	15,175	22,800	$243,600

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	25,000	3,000	28,000
Cherry	500	------	500
Peach	3,000	------	3,000
Pear	500	------	500
Prune	15,000	------	15,000
Walnut	300	------	300
Total fruit trees	44,300	3,000	47,300

Dairy Industry.

	No.	Production.	Value.
Creameries	35	------	------
Skimming stations	3	------	------
Butter (pounds)	--	6,000,000	$1,500,000
Cheese (pounds)	--	3,000	600
Cond. milk (cases)	--	12,000	54,000
Cond. cream (cases)	--	12,750	50,000

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples, approx.	9,000,000	$125,000
Peas	5,000,000	100,000
Irish potatoes	1,500,000	15,000
Strawberries	75,000	7,500
Totals	16,250,000	$247,500

Wines, Brandies, Etc.

	Amount.	Value.
Beer (barrels)	1,500	$6,000
Cider (gallons)	500	4,000

Fish Industry.

	Pounds.	Value.
Salmon	3,200,000	$62,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	2,662	$56,020
Stock	18,520	191,885
Dairy Cows—Graded	58	2,665
Common	17,010	340,470
Calves	8,912	45,020
Swine	5,046	12,965
Horses—		
Thoroughbred	1	250
Standard-bred	428	25,950
Common	5,305	154,560
Colts	688	14,785
Sheep—		
Imported or fine	1,215	3,175
Common	66,847	100,410
Goats	1,324	2,080
Total stock all kinds	128,016	$950,235
Wool (pounds)	750,000	$165,000

Manufactories—Exports.

Humboldt County reports 2 foundries, but does not give the value of the output; 8 planing mills, which employ 150 hands; 2 tanneries, 1 pottery, and 1 woolen mill. The number of employés and the output of these latter institutions are not given.

The exports are given as 261,320 pounds of butter, 65,300 pounds of salmon, and 316,000,000 feet of lumber.

STATISTICS OF HUMBOLDT COUNTY, 1905-6—Continued.

Poultry and Eggs.

	Dozen.	Value.
Chickens	2,903	$7,250

Forest Products.

		Amount.	Value.
Area of timberlands	acres.	925,000	$9,250,000
Pine		100,000	1,000,000
Redwood		825,000	8,250,000
Sawmills		12	1,200,000
Fuel, wood (cords)		15,000	75,000
Lumber—Pine (feet)		2,000,000	60,000
Redwood (feet)		326,000,000	5,860,000
Pickets (pieces)		426,000	6,500

Forest Products—Continued.

	Amount.	Value
Piles	4,600	$46,000
Posts (pieces)	75,000	7,800
Railroad ties (pieces)	245,000	86,000
Sash and door factories (number)	7	84,000
Shakes (thousand)	23,500	235,000
Shingles (thousand)	813,600	1,220,400
Stave bolts (cords)	6,500	52,000
Total value		$27,432,700

Power used for mills and manufactories in county: Steam—number, 18; electrical—number, 1.

INYO COUNTY.

Inyo, the third largest county, has the most diversified topography in the State, or in fact in the nation, claiming as it does Mount Whitney, the highest elevation, and Death Valley, the lowest depression. The Sierras, which form its western border, here attain their greatest altitude, there being many towering peaks scarcely inferior to Whitney itself. This great natural wall is impassable for ordinary travel, so that the traveler to or from Inyo must pass through western Nevada, if making the trip by rail, or by the southern route stage 120 miles between the railroad at Mojave and that at Keeler, on the shore of Owens Lake.

With exceptions not worthy of note in a brief review, all the agricultural land is contained in Owens Valley. This valley is about 100 miles long; at its northern end it is about 15 miles wide, narrowing to 2 miles halfway down its length, where a spur of the Sierras almost divides it, and south of that broadening to an average of 6 to 8 miles. Of its area of 500,000 acres, the Reclamation Service estimates that 200,000 acres can be made valuable agricultural land. Almost this amount is under claim of some kind, but less than one fourth is cultivated.

The soil of Owens Valley is especially fertile. Fruits attaining maturity are of quality second to none, in either size or flavor. Grains and garden produce of all kinds are grown to perfection.

The honey industry is of steadily increasing importance. The product is of superior quality, and invariably commands the highest market prices.

The valley is especially adapted to stock and dairy interests. The purity of the air and water, richness of the natural and cultivated grasses, mildness of climate, and fine mountain ranges for summer use, are all factors of importance. The shipments of livestock to outside markets is increasing annually. There are several creameries in operation, while Tonopah and other markets easily reached are supplied with fresh milk from this valley. Poultry-raising is also beginning to be managed in a systematic way, and is becoming an important source of revenue.

The rapid descent and large volume of several of the streams offer great possibilities for development of electric power. Companies for this purpose are already at work, the point of the delivery of the power to be Goldfield and Tonopah, some 80 miles to the eastward. One plant of this kind has been in operation for three years, furnishing light and power for the incorporated town of Bishop.

Text-books on California mineralogy credit Inyo with having the largest variety of minerals of any county. About one hundred and fifty different substances have been listed, including all the common metals in large quantity and many rarer ones. While not the most important, probably the most unique in local mineral production is the soda plant on the shore of Owens Lake, where the highly mineralized water of the lake is evaporated and the salts thus obtained gathered for refining. Marble, slate, and building material are included in the make-up of this well-favored county.

The greatest drawback is that of communication. As previously mentioned, the county is wholly cut off from western California by the Sierras.

The grand scenic attractions of the county have been painted by Bierstadt and described by many travelers who have ventured into the Sierra fastnesses. When communication is opened so that the trip can be made with comfort, and without too great a loss of time, the county will unquestionably have many summer visitors.

STATISTICS OF INYO COUNTY, 1905-6.

General Statistics.

Value of country real estate	$1,160.932
Of improvements thereon	$528.415
Of city and town lots	$166.285
Of improvements thereon	$218,937
Of personal property	$630.836
Total value of all property	$2,749,697
Expended for bridges, last fiscal year	$7.000
Road levy per $100, 1906	25 cts.
Value of county buildings	$30.000
Irrigating ditches—miles, 98; cost	$160,000
Railroads—One piece of steam—miles, 74¼; assessed value	$1,859 per mile
Electric power plants—2; assessed value	$112,000
Electric power lines—miles, 15; assessed value not given.	

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.
Wheat	5.000	1,500
Barley	1.200	------
Corn	4.000	------
Oats	2.000	------
Alfalfa hay	28,000	------

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		20,000	1,500	21,500
Apricot		400	50	450
Cherry		400	20	420
Fig		100	1	101
Peach		10,000	2,500	12,500
Pear		2,500	250	2,750
Plum		500	100	600
Prune		4,000	500	4,500
Quince		100	------	100
Almond		------	50	50
Walnut		1,000	250	1,250
Raisin grapes	acres	100	------	100
Table grapes		150	------	150
Wine grapes		300	------	300
Currants	acres	50	------	50
Gooseberries		10	------	10
Raspberries		10	------	10
Strawberries		50	------	50
Blackberries		50	------	50

Livestock Industry.

	Number.	Value.
Cattle—Beef	180	$5,400
Stock	17,500	175,000
Thoroughbred	52	1,300
Dairy Cows—Graded	800	20,000
Swine	520	1,560
Common Horses	1.850	31,000
Work Horses	1,225	65,000
Colts	400	6,000
Mules	310	9,300
Sheep	11,650	28,375
Angora Goats	3,600	4,880

Miscellaneous.

Inyo County reports 600 dozen chickens, worth $2,400; 4,205 beehives, valued at $12,615; 200,000 pounds of honey, worth $1,600,000; and 2 flouring mills, the value of which are not given.

KERN COUNTY.

Kern County, lying in the southern end of the San Joaquin Valley, its eastern boundary extending on to the Mojave Desert over the extreme southerly end of the Sierra Nevada Mountains, is the second largest county in the State and probably has the most diversified resources of any.

At Randsburg, on the eastern border, is one of the largest gold mines on this coast, and the country around Randsburg has many smaller mines that are free-milling ore, which make them paying properties for people or corporations of small means.

Along the southern border where the line crosses the San Emidio Mountains are large deposits of iron ore and antimony which are yet undeveloped, and along the western side of the county are the Sunset, Midway, and McKittrick oil fields, lying along the eastern base of the Coast Range Mountains, and which promise to yield untold wealth in their future production of oil.

In the northern part of the county and surrounding the town of Delano, is a large body of good land which is now attracting considerable attention from investors, as development has shown that within a few feet of the surface lies an unlimited quantity of water which can be raised to the surface to transform the arid plains into orchards and alfalfa fields.

In the northeastern part is the mining town, Kernville, surrounded by good mines, and near it on the south fork of Kern River is the South Fork Valley, where numerous prosperous stockmen have their alfalfa fields that furnish feed to the stock that pasture in the high Sierras in the summer time.

In the center and surrounding the town of Bakersfield, the county seat, lie thousands of acres of fertile land that are irrigated by Kern River, and which are mostly used to raise stock and alfalfa, but will produce anything that can be raised where there is good land and an abundance of sunshine.

Quite a large amount of capital is being interested in the installation of pumping plants in the Weed Patch, which is a fertile tract of land lying at the base of the Coast Range and Sierra Nevada mountains, and ranging in distance between eight and twenty miles from Bakersfield in a southeasterly direction, and has heretofore been uncultivated on account of scarcity of water.

A short distance north of Bakersfield lies the famous Kern River oil field, the production from which has amounted to many million barrels, and which undoubtedly will produce for a great many years to come.

In the Kern River and Sunset oil fields we have numerous refineries that are producing thousands of tons of asphalt that finds a ready market in all parts of the United States.

There are two transcontinental railroads passing through the county, with branch roads running to the McKittrick, Sunset, and Kern River oil fields.

In the Kern River cañon we have one electric power plant, which furnishes light and power to the cities of Bakersfield and Kern. One completed, one nearly completed, and one just commencing work that will furnish electricity for Los Angeles.

STATISTICS OF KERN COUNTY, 1905-6.

General Statistics.

Area, 8,100 square miles, or 5,184,000 acres.

Number of farms	850
Number of acres assessed	2,844,470
Value of country real estate	$10,814,620
Of improvements thereon	$2,387,390
Of city and town lots	$1,535,060
Of improvements thereon	$1,965,175
Of personal property	$5,998,310
Total value of all property	$22,700,555
Expended on roads, last fiscal yr.	$33,910
Expended for bridges, last fiscal year	$5,680
Number of miles of public roads	1,600
Road levy per $100, 1906	25 cts.
Value of county buildings	$156,000
Irrigating ditches—miles, 208½; cost	$335,530
Railroads, steam—miles, 299; assessed value	$4,316,270
Railroads, electric—miles, 7½; assessed value	$48,750
Electric power plants—3; assessed value	$524,250
Electric power lines—miles, 94; assessed value	$150,450
Number of acres irrigated	120,000

Electric power plants do not include canal of Kern River Co. assessed at $517,000.

Pullman car equipment, $38,060, not included in railroad figures.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	15,000	6,450	$122,000
Barley	10,000	5,500	117,000
Corn	7,000	6,300	138,000
Total cereals	32,000	18,250	$377,000
Alfalfa hay	------	24,000	$192,000
Grain hay	11,000	14,000	140,000
Total hay	------	38,000	$382,000

In figures given on hay, only mention is made of that shipped out of county.

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		10,000	2,000	12,000
Apricot		25,000	------	25,000
Cherry		1,000	------	1,000
Fig		1,000	------	1,000
Lemon		500	------	500
Nectarine		1,000	------	1,000
Olive		5,000	------	5,000
Orange		6,000	500	6,500
Peach		40,000	6,000	46,000
Pear		1,500	------	1,500
Plum		6,000	------	6,000
Prune		40,000	------	40,000
Quince		500	------	500
Almond		2,000	------	2,000
Pecan		200	------	200
Walnut		200	------	200
Total fruit trees		139,900	8,500	148,400
Raisin grapes	acres.	1,000	------	1,000
Table grapes		100	------	100
Total acres grapes		1,100	------	1,100
Blackberries	acres.	20	------	20
Loganberries		5	------	5
Raspberries		5	------	5
Strawberries		25	------	25
Total acres berries		55	------	55

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Lemons (boxes)	1,000	$2,500
Oranges (boxes)	6,000	15,000
Totals	7,000	$17,500
Dried—	Pounds.	Value.
Apricots	300,000	$40,000
Peaches	250,000	23,000
Prunes	1,720,000	43,000
Raisins	1,250,000	62,500
Totals	3,520,000	$168,500
Canned—	Cases.	Value.
Apricots	650	$2,100
Pears	50	200
Peaches	2,300	8,050
Plums	40	110
Totals	3,040	$10,460

Above figures are on articles shipped out of county, as there is no way to secure correct data on that which is consumed within the county.

STATISTICS OF KERN COUNTY, 1905-6—Continued.

Livestock Industry.

	Number.	Value.
Cattle—Beef		
Stock	58,000	$1,160,000
Dairy Cows—Graded	2,000	60,000
Holsteins	100	3,500
Jersey	100	3,500
Calves	10,000	75,000
Swine	8,000	40,000
Horses—		
Thoroughbred	10	5,000
Common	8,000	480,000
Colts	1,500	37,500
Mules	1,300	104,000
Sheep—Common	135,000	540,000
Lambs	40,000	60,000
Total stock all kinds	264,010	$2,568,500
Wool (pounds)	1,430,000	$185,000

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 8,000	------	$16,000
Beeswax	800	200
Honey	225,000	11,250
Alfalfa seed	280,000	35,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	1,000	$5,000
Ducks	50	300
Geese	30	300
Turkeys	250	6,250
Eggs	65,000	13,000
Total value		$24,850

Dairy Industry.

	Production.	Value.
Creameries, 3.		
Butter (pounds)	467,500	$96,305

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	10,000	------
Sawmills (number)	3	------

Power used for mills and manufactories in county: Steam—number, 5; water—number, 1.

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	1	2	------	$1,500
Brick	3	51	5,350,000	44,800
Cigars	3	11	650,000	32,500
Confectionery	2	6	------	9,500
Flouring mills (barrels)	1	12	20,000	90,000
Foundries and iron works	2	50	------	18,975
Lime (barrels)	4	100	160,000	128,000
Hides (pounds)		----	356,430	42,770
Meat packed		----	------	4,000
Tallow (barrels)		----	565	7,345
Olive oil (gals.)		----	40	160
Planing mills	2	4	------	------

Productions Shipped Out of State.

Peaches, canned	1,500 cases
Apricots, canned	500 cases
Prunes, dried	160,000 lbs.
Beeswax	800 lbs.
Honey	200,000 lbs.

LAKE COUNTY.

By her sister counties, Lake has long been cheerfully accorded the title of "The Switzerland of America," owing to her beauty of scenery. The county is located in the heart of the Coast Range, about 100 miles north of San Francisco, and is about 75 miles long and 25 miles wide. Mount St. Helena guards the southern extremity. Clear Lake is a splendid sheet of fresh water 25 miles long and from 2 to 10 miles broad. With the lake surface at an elevation of 1,350 feet above sea-level; having a depth sufficient to float vessels of considerable tonnage and draft; receiving in its basin the waters from several streams of considerable flow; stocked with an amazing wealth of native food fishes; bordered by smiling valleys of great fertility, by orchards of luscious fruit, by gently swelling slopes, by rugged mountains, by wild cañons touched with a certain savage beauty; and bearing upon its heaving breast a constantly increasing proportion of the internal commerce of the community, Clear Lake is the pride of Lake County, as well as the source of its name.

Although classed as mountainous, Lake County has a number of very fertile valleys, some of them being of large area. Artesian water is obtainable in profuse quantities, and with comparatively small outlay of money or effort. Fields are growing luxuriant crops of grain, though annually sown in the same crops for more than a half century. A variety of soils is found throughout the county, and even the valleys show differences. Generally the valleys are rich with alluvium, but in places there are extensive tracts of adobe, black and heavy, and apparently inexhaustible in productiveness. Occasionally a sandy loam is found in the valleys, especially in the neighborhood of the streams traversing the county at short intervals. On the plateau crowning the low foothills which ring the valleys is a lighter soil, but when cleared is capable of raising large vineyards and orchards of peaches, prunes, etc. The rocky hillsides furnish pasture for flocks of Angora goats.

STATISTICS OF LAKE COUNTY, 1905-6.

General Statistics.

Area, 710 square miles, or 454,400 acres.

Number of farms	950
Number of acres assessed	338,568
Value of country real estate	$2,036,385
Of improvements thereon	$541,665
Of city and town lots	$214,315
Of improvements thereon	$246,050
Of personal property	$461,460
Total value of all property	$3,499,875
Expended on roads, last fiscal yr.	$12,000
Expended for bridges, last fiscal year	$3,000
Number of miles of public roads	550
Road levy per $100, 1906	46 cts.
Value of county buildings	$20,000
Irrigating ditches—miles, 20; cost	$7,000
Electric power plants, 3; assessed value	$2,100
Number of acres irrigated	150

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	3,130	------	------
Barley	2,011	------	------
Oats	1,412	------	------
Corn	361	------	------
Total cereals	6,914	------	------
Alfalfa hay	897	2,691	$13,455
Grain hay	4,741	6,000	30,000
Grass hay	740	1,000	5,000
Total hay	6,378	9,691	$48,455

Wine Industry.

Lake County reports seven wineries and 34,590 gallons of wine, worth $7,000, and 2,000 gallons of vinegar, worth $400.

STATISTICS OF LAKE COUNTY, 1905-6—Continued.

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		14,455	1,028	15,483
Apricot		1,606	240	1,646
Cherry		539	70	609
Fig		922	13	935
Olive		3,000	6	3,006
Orange		123	20	143
Peach		5,000	------	5,000
Pear		26,035	3,094	29,129
Plum		6,955	------	6,955
Prune		41,300	6	41,306
Other kinds		125	------	125
Almond		5,183	735	5,918
Total fruit trees		105,243	5,212	110,455
Raisin grapes	acres.	1	----	1
Table grapes		26	---	26
Wine grapes		500	200	700
Total acres grapes		527	200	727
Blackberries	acres.	24	--	24
Loganberries		10	----	10
Strawberries		10	----	10
Total acres berries		44	----	44

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds	Value.
Apples	1,000,000	$6,000
Apricots	20,000	600
Blackberries	35,000	1,400
Beans	1,108,000	11,000
Beets	25,000	500
Cabbage	12,000	1,200
Corn	13,000	650
Currants	600	24
Cherries	16,000	800
Figs	14,000	350
Gooseberries	1,000	60
Grapes	4,216,000	31,620
Loganberries	10,000	400
Onions	5,000	100
Olives	60,000	1,500
Pears	1,450,000	16,312
Peaches	100,000	2,000
Peas	2,000	50
Plums	10,000	100
Irish potatoes	450,000	5,750
Strawberries	--------	2,000
Tomatoes	--------	1,000
Totals	8,547,600	$83,416
Green—	Pounds.	Value.
Almonds	6,000	$600
Apples	45,000	2,700
Beans	9,000	270
Corn	640,000	6,400
Pears	330,000	26,400
Peaches	9,000	720
Plums	10,000	600
Prunes	1,000,000	20,000
Walnuts	2,000	200
Totals	2,051,000	$57,890
Canned—	Cases.	Value.
Beans	21,000	$4,200

Livestock Industry.

	Number.	Value.
Cattle—Beef	2,300	$57,500
Stock	6,265	52,650
Dairy Cows—Graded	1,563	30,000
Jersey	20	500
Calves	2,581	12,905
Swine	4,015	20,075
Horses—		
Thoroughbred	12	2,400
Common	2,092	104,600
Colts	389	7,780
Mules	222	16,650
Sheep—Common	8,192	24,576
Angora Goats	400	2,000
Common Goats	4,509	13,527
Total stock all kinds	32,560	$345,163
Wool (pounds)	95,000	$12,350
Mohair (pounds)	37,000	9,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	2,143	$6,500
Ducks	200	400
Geese	30	360
Turkeys	300	3,600
Eggs	100,000	15,000
Total value		$25,860

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	121,000	$605,000
Sawmills (number)	9	------
Lumber—Cedar (feet)	300,000	9,000
Sugar pine (feet)	500,000	7,500
Fir (feet)	2,000,000	20,000
Shakes	100,000	1,000
Total value		$642,500

Power used for mills and manufactories in county: Steam—number, 9.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 350	------	$600
Honey	4,000	400
Hops	120,000	15,600
Alfalfa seed	80,000	8,000
Grass seed	1,000	80
Millet	30,000	450
Mineral water (cases)	60,000	150,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Flouring mills (barrels)	3	----	6,000	$30,000
Meat products—				
Hides		----	7,000	7,000
Lard (lbs.)		----	25,000	3,000
Meat packed (tons)		----	100,000	10,000
Olive oil (gals)		----	100	300
Planing mills	3	10	------	10.000

STATISTICS OF LAKE COUNTY, 1905-6—Continued.

Dairy Industry.

	No	Pounds.	Value.
Creameries	4	--------	--------
Butter		90,000	$18,000

Productions Shipped Out of County.

	Amount.
Hay	150 tons
Apples, fresh	8,000 boxes
Apples, dried	45,000 lbs.
Peaches, dried	9,000 lbs.
Pears, fresh	36,000 boxes
Pears, dried	330,000 lbs.
Plums, dried	10,000 lbs.

Productions Shipped—Continued.

	Amount.
Prunes, dried	1,000,000 lbs.
Chickens	2,000 doz.
Turkeys	48,000 lbs.
Eggs	100,000 doz.
Beans, canned	21,000 cases
Hops	120,000 lbs.
Alfalfa seed	80,000 lbs.
Hides	65,000 lbs.
Sheep	2,000
Swine	3,000
Wool	95,000 lbs.
Butter	15,000 lbs.
Cheese	50,000 lbs.
Wine, sweet	75,000 gals.
Mineral water	45,000 cases

LASSEN COUNTY.

[The following article is found in "The Counties" number of "For California," the publication of the California Promotion Committee.]

Lassen County lies in the northeastern part of California along the Nevada line. It is traversed from south to north by the Nevada-California-Oregon Railway (narrow-gauge), which connects at Reno, Nevada, with the Southern Pacific system. The located line of the Western Pacific—in course of construction—runs through the southern portion of the county. Susanville, the county seat, is in Honey Lake Valley, a little south of the center of the county.

Lassen embraces large areas comprising rich valley lands, suited to agriculture; rolling hills and uplands, affording splendid range for stock; and mountain table lands covered with timber.

The county has a population of only about 5,000. It could easily support many times that number. The assessment roll now foots over five and a half millions. The county has no debt and the tax rate is only about $1.60 per $100 valuation. The people are generally well-to-do and prosperous. The bank at Susanville, with a capital of $50,000, has more than $300,000 on deposit, which shows a condition of easy finances.

The principal present industries are farming and stock-raising. There are paying mines in the county, but as a whole Lassen is not mineral. Timber lands which are not in forest reserves are now generally held in private ownership, but as yet the manufacture of lumber has not been commenced.

But farming and stock-raising will always be the principal industries of the county. Climate and soil are particularly adapted to them. The altitude of the largest, most fertile and most productive valleys, such as Honey Lake Valley, Big Valley, and Long Valley, is a little over 4,000 feet. Other large valleys, like Madeline Plains, Willow Creek Valley, and Secret Valley, are in the neighborhood of 5,000 feet above sea-level. While the high valleys are not as well adapted to general farming as the lower ones, they are quite productive, and well suited to the stock-raising business. The climate generally is similar to that of the northeastern states, so far as range of temperature is concerned, but our summer season is quite dry, making irrigation necessary as a rule. With irrigation, where the altitude is not too great, any of the ordinary products of the temperate zone can be produced in abundance and of fine quality. Apples, pears, cherries, peaches, apricots, and berries of all kinds do splendidly. Of farm products alfalfa is probably the most important, though native grasses, timothy, and redtop are extensively raised.

Good hay and grass and pure cold water make the county an ideal one for dairying. There are a number of creameries in the county, and their product commands the top price in city markets.

Improved farm lands range in price from $25 to $100 or more per acre.

District schools are scattered all over the county. A county high school is located at Susanville. There are quite a number of churches in the county, including Methodist, Baptist, Catholic, and others. Three weekly newspapers are published—the *Lassen Advocate* and *Lassen Weekly Mail* at Susanville, and the *Big Valley Gazette* at Bieber.

Susanville is the largest town, with a population of about 1,000. It has a good and abundant water supply and good facilities for fighting fire. Its stores are well stocked, and goods are sold at reasonable prices. Business buildings, as a rule, are substantial, and residences handsome.

Lassen County has a range of temperature wide enough to give a pleasing variety to the seasons. Health conditions are fine. Pulmonary diseases are very rare, and malaria almost unknown. There are still large quantities of land open to entry, which, with water for irrigation, will make good farms and homes. There is plenty of water to irrigate these lands.

STATISTICS OF LASSEN COUNTY, 1905-6.

General Statistics.

Area, 4,465 square miles, or 2,857,600 acres.

Number of farms	645
Number of acres assessed	665,389
Value of country real estate	$3,379,865
Of improvements thereon	$423,050
Of city and town lots	$90,690
Of improvements thereon	$187,925
Of personal property	$1,111,536
Total value of all property	$5,193,066
Expended on roads, last fiscal yr.	$18,655
Number of miles of public roads	625
Road levy per $100, 1906	40 cts.
Value of county buildings	$45,000
Irrigating ditches; cost	$25,000
Railroads, steam—miles, 115; assessed value	$253,121
Electric power plants—2; assessed value	$3,900
Number of acres irrigated	26,240

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	5,300	2,450	$48,750
Barley	1,500	500	12,800
Oats	425	190	4,900
Rye	430	85	2,300
Total cereals	7,655	3,225	$68,750
Alfalfa hay	4,225	16,000	$80,000
Grain hay	115	345	1,380
Grass hay	90,000	19,600	117,600
Total hay	94,340	35,945	$198,980

Number of Fruit Trees and Vines.

	Bearing.
Apple	18,000
Apricot	110
Cherry	1,525
Peach	3,985
Pear	550
Plum	625
Prune	1,432
Walnut	150
Total fruit trees	26,377

Fruit Trees and Vines—Continued.

	Bearing.
Blackberries (acres)	10
Currants (acres)	3
Gooseberries (acres)	4
Loganberries (acres)	2
Raspberries (acres)	14
Strawberries (acres)	25
Total acres berries	58

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	65,100	$1,803
Blackberries	3,800	380
Beans	1,500	750
Beets	40,000	2,000
Cabbage	5,000	200
Corn	15,125	425
Currants	500	100
Cherries	4,500	225
Gooseberries	600	125
Loganberries	300	150
Onions	20,000	800
Pears	11,000	225
Peaches	20,000	6,000
Peas	3,000	150
Plums	21,000	630
Irish potatoes	200,000	2,000
Prunes	4,500	225
Raspberries	6,050	625
Strawberries	3,000	400
Tomatoes	7,500	800
Totals	432,475	$18,013

Livestock Industry.

	Number.	Value.
Cattle—Beef	10,000	$200,000
Stock	31,000	550,000
Dairy Cows—Graded	2,700	75,000
Calves	11,000	18,000
Swine	3,800	9,000
Horses—		
Thoroughbred	8	10,000
Standard-bred	2,100	105,000
Common	5,000	100,000

STATISTICS OF LASSEN COUNTY, 1905-6—Continued.

Livestock Industry—Continued.

	Number.	Value.
Colts	850	$12,750
Mules	400	7,500
Sheep—Common	65,000	195,000
Lambs	9,500	23,500
Common Goats	75	300
Total stock all kinds	141,433	$1,306,050
Wool (pounds)	290,000	$58,000

Dairy Industry.

	No.	Production.	Value.
Creameries	4	------	------
Butter (pounds)		600,000	$108,000
Cheese (pounds)		50,000	7,500

Poultry and Eggs.

	Dozen.	Value.
Chickens	1,600	$6,150
Ducks	30	425
Geese	12	275
Turkeys	80	2,575
Eggs	25,000	6,400
Total value		$15,825

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	270 825	$1,920,000
Sawmills (number)	7	35,000
Fuel, wood (cords)	16,000	27,000
Lumber—Cedar (feet)	90,000	2,000
Pine (feet)	2,085,000	33,500
Posts (pieces)	12,000	1,150
Shakes	30,000	350
Shingles	350,000	1,050
Total value		$2,020,050

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 3,500.		
Honey	121,000	$12,100
Alfalfa seed	210,000	21,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Confectionery (pounds)	2	2	5,000	$1,000
Flouring mills (barrels)	3	8	6,000	56,000
Hides		--	1,000	3,000
Lard (pounds)		--	8,000	1,000
Meat, packed (tons)		--	35	10,500
Planing mills	3	6	------	18,000

Lassen County reports 1 brewery; output, 212 barrels of beer, valued at $1,060.

Power used for mills and manufactories in county: Steam—number, 7.

Productions Shipped Out of State.

Apples, fresh	300 boxes
Peaches, fresh	1,500 boxes
Chickens	300 doz.
Turkeys	1,250 lbs.
Alfalfa seed	185,000 lbs.
Cattle	6,000
Hides	1,000
Horses	2,700
Sheep	30,000
Swine	1,100
Wool	280,000 lbs.
Butter	58,000 lbs.
Cheese	47,500 lbs.
Lumber	1,500 M.

LOS ANGELES COUNTY.

In wealth, population, and resources Los Angeles is the most important county in Southern California. There are two rivers in the county: the Los Angeles and the San Gabriel. During a large part of the year these are dry beds of sand, what little water they contain finding its way through the porous sand to the bedrock. In the winter they are dangerous streams. The Los Angeles River rises in the western part of the San Fernando Valley, about 12 miles northwest of the city, and flows easterly 18 miles to the Los Angeles Pass. Its stream is fed all along by springs. Two other "rivers," the Pacoima and the Tejunga, join it in the San Fernando Valley. Turning south, it flows through the Los Angeles Pass, and on through the city.

Los Angeles County embraces within its limits a great variety of scenery and climate. Within its territory may be found the climate and scenery of almost every part of the State, from the cool and breezy seashore to the warm inland plains and bracing mountain tops. Of the area of the county, about four fifths is capable of cultivation, the remainder being mountainous. The shore line is 85 miles in length. Nine tenths of the population is within thirty miles of the ocean.

The marvelous growth which has been made during the past few years may be seen from the statement that, within the space of twenty-four years, the population of the county has increased more than tenfold, and the assessed valuation of property in proportion.

The chief industry is horticulture, the list of products including everything that can be grown in the State, and almost everything that can be raised in semi-tropic countries. The area of land devoted to horticultural purposes is being rapidly extended, as the large tracts are subdivided and improved.

The county is well provided with transportation facilities. A dozen lines of railroad center in Los Angeles City, tapping almost every section of the county, while coast steamships call regularly at the leading seaports.

Perhaps the most important enterprise for Los Angeles is the big breakwater by the Federal Government at San Pedro. By means of this breakwater the depth of water over the bar will be so increased as to permit ocean-going vessels to come to the wharves, and Los Angeles will then be able to compete for its share of the growing Oriental trade. Other shipping points of the county are Port Los Angeles, near Santa Monica, and Redondo.

The San Gabriel Valley, a choice section of Los Angeles County, has the Sierra Madre range on the north. These mountains are grand and precipitous, inclosing the valley like a wall. This valley is the best known of any portion of Southern California. Even before there was any "boom" here worthy of mention, lands in the valley commanded a comparatively high price. As with most attractive sections, the level-headed mission fathers discovered its advantages, and founded the San Gabriel Mission—whose church is still in good preservation—in 1771. Now railroads traverse the valley, and the land is rapidly being transformed into a succession of small homes and thriving little cities. The valley contains 100 square miles of territory. The San Gabriel contains some of the choicest fruit land in Southern California, and is largely devoted to the raising of oranges and lemons, as well as deciduous fruits.

Pasadena, a beautiful city, is located at the foot of the Sierra Madre range, about seven miles from Los Angeles. Within twenty years Pasadena has grown from a sheep pasture to a city of beautiful homes, with a world-wide reputation. Other settlements in the valley are Alhambra, Monrovia, Duarte, and Azusa, all of which are mainly supported by horticulture.

Adjoining San Gabriel Valley on the east is Pomona Valley. Irrigation is cheaply supplied to this section from the San Antonio River. The soil and climate are peculiarly adapted to the culture of citrus fruits. Railroad facilities are very good, and increasing, which has caused the valley to settle up rapidly. It contains a number of flourishing towns, the chief of which is Pomona, one of the most thriving cities of Southern California. For miles in every direction around Pomona extend continuous orchards of oranges, lemons, apricots, peaches, prunes, olives, and other fruit trees, a specialty being made of olive culture.

Other important sections of the county are Los Nietos Valley, a well-watered district, noted for corn, alfalfa, and dairy products; the stretch of country between Los Angeles City and the ocean; San Fernando Valley, north of Los Angeles, in which a large amount of fine wheat is raised; and Antelope Valley, an elevated region in the northern part of the county, where land is cheap and, with water, very productive.

Los Angeles enjoys railroad competition in the shape of three transcontinental lines. The Pacific Coast Steamship Company runs vessels every few days from Los Angeles County ports to San Francisco and San Diego.

There is a great variety of soil in Los Angeles County, varying from light sandy loam to heavy adobe.

A mistaken idea prevails to some extent that farming is only carried on in Los Angeles County by means of irrigation, and that without it crops would be a failure. For grains and winter crops irrigation is not employed. Corn is irrigated in some localities, being a summer crop, but is successfully grown in many places without irrigation. Upon some lands, after a crop raised without irrigation has been harvested, another is raised by means of irrigation. On irrigated land two or three crops a year are frequently raised. With an artificial supply of water, the farmer is rendered independent of the season's rain, while the product of his lands is enormously increased.

The development of the horticultural industry during the past few years has been remarkable. The most important horticultural product is the orange. Besides the orange and lemon, the principal fruits raised are the almond, fig, prune, apricot, walnut, peach, pear, and berries.

Deciduous fruits are shipped fresh, canned, dried, and crystallized. An active demand for our dried fruits has grown up in Europe.

Alfalfa, which is largely grown for hay, is a most valuable forage plant. It is cut from three to six times a year. Large quantities of wheat and barley are raised. Corn sometimes grows to a height of twenty feet. Pumpkins have been raised weighing over 400 pounds. There is a beet-sugar factory at Alamitos. Los Angeles honey is celebrated all over the country. In the neighborhood of Los Angeles calla lilies, tuberoses, carnations, and other flowers are grown by the acre. Hundreds of acres are devoted to the cultivation of celery, which is shipped East by the trainload. Winter vegetables, such as string beans, tomatoes, green peas, and chile peppers, constitute a big business.

Until only a few years ago, most of the butter consumed in Southern California was imported from the North and East. This is no longer the case, a number of creameries having been established during the past few years, with most successful results.

Poultry does well in Los Angeles County when it is given the same attention it receives in the East. Eggs always command a good price.

Ostriches are raised for their plumes, and the industry is profitable. There is a large ostrich farm at South Pasadena.

Among the game found in the county are wild geese, ducks, snipe, rabbits, squirrels, foxes, deer, wildcats, California lions and bear, the latter being found in the northern part of the county.

The angler finds plenty of trout in the mountain cañons. In the ocean there is excellent fishing, both with line and seine, and some remarkable catches are made. The yellowtail, ranging from 15 to 80 pounds, is very numerous in the waters of the Pacific. The tuna attains a length of five feet or more, and a weight of from 100 pounds upward. "Jewfish" are sometimes caught weighing 400 pounds.

Although Los Angeles County is chiefly noted as a horticultural section, its mineral wealth is by no means unimportant. Including petroleum, it ranks fourth in mineral products among the counties, and is the only one which leads in five mineral products. Los Angeles is the center of a number of rich mineral fields in Southern California which annually produces many millions of dollars.

One of the most remarkable features of development in Los Angeles County has been the greatly increased production of petroleum. For over twenty-five years petroleum has been produced on a limited scale in Los Angeles and Ventura counties, but it is only within the past few years that the industry has assumed great importance. The oil produced in California differs from that of the Eastern States, being of a heavier grade, with an asphaltum base, and it is used almost exclusively for fuel. It has been adopted by most of the leading factories of this section, and is used largely by the railroads. A careful test made with a locomotive showed that oil at $1 a barrel is equivalent to coal at $4 a ton.

The school facilities of Los Angeles are especially good. Besides the complete system of public schools, private schools and colleges abound in Los Angeles, Pasadena, and other towns. Many Eastern people avail themselves of the opportunity to send children with a tendency to weak lungs to a country where plenty of out-of-door exercise is a possibility every day in the year. Most of the leading religious denominations are represented, not only by scores of churches, but also by one or more religious colleges. The work of the school is further supplemented by an army of specialists in music, painting, and every department of art. The Chautauqua has an active membership of nearly a thousand, and meets annually at Long Beach. Lectures and other entertainments, by home and foreign talent, are of almost daily occurrence. The educational and social facilities afforded by Los Angeles are, in the widest sense of the word, unsurpassed. Public libraries are numerous and well stocked with the latest works.

Catalina Island is a most attractive and popular resort in the Pacific, just off the coast of Los Angeles County. Between this resort and Los Angeles City there is a most excellent rail and boat service.

STATISTICS OF LOS ANGELES COUNTY, 1905-6.

General Statistics.

Area, 4,000 square miles, or 2,560,000 acres.

Number of farms	5,755
Number of acres assessed	759,408
Value of country real estate	$41,430,990
Of improvements thereon	$7,307,880
Of city and town lots	$130,167,255
Of improvements thereon	$63,542,475
Of personal property and money	$56,755,488
Total value of all property	$299,204,088
Expended on roads, last fiscal yr.	$217,143
Expended for bridges, last fiscal year	$8,652
Number of miles of public roads	7,500
Road levy per $100, 1906, 60 cents; total	$326,021
Value of county buildings and furniture	$1,800,616
Value of school property—furniture and libraries	$3,165,085
Irrigating ditches and conduits—cost	$500,000
Railroads, steam—miles, 649.79; assessed value	$6,772,706
Railroads, electric—miles, 755.69; assessed value	$11,556,285
Electric power plants and substations—19; assessed value	$1,050,500
Electric power lines—miles, 1,951.74; assessed value	$847,240

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	25,000	17,500	$450,000
Barley	60,000	35,000	700,000
Corn	5,000	3,500	90,000
Total cereals	90,000	56,000	$1,240,000
Alfalfa hay	4,000	25,000	$250,000
Grain hay	25,000	35,000	400,000
Total hay	29,000	60,000	$650,000

Number of Fruit Trees and Vines.

		Bearing.	Non Bearing.	Total.
Apple		105,255	40,235	145,490
Apricot		134,990	28,850	163,840
Cherry		1,350	------	1,350
Fig		19,245	1,140	20,385
Lemon		435,418	37,520	472,938
Nectarine		1,940	250	2,190
Olive		233,720	4,065	237,785
Orange		1,738,213	389,280	2,127,493
Peach		161,770	40,030	201,800
Pear		57,995	8,780	66,775
Plum		35,860	6,005	41,865
Prune		58,010	5,100	63,110
Quince		4,650	470	5,120
Almond		143,700	------	143,700
Pecan		1,130	------	1,130
Walnut		220,000	50,000	270,000
Total trees		3,354,376	611,725	3,966,101
Raisin grapes	acres.	200	------	200
Table grapes		2,935	415	3,350
Wine grapes		9,540	1,270	10,810
Total acres		12,675	1,685	14,360
Blackberries	acres.	455	------	455
Raspberries		215	------	215
Strawberries		1,215	------	1,215
Total acres		1,885	------	1,885

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,500,000	$15,000
Apricots	5,000,000	75,000
Asparagus	10,000	1,250
Blackberries	800,000	48,000
Beans	940,000	23,500
Beets	200,000	1,000
Cabbage	5,000,000	45,000
Celery (dozen)	100,000	20,000
Cauliflower	6,000,000	100,000
Cherries	10,000	500
Figs	400,000	14,000
Grape-fruit	140,000	16,500
Lemons (boxes)	736,100	2,576,350
Loganberries	200,000	24,000
Nectarines	10,000	500
Oranges (boxes)	1,669,500	4,591,125
Pears	500,000	12,500
Peaches	5,000,000	82,500
Peas	1,000,000	30,000
Persimmons	10,000	500
Plums	800,000	14,000
Irish potatoes	4,000,000	35,000
Sweet potatoes	1,000,000	10,000
Prunes	600,000	9,000
Raspberries	75,000	9,000
Strawberries	7,000,000	420,000
Tomatoes	1,400,000	75,000
Total value		$8,249,225

STATISTICS OF LOS ANGELES COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.—Continued.

Dried—	Pounds.	Value.
Almonds	40,000	$6,000
Apples	500,000	67,500
Beans	9,500,000	280,000
Onions	1,500,000	40,000
Peaches	350,000	28,000
Peanuts	3,000	150
Prunes	90,000	2,500
Walnuts	6,096,330	723,150
Totals	18,079,330	$1,147,300

Canned—	Cases.	Value.
Apricots	175,000	$525,000
Blackberries		
Figs		
Grapes		
Pears		
Peaches		
Plums		
Raspberries		
Strawberries		
Tomatoes	75,000	120,000
Chile, 1900 tons	------	85,000
Beans	13,000	24,500
Totals	26,400	$754,500

Wines, Brandies, Etc.

Number of wineries, 60; number of breweries, 3.

	Gallons.	Value.
Wine—Angelica	125,000	$35,000
Burgundy	6,000	1,200
Cabernet	6,000	1,200
Claret	650,000	97,500
Hock	36,000	9,000
Madeira	5,000	1,300
Malaga	5,000	1,300
Muscatel	65,000	18,200
Port	600,000	156,000
Reisling	150,000	30,000
Sauterne	10,000	2,000
Sherry	200,000	56,000
Tokay	5,000	1,250
Zinfandel	60,000	12,000
Totals	1,923,000	$421,950
Beer (barrels)	168,570	$1,220,000

Fish Industry.

	Pounds.	Value.
Sardines and macker'l	800,000	$56,500
Other kinds	4,069,941	203,500
Totals	4,869,941	$260,000

Dairy Industry.

	No.	Production.	Value.
Dairies, milk (gallons)	600	106,000,000	$1,590,000
Skimming stations	6	----------	----------
Butter (lbs.)	12	500,000	150,000
Cheese (lbs.)	--	1,000,000	160,000
Cream (gals.)	--	800,000	60,000

5,000,000 pounds of butter manufactured from products shipped in from other counties.

Livestock Industry.

	Number.	Value.
Cattle—Beef	1,000	$40,000
Stock	2,000	60,000
Dairy Cows—Graded	3,000	120,000
Angus	25	1,000
Guernsey	50	3,250
Herefords	50	3,250
Holsteins	100	6,500
Jersey	200	10,000
Calves	8,000	40,000
Swine	3,000	30,000
Horses—		
Thoroughbred	100	25,000
Standard-bred	200	40,000
Common	500	40,000
Colts	500	15,000
Mules	100	8,000
Sheep—Common	60,000	270,000
Lambs	20,000	60,000
Common Goats, Catalina	12,000	4,800
Wool (pounds)	500,000	60,000

Manufactories.

	No.	No. of Employes.	Quantity Produced.	Value of Product.
Bookbinderies	16	321	----------	$424,710
Paper boxes	7	154	----------	171,950
Wood boxes	5	105	1,850,000	298,000
Brick	15	650	110,000,000	660,000
Brooms (doz.)	8	67	47,100	120,290
Carriages and wagons	54	443	1,539	751,720
Cigars	35	300	5,500,000	220,000
Clothing	9	674	----------	979,800
Coffee, spices, etc. (lbs.)	10	140	4,026,700	678,580
Confect'ry (lbs.)	23	426	6,313,725	963,510
Cooper-shops	5	26	105,000	131,000
Grist mills	9	217	----------	3,038,855
Felt piano hammers (sets)	1	50	28,922	76,315
Foundries and iron works	17	832	----------	1,620,000
Felt (lbs.)	1	100	197,146	204,290
Furniture	30	400	----------	1,513,000
Fertilizer (tons)	5	64	10,880	320,350
Jewelry	10	83	----------	180,150
Leather goods	225	550	----------	750,000
Art leather	16	158	----------	189,000
Lime (barrels)	1	12	15,500	15,500
Macaroni (lbs.)	3	25	1,715,000	68,600
Malt (tons)	3	---	3,408	137,940
Meat products	5	670		
Hides (lbs.)		---	5,376,570	661,660
Lard (lbs.)		---	2,931,000	297,200
Meat packed (tons)		---	17,675	2,641,000
Tallow (bbls.)		---	6,185	118,000
Olive oil (gals.)	5	66	144,500	231,750
Paper (lbs.)	1	20	2,400,000	60,000
Pickles (gals.)	7	120	467,930	131,600
Pickled olives (gallons)	4	70	133,550	46,270
Iron pipe	7	360	----------	1,356,810
Sewer pipe	3	93	15,200	163,715
Planing mills	53	1745	----------	4,889,720
Potteries	6	35	----------	43,000
Soap (lbs.)	3	71	5,308,000	257,725
Shoes and slippers	3	166	186,010	189,621

STATISTICS OF LOS ANGELES COUNTY, 1905-6—Continued.

Manufactories—Continued.

	No.	No. of Employes.	Quantity Produced.	Value of Product.
Artificial stone		---	----------	$725,000
Granite		---	----------	77,085
Syrups and extracts	9	65	239,500	193,095
Tanneries	2	36	15,150	292,750
Tin and galvanized iron	45	169	----------	357,105
Willow and wooden ware	3	39	----------	80,235
Wall plaster (tons)	2	25	26,000	70,000
Trunks	10	85	24,400	173,850
Art metal	11	162	----------	300,500
Paint	6	88	----------	495,000

Forest Products.

Area of timber lands, 60,000 to 70,000 acres are embraced in Government Forest Reserve.

Fuel, wood, 5,000 cords, valued at $30,000.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—number, 40,000	------	$200,000
Beeswax	9,000	2,050
Flowers and plants (acres)	350,000	30,640
Honey	696,666	34,833
Alfalfa seed	10,000	15,000
Sugar beets (tons)	50,000	250,000
Oil (barrels)	3,545,000	1,595,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	30,000	$175,000
Ducks	3,000	15,000
Geese	500	3,000
Turkeys	5,000	90,000
Eggs	2,000,000	600,000
Total value		$883,000

Productions Shipped Out of State.

Almonds	35,000 lbs.
Apricots, dried	500,000 lbs.
Apricots, canned	1,500 cases
Grape-fruit	70,000 boxes
Lemons	704,900 boxes
Oranges	1,520,700 boxes
Peaches, dried	325,000 lbs.
Peaches, canned	1,000 cases
Pears, canned	600 cases
Strawberries, fresh	1,500,000 lbs.
Walnuts	6,050,000 lbs.
Beans, dried	4,500,000 lbs.
Beeswax	750 lbs.
Cabbage	2,000,000 lbs.
Honey	418,000 lbs.
Celery	50,000 lbs.
Onions, dried	450,000 lbs.
Irish potatoes	10,000 sacks
Sweet potatoes	1,000 sacks
Tomatoes, fresh	15,000 boxes
Wool	350,000 lbs.
Beer	10,600 bbls.
Wine, sweet	866,250 gals.
Wine, table	800,000 gals.
Sardines	7,000 cases
Brick	600,000
Brooms	7,250 doz.
Cigars	1,750,000
Olive oil	34,800 gals.
Olives, pickled	50,000 gals.

MARIN COUNTY.

Marin County is decidedly one of water frontage, being bounded on the west and south by the Pacific Ocean and by the Golden Gate, which separates it from San Francisco by only a mile and a half at its nearest point, and on the east by San Francisco Bay.

The topographical features are rolling hills and numerous small valleys. A part of the Coast Range crosses Marin in a northwesterly and southeasterly direction, and much of the surface of the county is broken and hilly, but a considerable portion immediately on the shore is composed of marsh and overflowed lands. The highest land is Mount Tamalpais, which has an elevation of 2,608 feet.

The soil varies from the rich adobe clay of the salt marshes to the sharp, gravelly loam of the higher foothills. In the valleys it is composed of heavy black loam with an admixture of gravel; in the foothills a reddish loam prevails, sharper, and carrying less adobe. It is all easily worked, heavily charged with the elemental constituents of plant life, admirably suited to horticultural purposes, and wherever worked to fruit yields heavily. Irrigation is not required. The depth of the soil, its retentive nature, and ample rainfall in winter, render artificial watering unnecessary.

Annual average rainfall at Point Reyes, 17.56; Point Bonita, 25.39; San Rafael, 39.58. Mean summer temperature of San Rafael, 76° for June, July, August and September; for the other months, 61°.

The principal industry is dairying, but of late years attention has been paid to fruit-growing. Some of the finest apples grown in the State are produced. On the dairy lands of the Novato ranch there are ten orchards. On every rented subdivision of this, and the Burdell ranch, are apple, pear, quince, fig, pomegranate, persimmon, apricot, peach, plum, and other fruit trees, the thrifty growth and large yield from which prove the superior adaptability of the soil and climate of this portion to fruit-growing. On the Novato ranch is one of the largest fruit orchards, including one of the oldest and most celebrated apple orchards in the State.

The land is generally held in large tracts, and rented out for dairying purposes. As a result there is but a sparse population, and but little advance is made in horticulture, although the greater part of the county is eminently fitted for this industry. The DeLong orchard was planted in 1857, and has been in continuous bearing from the beginning.

Immense amounts of vegetables are shipped from the lowlands.

The shipments of butter are enormous, and the quality is first class.

Most of the large ranches are stocked by the owners, and divided into tracts, which are leased at annual rentals, according to the number of cows.

San Rafael is the county seat. It has many fine buildings, public and private, elegant hotels, banks, fine churches, schools, electric lights, and a perfect sewerage system. It is a noted place of residence for San Francisco business men, and its hotels are a favorite resort for invalids and tourists. Its climate is regarded as very favorable for those with pulmonary complaints. Its private dwellings are elegant and its drives most beautiful and romantic. The road to the summit of Mount Tamalpais is a continuous and easy grade. San Rafael, in a sheltered valley, is secure from ocean fogs and winds. It is in constant communication with San Francisco by rail and ferry at Point Tiburon.

Sausalito is also a favorite place of residence for San Francisco businessmen, possessing features similar to San Rafael. Novato is the center of the fruit district; Point Reyes of the dairy interests.

At San Quentin is located one of the two State prisons. It is situated on San Francisco Bay, about 12 miles north of San Francisco, with which it is connected by ferry.

STATISTICS OF MARIN COUNTY, 1905-6.

General Statistics.

Area, 516 square miles, or 330,000 acres.

Number of farms	400
Number of acres assessed	324,624
Value of country real estate	$5,765,250
Of improvements thereon	$1,244,680
Of city and town lots	$2,870,020
Of improvements thereon	$2,706,715
Of personal property	$1,277,510
Total value of all property	$13,864,175
Number of miles of public roads	268
Road levy per $100, 1906	35 cts.
Value of county buildings	$115,000
Railroads, steam—miles, 85.05; assessed value	$978,030

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	782	12,103	$351,076
Corn	43	380	1,706
Total cereals.	825	12,483	$352,782
Hay	5,676	29,728	$264,492

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	7,660	1,963	9,623
Apricot	2,312	50	2,362
Cherry	213	----	213
Fig	32	----	32
Olive	3,000	----	3,000
Orange	189	----	189
Peach	2,170	50	2,220
Pear	771	----	771
Plum	331	20	351
Prune	3,326	100	3,426
Quince	232	----	232
Almond	140	----	140
Walnut	2	25	27
Total fruit trees	20,378	2,208	22,586
Wine grapes (acres)	2,036	55	2,091

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apple	462,600	$1,251
Beans	650	13
Beets	2,200	1,100
Cabbage	2,800	420
Celery	1,000	30
Cauliflower	22,500	225
Cherries	400	30
Grapes	760,000	7,700
Onions	8,500	85
Pears	6,000	80
Peaches	1,280	640
Peas	7,500	94
Quinces	5,220	52
Tomatoes	318,000	3,212
Total value		$14,932

Dried—	Pounds.	Value.
Onions	20,000	$200
Prunes	4,000	120
Totals	24,000	$320

Livestock Industry.

	Number.	Value.
Cattle—Beef	704	$17,690
Stock	4,300	118,604
Dairy Cows—Graded	24,495	797,820
Holsteins	2,362	60,865
Jersey	1,505	65,000
Shorthorns	700	------
Calves	3,527	20,870
Swine	9,953	72,234
Horses—		
Thoroughbred	2	------
Standard-bred	1	------
Common	3,056	210,010
Sheep—Common	1,315	3,615
Lambs	223	426
Total stock all kinds	52,143	--------
Wool (pounds)	2,811	365

STATISTICS OF MARIN COUNTY, 1905-6—Continued.

Dairy Industry.

	No.	Production.	Value.
Creameries (lbs.)	3	109,500	$13,687
Butter (pounds)	--	2,114,390	429,888
Cheese (pounds)	2	2,400	240
Cream (gallons)	--	130,790	7,684

Wines, Etc.

Marin County reports 2 wineries with an output of 46,700 gallons of claret wine, worth $6,750; and 1 brewery with an output of 4,000 barrels of beer, worth $12,500.

Poultry and Eggs.

	Dozen.	Value.
Chickens	13,172	$79,800
Ducks	10	90
Geese	19	228
Turkeys	32	787
Eggs	1,521,337	301,011
Total value		$381,916

MENDOCINO COUNTY.

Mendocino County has 100 miles of coast-line. In general topography it is mountainous, with valleys lying between the mountain chains and along the coast. It, together with the counties of Humboldt and Trinity, embodies the greater part of the northern Coast Range mountains, and contains their highest peaks and deepest cañons, fertile valleys, wooded slopes, rushing rivers, and picturesque scenery. It shares with Sonoma, Humboldt, and Del Norte the glory of the great redwood belt.

The county has a length of 85 miles from north to south, and the width is 45 miles from east to west. It is traversed the entire length by the Coast Range, which is composed of two parallel ridges. These mountains vary in height from 1,000 to 3,000 feet. Their lower slopes have a gentle declivity, while the higher portions are generally precipitous and furrowed with ravines and gulches. There are many small productive valleys throughout the county.

Mendocino is well watered with the numerous streams which take their rise in the mountain chain which intersects her territory. The Eel River, running north, and the Russian River, running south, have their sources in this county, and are the principal streams. A large number of tributaries connect with them, while down the slope of the western ridge large numbers of creeks, some of which might aspire to the dignity of rivers, find their way to the Pacific.

Almost the entire coast section is composed of valleys, in some places extending inland five miles, and the soil is very fertile and productive. The towns are all short distances apart, and most of the larger ones have large sawmills and are the shipping points for large quantities of lumber, ties, tanbark, etc.

In Ukiah Valley there is the greatest variety of soil, even on a small tract. All of the best lands are under cultivation. Holdings are not large, 200 acres of valley land being an exceptional farm, and the tendency is to subdivision.

The soil in Yorkville Valley is a rich, black loam, and well adapted to the growing of vegetables, fruits, grains, and hops. The soil of the hillsides and mountains is well suited to the growing of grass, vines, and fruits, and in some places grain.

Anderson Valley is a long, narrow strip of land lying between two chains of mountains. It extends 17 miles southeast and northwest, and is from 1 to 2 miles in width. The soil in this valley is a rich alluvium, and is well adapted to the growing of vegetables, fruits, and cereals. The soil of the hills is a rich, black loam, except in a few places, where there is adobe and gravel.

In Potter Valley the soil is mostly a sedimentary deposit, but a variety exists—some clay, a small amount of adobe, and some lands well adapted to fruit-raising.

In Little Lake Valley the soil generally is a rich, sandy loam, but in a few places a black loam is found. The soil is very productive, and never in the history of the valley has there been anything approaching a failure.

Wheat, barley, oats, and corn are the principal grains raised. Hops, beans, potatoes, and garden vegetables of various kinds are raised profitably in several localities. Fruits of widely varied nature are grown in gradually increasing quantities, oranges, lemons, figs, prunes, peaches, plums, apricots, apples, and pears being cultivated. The apples have been noted for their excellence for nearly twenty years. The Bartlett pears are eagerly sought by the canning companies. The planting of pear orchards has been encouraged of late years by the demonstration repeatedly given that this fruit tree is a reasonably certain bearer, and the returns are large. Strawberries, blackberries, and loganberries are cultivated increasingly, with good results.

There are extensive horse and cattle ranges. Dairying is a remunerative occupation, and with railroad facilities this line of production will be vastly increased. The making of cheese is followed with profit in Upper Lake.

Large bodies of sugar and yellow pine, fir, cedar, and oak give employment to several sawmills and furnish the home market a good quality of lumber. The minerals have heretofore been represented by the quicksilver industry, although gold, silver, copper, and oil have been discovered in small quantities. Besides quicksilver, immense quantities of mineral water have been bottled at the many mineral springs and shipped to all parts of the country. The several mineral springs are the sites for as many health resorts, as many as thirty thousand guests being entertained from all parts of the country each summer. Some of them go to the resorts for their health, the bright, clear atmosphere being very beneficial, and the waters frequently having a highly curative property in certain complaints. Others seek the deer, the fishing, and other sports. Among the resorts are Bartlett, Highlands, Adams, Harbin, Zeigler, Witter, and Anderson springs; Blue Lakes, Laurel Dell, Hoberg's, Soda Bay, Glenbrook, Carlsbad, Saratoga, Bonanza, Astorg, England, Howard, and Bynum.

There are several mines from which large amounts of quicksilver have been taken. Natural gas is found. There are large deposits of sulphur and of borax in some parts of the county.

Along the coast from Hardy south to Gualala there is a strip of farming and dairy land, varying in width from ½ to 5 miles, and comprising as rich and productive soil as can be found anywhere. Around Manchester, Bridgeport, and Point Arena are located a number of creameries that stand at the head of the California list in competition.

The principal agricultural industries are wool-growing, dairying, poultry and stock-raising, and the growing of hops, grain and other cereals, potatoes, apples, and fruits of almost all descriptions. Winemaking is very thriving, and new vineyards are constantly coming into bearing.

Dairying is one of the leading interests. There are some up-to-date creameries, with numerous skimming stations. The butter produced is of a very high grade, and finds a ready market.

Stock-raising, grazing, and wool-growing are very much in evidence. There are about 1,000,000 acres of land specially adapted for grazing purposes. The shipments of wool, of a grade second to none, amount to about 1,000,000 pounds per annum.

The Angora goat thrives well, the mountains being an ideal pasture.

Hops are a very prolific crop and of the finest grade.

Crops of wheat, oats, and barley are always certain.

Potatoes and apples of a very fine quality are raised and bring remunerative prices. The apples excel in size and flavor.

The Bartlett pear, nectarine, peach, and fig are grown very successfully. Berries of all descriptions grow abundantly and are of large size and fine flavor.

No irrigation is required, and crops do not suffer from drought at any time.

In the county are large tracts of redwood, covering over 600,000 acres, the lumber cut from which amounts to 100,000,000 feet annually. The lumber mills, in addition to having their logs floated on the streams on which they are situated, have modern railroads extending into the heart of the redwood belt. The largest mill in the interior is at Willits. All employ a large number of persons in the woods, about the shipping points, on their railroads, and in their mills. Shingles, boxes, and other lumber products are manufactured and shipped in large quantities.

Ukiah, the county seat, is located on the California Northwestern Railroad.

Most of the trade is carried by vessels from coast points to San Francisco. The California Northwestern Railroad, connecting with San Francisco, runs 60 miles through the county from south to north.

All the streams abound in trout. Game—quail, grouse, pigeons and deer—is abundant.

Land suitable for agricultural purposes, fruit-growing, etc., can be obtained at reasonable prices.

STATISTICS OF MENDOCINO COUNTY, 1905-6.

General Statistics.

Area, 3,860 square miles, or 2,442,000 acres.

Number of farms	720
Number of acres assessed	1,516,213
Value of country real estate	$7,284,538
Of improvements thereon	$1,062,454
Of city and town lots	$651,877
Of improvements thereon	$969,056
Of personal property	$2,298,486
Total value of all property	$12,266,411
Number of miles of public roads	855
Road levy per $100, 1906	40 cts.
Value of county buildings	$70,000
Irrigating ditches—miles, 12; cost	$10,000
Railroads, steam—miles, 185; assessed value	$493,000
Electric power plants—11; assessed value	$106,000
Electric power lines—miles, 25; assessed value	$10,000
Number of acres irrigated	2,500

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	18,000	21,000	$500,000
Barley	800	820	18,000
Oats	1,200	500	10,000
Corn	2,200	5,000	140,000
Total cereals	22,400	27,320	$668,000

Cereal Products and Hay—Continued.

	Acres.	Tons.	Value.
Alfalfa hay	1,500	7,000	$56,000
Grain hay	14,000	40,000	440,000
Total hay	15,500	47,000	$496,000

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	6,000,000	$45,000
Asparagus	3,000	150
Blackberries	6,000	450
Beans	10,000	300
Beets	8,000,000	30,000
Cabbage	200,000	4,000
Celery	2,000	100
Cauliflower	5,000	250
Corn	10.000	200
Currants	600	60
Cherries	3,000	300
Figs	40,000	250
Gooseberries	100	10
Grapes	180,000	1,800
Loganberries	6.000	450
Onions	200,000	2,500
Pears	500,000	5,000
Peaches	10,000	3,000
Peas	100,000	2,000
Plums	------	2,000
Irish Potatoes	9,000,000	90,000

STATISTICS OF MENDOCINO COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.—Continued.

Green—	Total Production. Pounds.	Value.
Quinces	1,000	$50
Raspberries	10,000	1,000
Strawberries	40,000	3,500
Tomatoes	12,000	120
Total value		$192,490

Dried—	Pounds.	Value.
Apples	2,000	$100
Beans	50,000	1,000
Chestnuts	100,000	1,400
Onions	100,000	500
Peas	100,000	1,000
Prunes	50,000	4,500
Walnuts	7,000	700
Totals	409,000	$9,200

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		205,000	45,000	250,000
Apricot		1,000	------	1,000
Cherry		5,100	400	5,500
Fig		1,000	------	1,000
Olive		500	------	500
Orange		200	------	200
Peach		17,000	------	17,000
Pear		33,000	3,000	36,000
Plum		5,000	------	5,000
Prune		75,000	------	75,000
Quince		100	------	100
Walnut		700	400	1,100
Total fruit trees		343,600	48,800	392,400
Table grapes	acres.	500	------	500
Wine grapes		1,500	2,000	3,500
Total acres grapes		2,000	2,000	4,000
Blackberries	acres.	10	3	13
Currants		1	----	1
Gooseberries		1	----	1
Loganberries		15	----	15
Raspberries		15	----	15
Strawberries		110	----	110
Total acres berries		152	3	155

Dairy Industry.

	No.	Production.	Value.
Creameries (milk)	12	900,000	$225,000
Skimming stations	2	------	------
Butter (pounds)		300,000	75,000
Cream (gallons)		20,000	8,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	7,000	$21,000
Ducks	100	500
Geese	300	6,000
Turkeys	1,200	20,000
Eggs	200,000	40,000
Total value		$87,500

Wines, Brandies, Etc.

Number of wineries, 7; number of breweries, 1.

	Gallons.	Value.
Wine—Angelica	500	$120
Claret	10,000	1,500
Totals	10,500	$1,620
Beer (barrels)	500	$1,000
Brandy	1,000	1,500
Cider	5,000	450
Vinegar	1,000	100

Fish Industry.

	Pounds.	Value.
Salmon	20,000	$1,600
Other kinds	40,000	2,000
Totals	60,000	$3,600

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	850,000	------
Oak (acres)	100,000	------
Pine (acres)	110,000	------
Redwood (acres)	640,000	------
Sawmills (number)	27	$420,000
Fuel, wood (cords)	400,000	1,200,000
Laths (thousand)	10,000	20,000
Lumber—Pine (feet)	20,000,000	400,000
Redwood (feet)	120,000,000	3,600,000
Tan bark (cords)	12,000	120,000
Pickets (pieces)	400,000	23,000
Piles	1,000	5,000
Posts (pieces)	100,000	9,000
Railroad ties (pieces)	2,500,000	1,000,000
Shakes (thousand)	500	4,000
Shingles (thousand)	100,000	250,000
Total value		$7,051,000

Power used for mills and manufactories in county: Steam—number, 27.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 500	------	$1,500
Beeswax	120	2
Flowers and plants (acres)	6	3,500
Honey	5,000	500
Hops	2,500,000	312,500

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Wood boxes	1	6	200,000	$20,000
Brick	5	25	3,000,000	24,000
Cigars	2	6	1,000,000	40,000
Flouring mills (barrels)	3	10	5,000	20,000
Meat products—				
Hides (pounds)		--	200,000	16,000
Lard (pounds)		--	75,000	7,500
Meat packed (tons)		--	150	7,500
Planing mills	3	30	------	100,000
Tanneries	3	9	------	3,000

STATISTICS OF MENDOCINO COUNTY, 1905-6—Continued.

Livestock Industry.

	Number.	Value.
Cattle—Beef	4,000	$100,000
Stock	15,000	150,000
Dairy Cows—Graded	320	13,000
Ayrshire	3,000	75,000
Devon	500	2,500
Holsteins	200	10,000
Jersey	3,000	150,000
Red Polled	150	9,000
Calves	8,000	40,000
Swine	11,000	27,000
Horses—		
Thoroughbred	120	120,000

Livestock Industry—Continued.

	Number.	Value.
Horses—Common	7,000	$350,000
Standard-bred	200	40,000
Colts	1,750	35,000
Mules	400	32,000
Sheep—		
Imported or fine	30,000	200,000
Common	80,000	250,000
Lambs	7,500	7,500
Angora Goats	2,000	10,000
Common Goats	3,500	10,000
Total stock all kinds	177,640	$163,100

MERCED COUNTY.

Merced County is in the heart of the San Joaquin Valley. The greater part of its area, which is about 90 miles east and west and 40 miles north and south, extends from the foothills of the Sierra Nevada range on the east to the summit of the Coast Range on the west.

With the exception of a small portion of the eastern part, and that situated on the eastern slope of the Coast Range, the county is almost a level plain, broken only by watercourses. The San Joaquin River passes in a northerly and southerly direction almost through the center of the county. To the west of the San Joaquin River are the rolling foothills of the Coast Range. A large number of creeks take their rise in the mountain ranges on both sides of the valley. The principal stream is the Merced River, which, having its source in Mariposa County, in the Yosemite Valley, runs the greater part of its course through Merced, flowing through the entire length of the county, and reaching the San Joaquin on its western border.

On the eastern side of the San Joaquin are bottom and plains lands, skirted on the east by a narrow strip of low foothills. The Merced River bottom has an average width of three miles, with an abrupt bluff on each side.

Irrigation is an absolute necessity over the larger portion of Merced County for the production of fruits, alfalfa, grain, and vegetables. Two of the largest and most complete irrigation systems in the State are owned and operated—one on the east side, the other on the west side, of the San Joaquin River.

Considerable attention is being given to the breeding of dairy stock, and the dairy business has gone ahead with such rapidity that it has become the principal industry. Some of the best equipped creameries in the United States are to be found in Merced County, and some of the recently constructed ones are models of up-to-date factories. The great success of the creamery business is not only based upon good markets and shipping facilities, coupled with thorough manufacturing processes, but also, and especially, is due to the great alfalfa-growing industry.

One acre and a half of some land will produce ten tons of alfalfa hay and support one cow, whose milk will sell for $40 at the creamery, one calf worth $10, and two pigs worth $20.

Merced County is the natural sweet potato belt of the State. In the county are several thousand acres of land that seems to be peculiarly adapted to their growth, as experience has demonstrated. Cereals of most kinds are raised, and even with its other great resources it is one of the leading wheat, barley, and corn producers.

Alfalfa grows prolifically, and produces four crops a year, besides pasturage. Table, raisin, and wine grapes find a natural home. Orange, lemon, olive, and fig trees thrive well, while apples, cherries, peaches, apricots, prunes, pears, nectarines, quinces, and persimmons are very profitable. The smaller fruits, such as strawberries, blackberries, raspberries, currants, and gooseberries, yield abundantly. Walnuts, chestnuts, pecans, almonds, and peanuts are easily raised.

A commercial product is buhach, from which the celebrated insect powder is manufactured and sent all over the United States. Over 300 acres are devoted to the growing of the pyrethrum plant.

The Chowchilla Ranch and Pastoral Company, located near the city of Merced, is extensively engaged in the raising of pure-bred and grade shorthorn cattle. The herd of thoroughbred Durham cattle on the Howard ranch is second to none in the State. There are also large flocks of pure-bred and high-grade Merino sheep. The raising and fattening of hogs for market has proved very profitable. Poultry-raising is a paying industry. Climatic conditions are favorable to the raising of chickens.

Merced is the county seat. It has fine educational facilities and modern systems of sewers and water supply, and is lighted by electricity. It is the starting point, via the Coulterville route, to the world-famed Yosemite Valley. Merced Falls, Snelling, LeGrand, Dos Palos, Volta, Los Banos, Atwater, and Cottonwood are thriving towns, located in districts with surroundings of unexceptional fertility.

Merced County is traversed by two transcontinental railroads, viz: the Southern Pacific and the Santa Fé.

The settlement of land by colonization has resulted very successfully. No more successful colonies can be cited than those of Dos Palos, the Rotterdam, the Pioneer, El Capitan, and the British, all regularly laid out in tracts of five, ten, and twenty acres. Diversified farming is practiced, and comfortable homes and thrifty farms are the result.

STATISTICS OF MERCED COUNTY, 1905-6.

General Statistics.

Area, 2,000 square miles, or 1,280,000 acres.

Number of farms	1,825
Number of acres assessed	1,176,200
Value of country real estate	$9,467,348
Of improvements thereon	$699,439
Of city and town lots	$533,417
Of improvements thereon	$750,215
Of personal property	$2,094,366
Total value of all property	$13,544,785
Expended on roads, and for bridges, last fiscal year	$51,613
Number of miles of public roads	940
Road levy per $100, 1906	40 cts.
Value of county buildings	$187,000
Irrigating ditches—miles, 151½; cost	$308,883
Railroads, steam—miles, 129.81; assessed value	$2,226,811
Electric power plants—1; assessed value	$16,950
Electric power lines—miles, 18½; assessed value	$20,612
Number of acres irrigated for feed, alfalfa, and fruit	146,095

Dairy Industry.

	Production.	Value.
Creameries, 3.		
Butter (pounds)	569,084	$102,435
Cream (pounds)	5,060,110	910,819

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	65,000	13,626	$327,024
Barley	102,500	38,709	719,987
Oats	21,500	5,073	121,752
Rye	5,000	300	7,800
Corn	2,500	1,350	32,400
Total cereals	196,500	59,058	$1,208,963
Alfalfa hay	19,148	114,888	$574,440
Grain hay	20,506	22,000	99,000
Total hay	39,654	136,888	$673,440

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	3,477	2,500	5,977
Apricot	9,250	3,120	12,370
Cherry	210	215	425
Fig	7,325	10,925	18,250
Lemon	385	204	589
Nectarine	590	76	666
Olive	1,620	2,730	4,350
Orange	2,050	1,294	3,344
Peach	68,950	75,324	144,274
Pear	5,200	4,020	9,220
Plum	2,115	430	2,545
Prune	12,780	760	13,540

STATISTICS OF MERCED COUNTY, 1905-6—Continued.

Fruit Trees and Vines—Continued.

		Bearing.	Non-Bearing.	Total.
Quince		529	600	1,129
Almond		18,750	5,135	23,885
Chestnut		20	39	59
Pecan		5	18	23
Walnut		725	1,107	1,832
Hazel nuts		3	----	3
Japanese persimmons		15	----	15
Total fruit trees		133,999	108,497	242,496
Raisin grapes	acres.	275	118	393
Table grapes	acres.	225	123	348
Wine grapes	acres.	839	120	959
Total acres grapes		1,339	361	1,700
Blackberries	acres.	20	5	25
Loganberries	acres.	13	4	17
Strawberries	acres.	10	--	10
Total acres berries		43	9	52

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	174,000	$1,740
Apricots	95,710	1,914
Asparagus	2,000	1,016
Blackberries	105,000	5,500
Beans	20,000	1,200
Cabbage	61,210	500
Celery	8,800	440
Corn	150,000	2,250
Figs	41,175	617
Grapes	5,091,600	40,732
Lemons (boxes)	253	1,012
Loganberries	93,000	5,525
Nectarines	2,000	20
Onions	10,000	500
Oranges (boxes)	1,640	3,280
Olives	100,000	4,000
Pears	195,000	1,950
Peaches	1,349,310	20,279
Peas	20,000	800
Persimmons	250	10
Plums	236,750	2,367
Irish potatoes	547,362	6,842
Sweet potatoes	8,631,920	99,267
Quinces	20,000	200
Strawberries	23,000	1,520
Tomatoes	763,675	2,955
Total value		$206,436

Dried—	Pounds.	Value.
Almonds	66,155	$8,269
Apples	2,100	147
Apricots	25,600	2,048
Beans	194,500	4,863
Corn	1,253,100	14,410
Figs	343,700	10,311
Onions	91,276	912
Pears	4,500	315
Peaches	151,115	12,089
Prunes	480,960	14,428
Raisins	600	30
Walnuts	7,475	1,121
Totals	2,621,081	$68,943

Fruit, Vegetables, Etc.—Continued.

Canned—	Cases.	Value.
Beans	200	$1,200
Peaches	10,000	25,000
Tomatoes	1,250	2,000
Totals	11,450	$28,200

Wines, Brandies, Etc.

Number of wineries, 1; number of distilleries, 2.

	Gallons.	Value.
Wine—Claret	23,950	$3,592
Malaga	200	50
Port	75,000	22,500
Sherry	250	75
Totals	99,400	$26,217
Brandy	3,030	$3,030
Cider	300	150
Vinegar	500	250

Livestock Industry.

	Number.	Value.
Cattle—Beef	1,078	$43,120
Stock	36,500	547,500
Thoroughbred	350	17,500
Dairy Cows—Graded	16,950	678,000
Calves	9,150	64,050
Swine	20,130	161,040
Horses—		
Thoroughbred	15	7,500
Standard-bred	4,550	318,500
Common	1,225	42,875
Colts	1,235	18,525
Mules	2,950	295.000
Sheep—Imported	750	3.750
Sheep—Common	95,235	333.322
Lambs	53,225	53,225
Angora Goats	3,000	7,500
Common Goats	2,020	2,020
Total stock all kinds	248,363	$2,593,427
Wool (pounds)	761,880	$106,663

Poultry and Eggs.

	Dozen.	Value.
Chickens	4,615	$18,460
Ducks	122	732
Geese	15	135
Turkeys	734	22,020
Eggs	169,504	42,376
Total value		$83,723

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 2,200	------	$3,300
Beeswax	1,000	300
Honey	60,000	4,500

Productions Shipped Out of State.

	Sacks.	Value.
Sweet potatoes	61,728	$74,536

STATISTICS OF MERCED COUNTY, 1905-6—Continued.

Manufactories.

	No.	Quantity Produced.	Value of Product.
Brick (thousand)	3	2,500	$15,000
Flouring mills (barrels)	1	20,000	80,000
Meat products—Hides		6,500	26,000
Tallow (pounds)		50,000	2,500
Olive oil (gallons)		650	1,300

Manufactories—Continued.

	No.	Quantity Produced.	Value of Product.
Pickled olives (gallons)		1,500	$1,050
Sugar corn (sacks)		600	600

Power used for mills and manufactories in county: Electrical—number, 1; water—number, 1.

MODOC COUNTY.

Modoc County lies in the extreme northeastern corner of California. The county is a succession of mountain ranges and valleys branching off from the Sierra Nevada Mountains, the principal spur of which is the Warner Range. It is principally drained by Pitt River, which flows into the Sacramento, near Redding, Shasta County. The lava-bed section occupies over one half the total area. The county has two large lakes, but barring the lakes and the large cattle ranges it is sparsely settled.

The valleys are the principal features, the leading ones being Surprise, Goose Lake, Hot Springs, Jess, Big, and Little Hot Springs.

Wheat, barley, fruit, vegetables, and hay are the leading staples. Thousands of acres are in alfalfa, and the stock and dairying industries are thriving. Every ranch has a fine orchard, and ranch houses and barns, costing $5,000 or $6,000 in total improvements, are not uncommon. Trees, both shade and ornamental, abound around every place.

The climate is that of the temperate zone, and the products are those of the great intermountain region which stretches from the Sierra to the western plains of Kansas. Snow falls in the valleys and much deeper in the mountains, forming the principal supply of moisture for the development of the country. Stock is usually fed for several months through the winter, although it is not always necessary so to do. The thermometer will sometimes run below zero for a few days in the winter, but not for very long, and 90° is extreme heat for summer. Even in summer the evenings are cool and delightful.

The county is well watered. Surprise Valley has nearly twenty streams, which run both winter and summer. Goose Lake Valley is equally fortunate, while the Pitt River supplies water for many farms and ranches. Many springs exist, especially in the mountains; and in Surprise Valley there are many artesian wells.

The timber of the county is pine and fir in the Warner Range, and sugar pine in the western part.

Horticulture has had but a small place in the industries, only sufficient fruit for home uses being raised. However, the gradual approach of the railroad running north from Reno, Nevada, will increase the productivity in this line immensely, as the county is well adapted to apples, pears, and berries. The wild plum is about the only native fruit. The cultivated fruits were brought in the earlier days from Eastern States by the immigrants who came across the plains. A great deal of orchard planting has been done within the last few years.

The last five years have seen a great deal of reservoir work undertaken throughout the county and its tributary valleys. The rains come in time to insure abundant harvests year after year.

The nearest railroad point to Alturas, the county seat, is Madeline, in Lassen County. Daily trains are run from Madeline to Reno, Nevada.

There are flouring-mills located at Bidwell, Lake City, Cedarville, New Pine Creek, Alturas, and Adin. There are sawmills located at Bidwell, Cedarville, Eagleville, Willow Ranch, Davis Creek, Jess Valley, Alturas, Adin, and Widow Valley.

STATISTICS OF MODOC COUNTY, 1905-6.

General Statistics.

Area, 4,097 square miles, or 2,622,080 acres.

Number of acres assessed	330,719
Value of country real estate	$2,436,466
Of improvements thereon	$431,418
Of city and town lots	$65,478
Of improvements thereon	$221,884
Of personal property	$1,314,444
Total value of all property	$4,469,690
Expended on roads, last fiscal year	$16,361
Expended for bridges, last fiscal year	$600
Number of miles of public roads	745
Road levy per $100, 1906	35 cts.
Value of county buildings	$13,950
Irrigating ditches—miles, 325; cost	$14,750

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	6,132	4,054	$75,640
Barley	3,346	2,247	46,070
Oats	276	133	3,722
Rye	208	74	2,136
Corn	7	2	200
Total cereals	9,969	6,510	$127,768
Alfalfa hay	4,843	10,846	$53,385
Grain hay	1,213	1,716	8,445
Grass hay	25,551	40,504	184,989
Total hay	31,607	53,066	$246,809

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	606,720	$11,538
Apricots	10,450	418
Blackberries	4,400	880
Beans	80,370	5,516
Beets	514,370	3,272
Cabbage	233,250	3,596
Corn	10,930	425
Currants	1,025	50
Cherries	6,050	865
Gooseberries	2,430	121
Loganberries	1,940	97
Onions	85,610	1,619
Pears	22,310	556
Peaches	7,850	258
Peas	275	105
Plums	3,220	325
Irish potatoes	1,041,600	11,538
Prunes	1,900	190
Raspberries	5,190	501
Strawberries	12,145	1,173
Tomatoes	99,960	2,961
Totals	2,751,995	$45,804

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	18,700	1,742	20,432
Apricot	313	120	433
Cherry	675	272	947
Peach	1,116	487	1,603
Pear	1,172	269	1,441
Plum	1,357	203	1,557
Prune	968	37	1,055
Total fruit trees	23,301	3,130	27,468

Wines, Brandies, Etc.

Number of breweries, 1.

	Gallons.	Value.
Beer (barrels)	90	$1,395
Vinegar	830	415

Livestock Industry.

	Number.	Value.
Cattle—Beef	9,000	$210,467
Stock	30,903	275,332
Dairy Cows—Graded	474	12,850
Herefords	5	250
Shorthorns	243	22,650
Calves	7,883	67,026
Swine	4,806	22,864
Horses—		
Thoroughbred	14	10,050
Common	5,663	210,770
Colts	894	17,166
Mules	522	32,995
Sheep—Imported or fine	65	1,025
Common	43,041	166,229
Lambs	13,938	35,775
Common Goats	297	955
Total stock all kinds	117,748	$886,400
Wool (pounds)	146,060	30,002
Mohair (pounds	550	142

Poultry and Eggs.

	Dozen.	Value.
Chickens	1,174	$3,863
Ducks	5	22
Geese	7	92
Turkeys	129	3,903
Eggs	31,725	5,991
Total value		$13,871

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Flouring mills (barrels)	2	6	3,950	$17,300
Leather goods	1	2	----	4,000
Lime (barrels)		--	150	756
Hides (pounds)		--	7,000	1,330
Lard (pounds)		--	4,000	800
Planing mills	1	--	----	------
Artificial stone	1	6	----	------

STATISTICS OF MODOC COUNTY, 1905-6—Continued.

Dairy Industry.

	No.	Production.	Value.
Creameries	1		
Butter (pounds)		22,121	$5,530

Miscellaneous Products.

	Pounds.	Value.
Bees (hives), No., 716	------	$1,755
Beeswax	315	63
Honey	14,530	1,453
Alfalfa seed	335,300	35,159
Sugar beets (tons)	1,000	15,000

Forest Products.

	Amount.	Value.
Area of timber lands—		
Pine (acres)	2,130	------
Sawmills (number)	3	$7,500
Lumber—Pine (feet)	3,173,000	191,100
Shakes	52,000	2,080
Shingles	325,000	11,375
Total value		$212,055

Power used for mills and manufactories in county: Steam—number, 5; electrical—number, 3; water—number, 2.

MONO COUNTY.

Mono is a long, narrow county lying on the eastern slope of the Sierras, its greatest length bordering on the State of Nevada, which forms its northeastern boundary; its general direction being southeast and northwest.

The general contour is mountainous and very rough, all but 400 square miles, or less, being mountainous. The western portion lies among the Sierra Nevada Mountains, along their summit, the heights being clad in snow, and the slopes of the range being covered with forest trees.

Among the highest peaks are Mount Dana, 13,627 feet; Mount Lyell, 13,217 feet; and Castle Peak, 13,000 feet. The greater portion of the population is in the eastern part, in the valleys and the mining camps in the surrounding mountains. This portion, which has always been considered a strange, mysterious country, is of a desert-like, volcanic character, abounding in salt pools, alkali, and volcanic table-lands, its character being significantly indicated by some of the local names, such as Hot Springs, Geysers, Sulphur Springs, Black Lake, Soda Pond, Volcano, Obsidian Mountain, Deep Cañon, Volcanic Tableland, Red Crater, Adobe Meadows, and Oasis.

Mono Lake, the "Dead Sea of America," is one of the attractions, and situated in the center of the county; it is about 12 miles long and 8 miles wide; its waters are a somewhat unusual compound, various chemical substances being found in solution in them. Several attempts have been made to utilize this water without success. This lake has all the appearances of having once been the scene of volcanic action. The country surrounding it, as Bodie, Aurora, Lundy, Tioga, and Benton, abounds in minerals. The lake has a number of small streams flowing into it, but is without a perceptible outlet.

Owens River in the south, which takes its rise in a high peak in the Sierras, and Kitten and Walker rivers in the north, are the principal streams. One passes through the southern part into Inyo County. The other, after rising in Mono County, continues its course into the State of Nevada. These two streams with their branches, together with the small streams that flow into Mono Lake, furnish the principal water supply for irrigation.

The retaining of the snow in the high mountains, at the sources of the streams used for irrigation, until later in the season, assures an abundance of pasturage on the mountain ranges, which are thronged with vast herds of cattle and bands of horses and sheep that are brought from the lower sections to graze during the summer.

That portion of the valley soil lying contiguous to the streams is very rich. A great deal of the sagebrush land, formerly considered barren, is found to be very productive when placed under cultivation. Thus the area of tillable land has been vastly increased within the last few years, and wherever water can be got on to the land, even well up on the foothills, there are farms that are making comfortable homes for their owners.

The agricultural resources are chiefly confined to the raising of hay and the hardier cereals and vegetables for home consumption. The small surplus finds a ready market in the mining camps. Apples raised in the lower valleys are of superior quality and flavor and thrive well. Plums and peaches are grown on a limited scale. Berries also do well, considering the high altitude.

Grazing is the leading industry, and the pasturage is good and plentiful. Herds of dairy cattle are moved from the valleys during the summer, and an excellent product of butter is made. Large bands of sheep are also driven to its mountains for summer pasturage. Goats, hogs, horses, poultry, and mules are raised in large numbers.

The timber belt is very large and the product of good marketable quality, but as there is no means of transportation to market, the development of the lumber interests is retarded, although considerable quantities are used for local mining purposes.

Bridgeport is the county seat, and is located in a prosperous farming section.

Considerable mining for precious metals is carried on, the leading camp being Bodie. This industry is again prosperous. The introduction of the cyanide process, and the installing of electric power plants on the several streams of the county, thereby furnishing cheap power, make it possible to work at a profit large bodies of low-grade ore that heretofore were of no value, on account of cost of reduction.

STATISTICS OF MONO COUNTY, 1905-6.

General Statistics.

Area, 2,796 square miles, or 1,789,440 acres.

Number of farms	170
Number of acres assessed	170,054
Value of country real estate	$484,076
Of improvements thereon	$192,934
Of city and town lots	$17,640
Of improvements thereon	$85,840
Of personal property	$200,945
Total value of all property	$981,435
Expended on roads, last fiscal yr.	$2,909
Expended for bridges, last fiscal year	$725
Number of miles of public roads	292
Road levy per $100, 1906	30 cts.
Value of county buildings	$45,600
Railroads, steam—miles, 68; assessed value	$90,015
Electric power plants—2; assessed value	$26,000
Electric power lines—miles, 12; assessed value	$4,000
Number of acres irrigated	10,710

Balance grazing and mineral lands.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	192	----	192
Cherry	38	----	38
Peach	40	----	40
Pear	20	----	20
Plum	24	----	24
Total fruit trees	314	----	314
Table grapes (acres)	2	----	2

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	30	18	$450

Livestock Industry,

	Number.	Value.
Cattle—Beef	500	$10,000
Stock	1,868	18,680
Dairy Cows—Graded	276	6,900
Calves	491	2,455
Swine	129	645
Horses—		
Standard-bred	2	800
Common	1,361	26,640
Colts	138	1,570
Mules	30	900
Sheep—Common	5,573	11,565
Common Goats	220	264
Total stock all kinds	10,588	$80,419

Wool, 56,730 pounds.

Miscellaneous.

Mono County reports two sawmills, worth $5,500, that turn out annually 300,000 feet of lumber, worth $3,600.

The county has 162 dozen chickens, worth $810, and 309 beehives, worth $609.

The mineral output is given as: gold, $308,884, and silver, $11,240.

There were 297 vehicles made in the county last year, worth $9,560.

MONTEREY COUNTY.

Monterey County is situated about 100 miles south of San Francisco, and 500 miles north of Los Angeles, on the Pacific coast. It is 124 miles long and 45 miles wide, its extreme length being from north to south.

Owing to the peculiar topography, with its rough mountains and broad plains, its great river running from south to north, with tributaries from either side, its rolling hills and rugged mountains, it is found to be a miniature of the State, with its entire diversity of climate and soil, enabling it to yield everything produced in the State, and rendering it one of the most desirable regions for settlement.

Its rivers furnish a never-failing supply of water for irrigation, and the mountains abound in minerals—gold, silver, copper, coal, bitumen, and oil.

The county is divided into three sections—the mountains and hills on the east, mountains and hills on the west, and the great Salinas Valley situated between these ranges of mountains.

The portion of Pajaro Valley lying south of the Pajaro River, and running to Monterey Bay on the southwest, is in Monterey County, and is about 15 miles long, and from 6 to 8 miles wide. The land is exceedingly fertile and under a thorough system of cultivation, producing immense crops of all kinds of vegetables, grain, fruit, and berries. Well-tilled farms greet the eye, and villages, school houses, churches, and picturesque residences dot the landscape in every direction. The foothills are covered with flocks and herds, and the lower ranges are timbered with live oak. The Pajaro River flows southwesterly and finds an outlet in Monterey Bay, near the mouth of the Salinas River.

The great Salinas Valley opens out on Monterey Bay and extends southward 100 miles, with an average width of 10 miles; therefore its area is about 1,000 square miles, or 640,000 acres. The Salinas River flows through its entire length. The land may be divided into three classes, viz: First, the heavy, rich bottom lands, which produce almost everything, the soil being sediment and black adobe, which often contains just enough sand to make it work easily. Second, the mesa or table-lands, particularly adapted to growing wheat, barley, and other cereals. Third, the uplands and slightly rolling hills, some of which are the finest fruit lands in California, and will produce oranges, lemons, grapes, peaches, apricots, almonds, walnuts, figs, apples, plums, pears, berries, and all other fruits common to the State.

Nearly all semi-tropical fruits do well in some part of this county, especially in the thermal belt along each side of Salinas Valley. A number of orange and lemon trees in yards of Salinas City hang full of fruit each year and are never injured by frost.

In barley, beets, and carrots, this valley can not be surpassed.

Going south, wheat excels; and grapes, peaches, prunes, apricots,

cherries, and almonds grow to perfection in the foothills, cañons, and small valleys, and figs do well in sheltered places.

Olive trees flourish with all the vigor they possess in their native country. Currants, gooseberries, blackberries, loganberries, and raspberries grow luxuriantly. Strawberries are in the market all the year round, and are shipped from Pajaro by carloads. Grapes grow to perfection everywhere in the county, except in the heavy bottom lands of the lower Salinas Valley.

As to potato-raising, the Salinas Valley has no equal; here is the home of the famous Salinas Burbanks that are in such great demand all through the northwest, and thousands of sacks are shipped to the Philippine Islands. As high as four hundred bushels to the acre have been raised near Salinas.

Dairying is a very prominent, if not a leading industry, most of the dairies being devoted to butter-making. Some of the finest dairies in the State are in Monterey County, and some of the best butter in the State is made here. They have the latest and best improved machinery, and have found their business very profitable.

Extensive work has been done in the last few years in bringing the valley under a thorough system of irrigation. Opposite Soledad, on the south side of Salinas River, considerable irrigation is done around Fort Romie on lands purchased by the Salvation Army, and sold on most favorable terms to worthy poor in need of homes. This is one of the most prosperous colonies in America. Around the Spreckels sugar factory, 4 miles from Salinas City, a great deal of land has been irrigated for raising beets. This is the largest beet-sugar factory in the world.

The main transcontinental line of the Southern Pacific Railroad enters this county through Pajaro Valley on the north, and runs southeast through its entire length, paralleling the Pajaro and Salinas rivers.

Pajaro is the great shipping point for apples, berries, all fruits, and dairy products of its section.

Hotel Del Monte, "the queen of American watering-places," including the main structure and two annexes, together with the connecting wings, is simply immense, and everything connected with the establishment is on the same magnificent scale. The grandeur of the hotel is repeated in the grounds, which cover 140 acres laid out in lawns, flower-beds, parks, and groves, and the landscape gardening is a marvel of beauty.

A little farther on is Monterey, situated on the beach of Monterey Bay, lying back on her sloping hills, and overlooking the placid waters of the bay—one of the grandest and most beautiful townsites nature ever formed.

Two miles farther on is Pacific Grove. Nestled among the pines is this little town, with beautiful streets, magnificent cottages, fine churches and school houses, charming drives, and with never a saloon in its sacred limits.

The harbor of Monterey Bay is second in importance on the coast. The largest battleships of our navy find anchorage within 100 feet of the shore, and during heavy storms at sea it is not unusual to see many ships of different nations anchored in the calm waters of the bay. The fishing is incomparable for quantity and variety, and a cannery is located at Monterey. There is an abalone canning factory located at Point Lobos, and one at Point Sur. Monterey Bay contains about one hundred and fifty species of food fish, and many are annually taken for market. There is a whaling company at Monterey, and some seasons many whales are captured.

Salinas City, the county seat, is in the heart of the best portion of Salinas Valley, the head of the first division of the railroad, near the Spreckels sugar factory, and containing extensive gas and water works, a large flouring-mill, a large creamery, a planing-mill, and shops, banks, churches, and school houses. There are many magnificent residences and well-improved streets. Fraternal societies are well represented.

Soledad, named for Soledad Mission, is in another wheat belt, and is an important shipping point for grain and dairy products. It is the nearest point to Paraiso Springs, whose waters contain medicinal properties of a high order.

The narrow-gauge railroad from Pajaro to Salinas parallels the main line on the west, taps Monterey Bay at Moss Landing—where there are extensive warehouses and lumber yards, and where the coast vessels stop regularly for grain and merchandise—then continues to Spreckels's sugar factory, and is used principally for hauling beets to the factory and lime rock from the quarries, though considerable grain is shipped by it from the region west of Salinas.

STATISTICS OF MONTEREY COUNTY, 1905-6.

General Statistics.

Area, 2,977 square miles, or 476,320 acres.

Number of farms	3,407

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	47,230	23,072	$563,584
Barley	104,050	56,291	723,861
Oats	12,660	5,520	160,540
Rye	100	50	1,000
Corn	400	300	5,500
Total cereals	164,440	85,233	$1,454,485
Alfalfa hay	825	5,400	$38,500
Grain hay	32,780	40,384	303,508
Total hay	33,605	45,784	$342,008

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	270,570	95,870	366,440
Apricot	31,345	6,360	37,705
Cherry	3,850	100	3,950
Fig	600	50	650
Lemon	75	15	90
Nectarine	800	75	875
Olive	6,550	500	7,050
Orange	150	20	170
Peach	6,097	790	6,887
Pear	17,830	2,160	19,990
Plum	2,500	100	2,600
Prune	33,000	150	33,150
Quince	150	25	175
Other kinds	250	25	275
Almond	9,530	500	10,030
Chestnut	20	50	70
Pecan	10	5	15
Walnut	3,430	650	4,080
Other nuts	25	10	35
Total fruit trees	386,782	107,455	494,237

Fruit Trees and Vines—Continued.

	Bearing.
Table grapes (acres)	130
Wine grapes (acres)	170
Total acres grapes	300
Blackberries (acres)	160
Currants (acres)	1
Gooseberries (acres)	1
Loganberries (acres)	72
Raspberries (acres)	92
Strawberries (acres)	360
Total acres berries	686

Fruit, Vegetables, Etc.

	Total Production, Pounds.	Value.
Green—		
Apples	61,667,000	$626,685
Apricots	508,700	13,258
Asparagus	10,000	600
Blackberries	1,504,000	45,120
Beans	3,184,500	62,457
Beets	450,804,000	1,116,620
Cabbage	8,000	620
Celery	3,500	165
Cauliflower	500	15
Corn	36,000	3,010
Currants	500	15
Cherries	271,000	8,150
Figs	100	3
Grapes	20,000	200
Loganberries	561,000	19,630
Nectarines	2,000	40
Onions	738,000	73,800
Oranges (boxes)	10	15
Olives	120,000	12,000
Pears	1,020,750	12,920
Peaches	378,400	9,952
Peas	21,250	650
Plums	5,000	50
Irish potatoes	19,160,500	191,407
Sweet potatoes	500	10

STATISTICS OF MONTEREY COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.—Continued.

Green—	Total Production, Pounds.	Value.
Prunes	608,000	$9,240
Quinces	500	10
Raspberries	585,500	26,335
Strawberries	3,501,000	175,020
Tomatoes	29,500	685
Total value		$2,408,682

Dried—	Pounds.	Value.
Almonds	4,000	$400
Apples	1,000	100
Apricots	3,000	300
Beans	13,700	410
Corn	100	10
Figs	100	10
Nectarines	300	15
Pears	1,000	50
Peaches	1,000	50
Prunes	4,000	200
Walnuts	1,000	100
Totals	29,200	$1,645

Canned—	Cases.	Value.
Apples	50	$50
Apricots	40	40
Blackberries	40	40
Cherries	10	12
Grapes	100	100
Nectarines	20	20
Pears	75	75
Peaches	150	150
Plums	50	50
Raspberries	50	50
Strawberries	50	50
Tomatoes	75	75
Totals	710	$712

Poultry and Eggs.

	Dozen.	Value.
Chickens	16,002	$64,260
Ducks	175	775
Geese	135	810
Turkeys	240	3,480
Eggs	737,125	110,656
Total value		$179,981

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 1,250		
Honey	16,500	$1,700
Sugar beets (tons)	120,003,500	314,000

Fish Industry.

	Pounds.	Value.
Salmon	606,000	$24,240
Sardines	600,000	4,500
Mackerel	40,000	3,000
Totals	1,246,000	$31,740

Wines, Brandies, Etc.

	Gallons.	Value.
Claret wine	1,000	$100
Vinegar	200	20

Livestock Industry.

	Number.	Value.
Cattle—Beef	49,585	$426,275
Stock	43,689	821,480
Thoroughbred	100	5,000
Dairy Cows—Graded	8,170	238,850
Holsteins	235	7,225
Jersey	20	600
Calves	11,114	50,470
Swine	19,233	99,630
Horses—Thoroughbred	49	20,300
Standard-bred	350	165,000
Common	20,178	798,865
Colts	4,806	201,120
Mules	483	32,550
Sheep—Imported or fine	50	500
Common	40,025	111,050
Lambs	5,500	10,600
Angora Goats	3,000	17,500
Common Goats	1,300	3,400
Total stock all kinds	207,887	$3,010,415
Wool (pounds)	208,400	$24,988
Mohair (pounds)	17,900	4,220

Dairy Industry.

	No.	Production.	Value.
Creameries	13	-------	-------
Butter (pounds)	--	2,662,150	$634,930
Cheese (pounds)	4	1,762,000	256,200
Cream (gallons)	--	213,400	5,200

Forest Products.

	Amount.	Value.
Area of timber lands—Redwood (acres)	3,000	------
Sawmills (number)	1	$2,500
Fuel, wood (cords)	4,000	16,000
Lumber, redwood (feet)	300,000	3,000
Pickets (pieces)	10,000	500
Posts	155,000	12,700
Total value		$34,700

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Brick	1	15	550,000	$5,500
Cigars	1	3	75,000	525
Flouring mills (bbls.)		--	80,000	240,000

Productions Shipped Out of State.

	Amount.
Barley	7,000 tons
Wheat	5,000 tons
Apples, fresh	753,000 boxes
Cherries, fresh	5,000 boxes

NAPA COUNTY.

Napa County lies in a northeasterly direction from San Francisco, its county seat, Napa, being about 40 miles from San Francisco and about 70 miles southwesterly from Sacramento. Though one of the smallest, it is one of the most important counties of the State, on account of its proximity to the great market of San Francisco, with which it has several lines of rail and water communication, the variety and wealth of its agricultural, mineral, and manufactured products, the fertility of its soil, the salubrity of its climate, and the excellence of its educational facilities. The length is about 50 miles, and its width varies from 30 to 35 miles.

Spurs of the Coast Range Mountains having a northwesterly trend divide the county into several valleys and afford a variety of scenery of unsurpassed beauty. The western boundary runs for its entire length from San Pablo Bay to Mount St. Helena, along the top of one of these ridges. The only valley of importance intersecting the slope of this western range is Brown's Valley, a productive glen that lies west of Napa City and contains many pretty suburban homes. East of this range, extending for almost the entire length of the county, lies the beautiful Napa Valley, varying in width from 1 to 5 miles, and opening at its lower end into a wide, fanlike expanse of tule land. Mount St. Helena, at the head of this valley, rears its summit nearly 4,500 feet above the level of the sea. The valley is watered by numerous streams that flow from the mountains and find their way into Napa River, which flows the entire length of the valley, and is navigable for steamers and sailing craft as far as Napa City.

The northeastern half of the county is broken by ranges of high mountains into several valleys, of which Berryessa, the most easterly, is the largest.

The rainfall averages so well that a shortage of crops is unknown. The influence of the ocean breeze is felt during the summer to an extent amply sufficient to temper the sun's heat, while the hills act as a barrier against the fogs. The foothills are especially famed for their climatic features, and here are some of the most noted health resorts in the State.

The soil may be divided into five classes. The first class, termed argillaceous, is common to the mountains on the east side of the county, and is not very productive. The second class, adobe, does not exist to any great extent. The best soil is the loam, which may be found in all the valleys, but principally in Napa. Tule soil is found from Napa City southward, and along the margin of the bay. The last class is lava, a decomposed volcanic formation, and is excellent for vineyards. It is found in the vicinity of Howell Mountain.

As the climate of Napa Valley corresponds strikingly in its main features to that of the south of France, grape-growing, wine-making, and horticulture are followed with great success. The olive, which requires a temperate climate, and dreads equally excessive hot or cold weather, thrives remarkably, and has been largely planted on stony hillsides that would be almost useless for other fruits. The oil and pickled olives manufactured are not excelled by any other domestic or imported product.

Napa County at one time led the State in the amount of wine produced, but the ravages of the phylloxera caused the death of many of the finest vineyards, and curtailed the production of grapes. Some of these vineyards have been replanted with resistant vines, and thus the output of wine is increasing.

The raising and curing of French prunes has been brought to a high state of excellence. Cherries and peaches are successful crops, and walnuts, almonds, apricots, pears, and apples thrive in all sections. While Napa County makes no claims to general adaptability to the culture of citrus fruits, there are few orchards that do not contain a number of orange and lemon trees to provide for the use of the family and for local sale. The output is uniformly of fine quality. Berries of all kinds thrive, and form a very material part of the produce.

Diversified farming is carried on on a large and profitable scale, the nature of the crops raised depending upon the character of the soil. The hay crop is generally large, and, being near to market, finds a profitable sale. Wheat, oats, barley, and corn are raised on a large scale, particularly in the eastern valleys. Potatoes, asparagus—in fact, vegetables of all kinds—do well. All the crops are raised without irrigation, the rainfall being ample, even in the driest years, to insure a good crop.

More and more attention is being paid, year after year, to dairying and stock-raising, and also to poultry-raising.

Napa County has always been noted for the fine horses that its farms produce. The most complete establishment devoted exclusively to the breeding of thoroughbred horses, the Napa Stock Farm, has several high-class imported stallions, and over sixty thoroughbred mares.

Quicksilver, magnesite, mineral waters, and building stone are produced in large quantities.

Napa City is situated at the head of navigation on Napa River. It is chiefly interested in the manufacture of leather and leather goods. There are tanneries, glove factory, shoe factory, woolen mill, and many other industries. It has excellent streets and buildings, fine schools and numerous churches. The State Hospital is located a short distance from the city. At Yountville, 9 miles from Napa, is the State home for volunteer soldiers.

St. Helena, farther up the valley, is the second town in size, and is chiefly devoted to the wine-making industry. It is also the business center for Pope Valley. Here is situated the St. Helena Sanatorium and the health-food factory.

Napa County is famous for the excellence of its roads and the size and number of its stone bridges. All the main county roads are sprinkled in the summer, and rural delivery routes carry the daily mail to the doors of the country people.

STATISTICS OF NAPA COUNTY, 1905-6.

General Statistics.

Area, 800 square miles, or 512,000 acres.

Number of farms	1,292
Number of acres assessed	405,678
Value of country real estate	$5,181,285
Of improvements thereon	$2,661,975
Of city and town lots	$1,216,575
Of improvements thereon	$2,114,840
Of personal property	$2,301,980
Total value of all property	$13,476,655
Expended on roads, last fiscal yr.	$23,886
Expended for bridges, last fiscal year	$15,000
Number of miles of public roads	453
Road levy per $100, 1906	32 cts.
Value of county buildings	$130,000
Railroads, steam—miles, 53; assessed value	$859,614
Railroads, electric—miles, 7; assessed value	$80,650
Electric power lines—miles, 9; assessed value	$4,960
Number of stone bridges	100

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	2,000	1,200	$36,000
Barley	4,000	2,200	55,000
Oats	6,000	3,900	124,800
Corn	7,000	7,525	173,075
Total cereals	19,000	14,825	$388,875
Alfalfa hay	150	450	$2,250
Grain hay	15,600	27,300	245,700
Total hay	15,750	27,750	$247,950

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	47,000	6,000	53,000
Apricot	14,000	800	14,800
Cherry	35,000	2,000	37,000
Fig	1,200	------	1,200
Lemon	500	------	500
Nectarine	200	------	200
Olive	40,000	------	40,000
Orange	3,500	200	3,700
Peach	112,000	6,500	118,500
Pear	60,000	1,000	61,000
Plum	140,300	30,500	170,800
Prune	435,900	91,500	527,400
Quince	600	250	850
Almond	45,000	300	45,300
Walnut	9,700	1,200	10,900
Total fruit trees	944,900	140,250	1,085,150
Table grapes } acres.	50	----	50
Wine grapes } acres.	6,700	2,600	9,300
Total acres grapes	6,750	2,600	9,350
Blackberries } acres.	82	----	82
Gooseberries } acres.	10	----	10
Raspberries } acres.	8	----	8
Strawberries } acres.	12	----	12
Total acres berries	112	----	112

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,600,000	$25,600
Blackberries	201,250	8,050
Corn	15,050 000	173,075
Cherries	400,000	22,000
Gooseberries	34,680	1,040
Grapes (tons)	14,400	395,200
Olives	3,200,000	72,000
Pears	644,648	------
Peaches	856,440	------
Plums	15,752	------
Irish potatoes	3,500.000	35,000
Prunes	14,067,828	------
Raspberries	------	320
Strawberries		360
Tomatoes	300,000	1,200

Dried—	Pounds.	Value.
Pears	16,000	------
Peaches	45,952	------
Plums	5,505	------
Prunes	5,275,439	------
Walnuts	106,700	$10,670

Wines, Brandies, Etc.

Number of wineries, 32; number of distilleries, 6; number of breweries, 2.

	Gallons.	Value.
Wines—Burgundy	75,100	$18,775
Claret	1,173,700	266,951
Hock	30,000	7,500
Riesling	735,600	166,188
Sauterne	15,050	3,662
Zinfandel	101,000	21,050
Totals	2,130,450	$484,126
Brandy	7,569	$3,784

Livestock Industry.

	Number.	Value.
Cattle—Beef	980	$29,400
Stock	7,200	129,600
Dairy Cows—Graded	9,100	273,000
Jersey	95	9,500
Calves	7,600	30,400
Swine	3,000	15,000
Horses—		
Thoroughbred	200	80,000
Standard-bred	1,200	12,000
Common	5,000	250,000
Colts	1,100	22,000
Mules	250	1,250
Sheep—Common	3,500	10,500
Lambs	1,500	1,500
Common Goats	1,800	3,600
Total stock all kinds	42,525	$867,750

Dairy Industry.

	No.	Production.	Value.
Creameries	10	------	------
Butter (pounds)	--	313,336	$82,115
Cream (gallons)	--	3,890	3,890

STATISTICS OF NAPA COUNTY, 1905-6—Continued.

Poultry and Eggs.

	Dozen.	Value.
Chickens	5,700	$29,640
Ducks	187	1,215
Geese	64	1,382
Turkeys	322	8,539
Eggs	237,862	56,492
Total value		$97,268

Forest Products.

	Amount.	Value.
Fuel (wood), cords	10,000	$55,000
Pickets (pieces)	------	950
Piles	2,000	10,000
Total value		$65,950

Power used used for mills and manufactories in county: Electrical—number, 13.

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Paper boxes	1	16	240,000	$14,400
Cement (tons)	1	250	159,720	2,096,500
Cigars		7	225,000	13,500
Foundries and iron works	1	4	------	6,000
Planing mills	1	25	------	70,000
Shoes	1	100	93,900	250,000
Artificial stone		14	------	22,974
Sandstone		6	------	7,500
Tanneries	2	122	------	680,000
Shirt factories	2	110	324,000	131,000
Ice cream companies	1	10	------	35,000
Gloves	1	275	------	400,000

Productions Shipped Out of State.

Brandy	7,569 gals.
Wine, sweet	2,790 gals.
Wine, table	1,436,360 gals.

NEVADA COUNTY.

Nevada County, with an area of over 1,000 square miles, begins at the Yuba County line and is hemmed in between the Middle Yuba and Bear rivers, until their sources are reached, when the boundary lines run directly east to the State of Nevada. It is bounded on the north by Yuba and Sierra counties, on the east by the State of Nevada and Placer County, on the south by Placer County, and on the west by Yuba County. It has a climate more varied than that of any other section of our State. From the rolling foothills of its western portion, where snow and frost are seldom seen, and where the elevation is but slightly above that of the sea-level; to the snow-capped peaks of the Sierra Nevadas, in the extreme east, where the elevation is nearly 8,000 feet.

It therefore naturally follows that with such a variety of climate, the industries of the different localities are many and diversified. In the extreme western part of the county, citrus fruits of a superb quality are grown, also the olive and many other fruits of this class; while in the central portion the Bartlett pear and other fruits of the temperate climate attain their best flavor.

Farming and stock-raising are also carried on to quite an extent. But we look for greater activity, in the immediate future, along the lines of agriculture and horticulture, from the fact that a broad-gauge railroad, connecting Nevada City and Grass Valley with Auburn and Marysville, now in course of construction, will pass through a portion of the county admirably adapted to these industries. Lack of transportation facilities has been the great drawback to fruit-raising in this county, but now that we are about to be brought into direct touch with the commercial world, we feel that a great impetus along these lines will naturally follow.

Nevada County's incomparable water system is also one of its many attributes destined to make her famous, and which is essential to the farmer, the fruit-grower, and the miner. Her network of ditches, canals, and waterways, aggregating fully one thousand miles in length, is conceded to be the greatest water-supply system in the State.

Nevada County has also two of the largest and best equipped electric power plants in the State, so that for power facilities it may be readily seen that this county is unexcelled.

But it is as a mining county that Nevada has gained a world-wide reputation. She stands preëminently the greatest gold-producing county in the State, and is accredited with having added to the circulating medium of the world fully $250,000,000. This is considered to be a very conservative estimate, for the reason that there are a number of companies, operating on a large scale, that have never given out a report of their product. With the suppression of hydraulic mining our annual output was diminished by nearly $4,000,000, but from our matchless quartz mines and from our drift mines (which, by the way, are rapidly coming into prominence), our average annual yield of gold is at present, approximately, $2,250,000.

Considerable activity, within the past few years, has also developed along the line of copper mining. Capital looking for copper propositions has been attracted to Nevada County, and from the present outlook the county will certainly become one of the greatest copper-producing districts of California, if not of the world.

STATISTICS OF NEVADA COUNTY, 1905-6.

General Statistics.

Area, 1,016 square miles, or 650,240 acres.

Number of farms	520
Number of acres assessed	489.819
Value of country real estate	$2.551.705
Of improvements thereon	$1.463.240
Of city and town lots	$407,875
Of improvements thereon	$1.284.730
Of personal property	$1.048,375
Total value of all property	$6.755,925
Expended on roads, last fiscal yr.	$28,925
Expended for bridges, last fiscal year	$7,580
Number of miles of public roads	650
Road levy per $100, 1906	50 cts.
Value of county buildings	$100,000
Mining and irrigating ditches—miles, 1,000; cost	$4.223,760
Railroads, steam—miles, 53.63; assessed value	$749.178
Railroads, electric, asses'd value	$47,200
Electric power plants, assessed value	$141,760
Electric power lines—miles, 61½; assessed value	$32.300
Number of acres irrigated	350

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Alfalfa hay	200	700	$11,750
Grain hay	5,000	5,000	90,000
Grass hay	150	450	4,750
Total hay	5,350	6,150	$106,500

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apples	13,120	1,270	14,390
Apricot	150	40	190
Cherry	282	64	346
Fig	280	50	330
Lemon	5	5	10
Nectarine	26	4	30
Olive	25	75	100
Orange	40	160	200
Peach	12,015	2,050	14,065
Pear	28,465	4,300	32,765
Plum	900	400	1,300
Prune	6,033	300	6,335
Quince	150	------	150
Persimmon	5	5	10
Pomegranate	12	3	15
Almond	60	350	410
Chestnut	12	9	21
Pecan	5	------	5
Walnut	105	900	1,005
Total fruit trees	61,692	9,985	71,677

Fruit Trees and Vines—Continued.

		Bearing.	Non-Bearing.	Total.
Table grapes	acres.	200	50	250
Wine grapes		400	200	600
Total acres grapes		600	250	850
Blackberries	acres.	12	5	17
Currants		1	----	1
Loganberries		1	1	2
Raspberries		6	2	8
Strawberries		6	----	6
Total acres berries		26	8	34

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	250,000	$6,200
Apricots	2,350	60
Blackberries	48,000	2,400
Beans	30,000	1,500
Beets	40,000	800
Cabbage	160,000	2,400
Celery	8,000	400
Corn	22,500	300
Currants	960	48
Cherries	1,500	120
Figs	10,716	315
Grapes	252,000	4,600
Loganberries	960	100
Nectarines	750	23
Onions	2,500	125
Oranges (boxes)	80	160
Olives	250	15
Pears	950,000	19,000
Peaches	122,785	3,070
Peas	17,500	700
Plums	54,000	945
Irish potatoes	300,000	3,750
Prunes	150,000	3,750
Quinces	4,500	90
Raspberries	5,760	280
Strawberries	5,500	330
Tomatoes	60,000	1,500
Total value		$53,039

Dried—	Pounds.	Value.
Prunes	60,000	$2,500
Walnuts	5 000	625
Totals	65,000	$3,125

Dairy Industry.

	No.	Production.	Value.
Creameries	2	------	------
Butter (pounds)		105,137	$28,387

STATISTICS OF NEVADA COUNTY, 1905-6—Continued.

Wines, Brandies, Etc.

Number of wineries, 2; number of breweries, 5.

	Gallons.	Value.
Wine—Claret	15,000	$9,000
Port	1,000	1,500
Total wine	16,000	$10,500
Beer (barrels)	4,000	$37,800
Vinegar	5,725	1,430

Livestock Industry.

	Number.	Value.
Cattle—Beef	450	$15,750
Stock	6,415	128,300
Dairy Cows—Graded	600	24,000
Jersey	75	4,500
Calves	1,825	18 250
Swine	500	3,500
Horses—		
Standard-bred	200	30,000
Common	1,800	180,000
Colts	150	7,500
Mules	45	4,500
Sheep—Common	5,000	15,000
Lambs	1,500	3,000
Angora Goats	150	500
Common Goats	200	400
Total stock all kinds	18,910	$435,200
Wool (pounds)	30,000	$10,500

Poultry and Eggs.

	Dozen.	Value.
Chickens	500	$2,500
Turkeys	40	600
Eggs	19,250	4,810
Total value		$7,910

Miscellaneous Products.

	Tons.	Value.
Natural ice	120,000	$300,000

Forest Products.

	Amount.	Value.
Area of lands, partly timbered (acres)	20,000	------
Pine (acres)	20,000	$200,000
Sawmills (number)	6	------
Fuel, wood (cords)	37,120	130,480
Laths	821,400	2,855
Lumber— Cedar, Pine, Fir (M ft.)	36,995	633,720
Pickets (pieces)	30,295	642
Posts (pieces)	5,495	1,189
Railroad ties (pieces)	15,000	7,500
Shakes (thousand)	1,000	11,000
Total value		$987,386

Power used for mills, mines and manufactories in county: Steam—number, 20; water—number, 40.

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Wood boxes		--	7,760	$79,620
Cigars	5	15	936,000	44,460
Conf'ction'y (lbs.)	4	--	45,000	5,625
Foundries and iron works	3	45	------	100,000
Hides (pounds			113,300	11,707
Lard (pounds)		--	57,500	6,109

Productions Shipped Out of State.

	Amount.
Peaches, fresh	1,500 boxes
Pears, fresh	12,000 boxes
Plums, fresh	400 boxes
Prunes, fresh	20,000 lbs.
Prunes, dried	30,000 lbs.
Grapes, fresh	50,000 lbs.

ORANGE COUNTY.

Orange County is one of the youngest counties, having been organized in 1889 from a portion of Los Angeles County. Its area is divided into mountains, 65; foothills, 150, and valleys, 550 square miles.

The Santa Ana range of mountains is the line between Orange and San Bernardino counties at the northeast corner of the former county. It is also the dividing line between Orange and San Diego counties on the east. This range also sends up a line of foothills westwardly along the seashore nearly halfway across the county. All of the western portion of the county is included in the Santa Ana plain, or valley. There are also several small valleys among the foothills and along the mountain streams. The Santa Ana plain is covered with a rich loam, and, with the exception of some patches of alkali, is very productive. The highest point of land is what is locally known as Saddleback, or Santa Ana Peak, with an elevation of 5,675 feet.

There is an abundant water supply. The Santa Ana River enters near the northeast corner, and traverses the entire Santa Ana plain, flowing into Newport Bay. Besides this stream there is Santiago Creek; also Aliso, Trabuco, Mission Vieja, San Juan, and Coyote creeks, and other streams. The last-named creek forms the boundary between Orange and Los Angeles counties on the west. The artesian belt running through Orange County furnishes a plentiful and cheap water supply, and makes the section as nearly independent of rainfall as it is possible to be. Much artesian water has been developed; more in the artesian belt west of the river than in any other portion. There hundreds of artesian wells have been sunk, and the farmers have installed pumping plants and organized irrigation districts.

In the foothills a sharp, gravelly loam of a reddish color prevails. Descending into the valleys, this loam loses its color and its sharpness and becomes black, with a large admixture of adobe and frequent streaks of alkali. West of the Santa Ana River large deposits of peat are found, the product of tule roots and other swamp vegetation. This varies in depth from a few inches to sixteen feet. This land is considered the best for agricultural purposes, and is held at a high figure.

All the fruits do well. Many varieties of oranges and several of lemons are grown. Oranges are shipped from the last of December until June, and the bulk in March and April.

There are some portions where apples are grown which vie with those of the Eastern States, in size, flavor, and appearance. It was only during the past few years that much fruit besides oranges and grapes was grown. Now, however, large orchards are annually being planted to almost every known variety.

Apricots, peaches, apples, oranges, lemons, figs, prunes, and walnuts do well, apricots especially holding front rank, with walnuts in the second place.

The larger amount of the fruit produced finds a market in the East, the citrus fruits and walnuts being shipped entirely out of the county. The deciduous fruits are very largely disposed of to the drying establishments and packing-houses, and by them shipped both dried and green to Eastern States.

The rich bottom lands yield immense crops of corn, and large portions grow the finest alfalfa and natural grasses.

The mesa, or uplands, are of the finest quality, and admirably adapted to barley, oats, wheat, flax, hemp, and the vine, as well as all the ordinary northern fruits.

Every character of soil that is found in California can be duplicated in these lands, and every product grown in the semi-tropics can be successfully raised.

Celery-raising has grown to a very large industry, the output reaching 1,800 carloads.

While celery-growing is occupying much attention, other sources of income are not neglected, and of these the most important are the dairy interests and the rearing of cattle and hogs.

The shipping of vegetables, consisting of early onions, potatoes, cauliflower, cabbage, etc., is a growing and profitable business.

The sugar-beet is raised extensively, and a factory is located at Los Alamitos. This factory runs four months, and consumes the product of over four thousand acres, turning out millions of pounds of sugar ready for table use. The big sugar factories at Chino and Oxnard draw extensively from the soil of this county, thousands of tons of beets being shipped to these places from the vicinity of Anaheim, Buena Park, Garden Grove, Westminster, and Bolsa every year.

No business has developed more rapidly than the oil industry. North and east of Fullerton thousands of dollars have been expended in sinking wells, several of which have turned out to be gushers.

Santa Ana is the county seat. Anaheim is next in size, Orange following. Tustin is a charming suburb of Santa Ana, with splendid orchards, attractive homes and people of refinement. Fullerton is a place of much business and the headquarters of the oil industry of that section. El Toro is made up in a large measure of English settlers of wealth and progressive ideas. San Juan Capistrano, in the extreme south, is the seat of one of the largest and most interesting old missions.

STATISTICS OF ORANGE COUNTY, 1905-6.

General Statistics.

Number of farms	4,319
Number of acres assessed	443,456
Value of country real estate	$7,088,115
Of improvements thereon	$1,505,955
Of city and town lots	$2,904,680
Of improvements thereon	$2,036,225
Of personal property	$1,680,310
Total value of all property	$15,215,285
Expended on roads, last fiscal yr.	$38,522
Expended for bridges, last fiscal year	$1,000
Number of miles of public roads	365
Road levy per $100, 1906	40 cts.
Value of county buildings	$121,000
Railroads, 3; steam—miles, 98.95; assessed value	$160,855
Railroads, electric—miles, 31.83; assessed value	$216,735
Electric power plants—1; assessed value	$47,735
Number of acres irrigated	32,000
Pumping plants used for irrigation, 227; value	$43,595

Wines, Brandies, Etc.

Number of wineries, 5; number of breweries, 1.

	Gallons.	Value
Wine—Angelica	20,000	$10,000
Claret	70,000	17,500
Port	28,000	14,000
Riesling	12,000	3,000
Sherry	7,000	3,500
Totals	137,000	$48,000
Beer (barrels)	6,000	------
Brandy	2,000	$3,500

Poultry and Eggs.

	Dozen.	Value.
Chickens	18,000	$90,000
Ducks	200	1,000
Geese	100	2,000
Turkeys	250	5,000
Eggs	2,700,000	675,000
Total value		$773,000

STATISTICS OF ORANGE COUNTY, 1905-6—Continued.

Number of Fruit Trees and Vines.

	Bearing.	Non Bearing.	Total.
Apple	11,050	3,840	14,890
Apricot	144,780	57,980	200,760
Fig	2,510	------	2,510
Lemon	49,875	63,235	113,110
Olive	22,935	------	22,935
Orange	590,425	192,280	782,705
Peach	23,580	25,970	49,550
Pear	4,070	1,740	5,810
Prune	20,220	------	20,220
Walnut	160,185	102,550	262,735
Total trees	1,029,830	447,595	1,475,225
Raisin grapes } acres.	300	------	300
Wine grapes } acres.	750	------	750
Total grapes	1,050	------	1,050
Blackberries } acres.	40	------	40
Loganberries } acres.	15	------	15
Raspberries } acres.	5	------	5
Strawberries } acres.	100	------	100
Total berries	160	------	160

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	552,500	$1,050
Blackberries	160,000	8,000
Cabbage (tons)	6,000	90,000
Lemons (boxes)	31,200	39.000
Loganberries	60,000	3,000
Oranges (boxes)	618,884	773,605
Peaches	1,179,000	23,580
Persimmons (boxes)	500	------
Irish potatoes (sacks)	100,000	125,000
Sweet potatoes	20,000	40,000
Raspberries	20,000	1,000
Strawberries	400,000	20,000
Tomatoes	450,000	4,500
Total value		$1,128,735

Dried—	Pounds.	Value.
Apricots	754,000	$98,020
Walnuts	5,236,680	575,035
Totals	5,990,680	$673,055

Canned—	Cases.	Value.
Pears	241	$482
Peaches	2,944	5,888
Tomatoes	25,500	1,875
Tomatoes (gals.)	2,000	--------
Peaches (gals.)	2,000	--------
Taylor cannery, Santa Ana, different varieties of fruit—		
Tins	8.420	--------
Glass	1,683	--------
Total cases	51,788	--------

Fish Industry.

	Pounds.	Value.
Various kinds	815,950	$24,478

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	1,560	830	$20,750
Barley	42,420	22,600	452,000
Oats	1,000	220	5,500
Rye	12,000	2,000	79,040
Corn	2,200	1,000	25,000
Total cereals	59,180	26,650	$582,290
Alfalfa hay	3,000	------	$120,000
Grain hay	33,000	------	330,000
Total hay	36,000	------	$450,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	90	$1,350
Stock	5,725	57,250
Dairy Cows—Graded	1,700	34,000
Thoroughbred—different breeds	3,845	67,285
Calves	2,670	13,350
Swine	2,260	6,780
Horses—		
Thoroughbred	35	7,000
Standard-bred	1,345	53,800
Common	2,680	67,000
Colts	1,590	19,875
Mules	510	20,400
Sheep—Common	28,200	56,400
Lambs	7,100	3,550
Total stock all kinds	57,750	$408,040

Dairy Industry.

	No.	Production.	Value.
Creameries	2	--------	--------
Skimming stations	5	--------	--------
Butter (pounds)	--	175,000	$43,750
Cheese (pounds)	--	4,663,600	93,272
Condensed milk (cases)	--	350,000	306,250
Cream (gallons)	--	4,218,235	421,823
Total value			$825,095

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 2,750	--------	$5,500
Beeswax	4,000	1,000
Chile peppers, dried (tons)	350	70,000
Flax (700 acres)	940,000	11,750
Flowers and plants (acres)	10	------
Honey (tons, 193)	386,000	19,300
Honey, comb	10,000	1,000
Pumpkins (tons)	1,200	3,000
Green peas and beans (400 acres)	1,600,000	64.000
Sugar beets (tons)	34,194	160,970
Celery (3,410 acres), (carloads)	2,276	470,000
Peanuts (300 acres)	400,000	16,000
Beet sugar	11,750,000	528,750
Crude oil (bbls.)	1,407,225	422,167
Wood (cords)	4,000	20,000
Apricot pits (tons)	85	2,550

STATISTICS OF ORANGE COUNTY, 1905-6—Centinued.

Manufactories.

	No.	No of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	1	----	------	------
Brick		----	125,000	$1,000
Confect'ry (lbs.)	3	----	-----	------
Flouring mills (bbls. daily)	1	----	100	------
Ice plant		- --	2,000	1,000
Planing mills	4	65	------	------
Artificial stone	6	36	------	------
Peat fuel	1	8	------	------
Tiling and sewer pipe	2	15	------	15,000

Productions Shipped Out of State.

Apricots, dried	754,000 lbs.
Lemons (100 carloads)	31,200 boxes

Productions Shipped Out of State—Cont'd.

Persimmons	500 boxes
Oranges (1,682 carloads)	618,884 boxes
Walnuts	5,091,080 lbs.
Beeswax	7,000 lbs.
Cabbage	300 carloads
Celery	2,276 carloads
Milk	777,600 lbs.
Cream	3,705,785 lbs.
Peas, green	1,500,000 lbs.
Irish potatoes	15,000 sacks
Sweet potatoes	16,000 sacks
Barley	59 carloads
Tomatoes, fresh	10 carloads
Fruit, canned, different kinds	10,103 cases
Sugar beets	1,015 carloads
Apricot pits	85 tons
Crude oil	792,353 barrels

PLACER COUNTY.

Placer County lies between latitude 38° 70′ and 39° 30′. Its direction is northeast and southwest. It is about 100 miles long and of varying widths, from 10 to 30 miles, the course and distance being defined by the course of the rivers which mark its boundaries. It extends from about 8 miles from the Sacramento River to the summit of the Sierra Nevada Mountains. Just above Auburn, between the Bear and American rivers, the county is very narrow, being but about 8 miles across. Above Auburn it widens out into the two divides lying between the Bear River and the Middle Fork of the American River. These are known as the Dutch Flat or Railroad Divide, and the Forest Hill Divide. The southwestern portion is more regular in shape than the part just described. This section contains the foothill and level agricultural lands. Its shape is nearly a parallelogram, the southwest two thirds being on the plains proper, and the northeast one third being the foothill and fruit district.

Of the area, 810 square miles are mountainous, 450 foothills, and the remainder valleys. The entire extent faces toward the west, extending from an altitude of some 40 feet on the plains in the western portion to over 7,000 feet at its eastern boundary line, embracing nearly every variety of climate known in the State. At the eastern boundary, separating it from the State of Nevada, is Lake Tahoe, one of the most picturesque lakes in America. The topography of Placer County is as irregular as is its shape. Imagine the whole Atlantic coast from Labrador to Tallahassee incorporated into one county, and one will have a fair idea of what may be found in Placer, exaggerated as to size, but not as to the great variety of climate, elevations, soils, and resources. As to the latter, the whole Atlantic seaboard can hardly equal the endless variety to be found within the borders of this county, which rivals Florida in the quality of its oranges, excels New Jersey in peaches, equals the New England States in its granite quarries, and compares favorably with Maine in the quality of its lumber.

From an elevation of about 2,500 feet up to the summit of the mountains snow falls in the winter, light at the lower edge of the line, and increasing in depth as it ascends the Sierras. Here is a strip of territory from the snow line up to an elevation of 3,000 feet, particularly well adapted to the apple, the pear, and a great variety of vegetables.

The soil of the western or valley portion is of the same general alluvial composition as all the soil in the Sacramento Valley, and is well adapted to the growth of grain. Over 30,000 acres are annually devoted to wheat, barley, oats, and hay. The low foothills back of Lincoln are excellent for the grape.

The soil of the valley lands is mostly a red loam, mixed with considerable clay in spots; that of the foothills is a gravelly red loam, in places light and sandy, and is excellent for the production of fruits. Farther up the soil changes to a red character, with a slate bedrock. This, too, is very fertile. The agricultural region includes the valley and foothill lands all the way from the western boundary to an elevation above Colfax. The foothills everywhere possess a soil which only needs cultivation. The granite soils around Newcastle are composed largely of clay, sand, soda, potash, lime, phosphorus, iron, and magnesia. The constant decomposition that is going on appears to be of nearly endless duration, and of such a nature as to render the soil almost inexhaustible. Artificial fertilization has not yet been found necessary.

For an irrigation water supply Placer has three sources—the Yuba, Bear, and American rivers. Including its branches, the Bear River irrigation ditch is 200 miles in length. This system has been increased in its capacity, and brings water from the Yuba River, so that an abundance is assured. There are several other canals, originally built for mining but now used for irrigation.

Placer County holds a foremost position among the fruit-producers, and it is the most easterly of the counties of California. With the Central Pacific Railroad running the entire length of her territory, she is one day nearer the Eastern market than any other part of the State, a very large item in the shipping of green fruit. In her thermal belt fruit ripens earlier than in most other places in the State, another large advantage. Pears, plums, prunes, apples, apricots, cherries, persimmons, pomegranates, quinces, and figs all do well. Peaches have been grown for the past twenty-five years, and failure of a crop is unknown. Fine oranges are produced, and Placer holds a position beside Butte in the northern citrus belt. In the production of small fruits, berries, and table grapes Placer holds a foremost place.

The largest cherry trees in the world are at the ranch of Robert Hector, from one of which has been picked as high as 3,000 pounds in one season. At the Pan-American Exposition Placer won gold medals for peaches, oranges, and grapes. An exhibit of fifty oranges averaged twenty-four ounces in weight.

A lemon that was on exhibition at the Sacramento Chamber of Commerce measured 22 inches in circumference the small way, and weighed three and a half pounds.

Olive-growing is a profitable industry. The principal orchards are provided with manufacturing plants and are producing a very fine quality of oil.

Dairying and stock and poultry raising are extensive industries. Butter-making is carried on in the summer, the mountain ranges providing plenty of natural feed; the butter is of a very fine quality.

Considerable quantities of vegetables are raised, not only for local consumption, but also for shipment abroad.

Much sugar and yellow pine, fir, spruce, and cedar are found in the mountains, and the lumber output from that section has been very large for many years. Oak and scrub pine abound all over the foothills, and fuel is plentiful.

Placer County ranks well up among the mining counties. Her average yearly contribution to the world's wealth is something above the million mark. The total production since the discovery of gold at Auburn, May 16, 1848, is estimated at much over $75,000,000. The mining methods include drift, river, placer, and quartz. Placer's drift mines are among the largest in the world.

The granite quarries rank with the best in the United States. Nearly all the street curbing in San Francisco is from the Placer quarries, while the State Capitol is an example of the value and beauty of foothill granite.

Potter's clay is found in abundance at Lincoln, from which is manufactured sewer pipe, tiling, pressed brick, architectural terra cotta, and glazed brick for interior decoration.

'Placer County is a natural sanatorium. As a resort for patients suffering from pulmonary diseases, leading physicians say it has no equal on the Pacific Coast. It is here patients find relief and some of them are cured. The altitude is just right for people suffering from asthma or bronchial diseases.

STATISTICS OF PLACER COUNTY, 1905-6.

General Statistics.

Area, 1,390 square miles, or 889,600 acres.

Number of farms	927
Number of acres assessed	645,790
Value of country real estate	$3,926,340
Of improvements thereon	$1,206,550
Of city and town lots	$423,270
Of improvements thereon	$934,890
Of personal property	$749,070
Total value of all property	$7,411,715
Expended on roads, last fiscal yr.	$37,400
Expended for bridges, last fiscal year	$7,500
Number of miles of public roads	724
Road levy per $100, 1906	40 cts.
Value of county buildings	$260,000
Irrigating ditches—miles, 127; cost	$135,615
Railroads, steam—miles, 131.47; assessed value	$9,331,880
Electric power plants—3; assessed value	$35,400
Electric power lines—miles, 75½; assessed value	$35,500
Number of acres irrigated	12,400

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	21,300	6,800	$182,760
Barley	11,100	2,300	43,275
Oats	3,900	793	18,450
Total cereals	36,300	9,893	$244,485
Grain hay	31,200	41,200	$289,400

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	22,470	5,700	28,170
Apricot	13,300	9,000	22,300
Cherry	19,100	9,600	28,700
Fig	7,400	3.250	10,650
Lemon	870	600	1,470
Nectarine	9,800	2,800	12,600
Olive	39,700	16,400	56,100
Orange	32,000	19,200	51,200
Peach	909,200	604,710	1,513,910
Pear	116,600	56,000	172,600
Plum	115,400	182,500	297,900
Prune	6,000	2,000	8,000
Quince	1,800	200	2,000
Almond	7,400	4,600	12,000
Other nuts	1,090	500	1,590
Total trees	1,302,130	917,060	2,219,190

Fruit Trees and Vines—Continued.

		Bearing.	Non-Bearing	Total.
Raisin grapes	acres.	210	------	210
Table grapes		2,100	480	2,580
Wine grapes		1,740	1,000	2,740
Total grapes		4,050	1,480	5,530

Fruit, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples	220,400	$3,400
Apricots	516,000	10,200
Blackberries	18,000	6,400
Currants	3,400	195
Cherries	495,700	49,500
Figs	10,400	740
Grapes	6,150,400	151,100
Nectarines	29,000	1,075
Oranges (boxes)	49,500	50,200
Olives	382,000	------
Pears	3,190,500	37,400
Peaches	21,419,000	429,100
Persimmons	9.000	475
Plums	7,490,500	299,620
Quinces	40,000	550
Raspberries	119,400	4,970
Strawberries	400,000	15,970
Tomatoes	370,000	3,650
Total value		$1,066,445

Canned—	Cases.	Value.
Apples	150	$300
Blackberries	125	250
Pears	2,983	5.900
Peaches	5,627	11,400
Tomatoes	1,940	3,880
Totals	10,825	$21,730

Wines, Brandies, Etc.

Number of wineries, 2; number of distilleries, 1; number of breweries, 2.

	Gallons	Value.
Wine—Angelica	37,400	$10,100
Claret	59,470	18,900
Port	58,900	25,900
Sherry	24,000	9,700
Totals	179,770	$64,600
Beer (barrels)	22.500	$7,400
Brandy	9,800	5,995
Vinegar	4,800	570

STATISTICS OF PLACER COUNTY, 1905-6—Continued.

Livestock Industry.

	Number.	Value.
Cattle—Beef	1,940	$41,300
Stock	1,540	21,750
Dairy Cows—Graded	2,525	65,825
Jersey	470	3,000
Calves	1,260	7,650
Swine	740	2,400
Horses—		
Thoroughbred	6	2,400
Standard-bred	6	1,440
Common	1,693	54,000
Colts	460	7,470
Mules	275	8,250
Sheep—		
Imported or fine	500	2,500
Common	21,000	57,000
Lambs	1,800	2,700
Common Goats	960	1,025
Total stock all kinds	35,175	$278,710
Wool (pounds)	172,600	$39,570

Forest Products.

	Amount.	Value.
Area of timber lands—		
Cedar (acres)	3,900	------
Pine (acres)	8,000	------
Sawmills (number)	3	$38,950
Laths	748,000	------
Lumber—Cedar (feet)	43,000	750
Pine (feet)	6,829,750	127,518
Posts (pieces)	190,000	15,200
Railroad ties (pieces)	27,000	10,400
Sash and door factories (number)	1	------
Total value		$192,818

Power used for mills and manufactories in county: steam—number, 3.

Dairy Industry.

	No.	Production.	Value.
Creameries	4	74,200	$18,700
Butter (pounds)		4,900	1,540
Cream (gallons)		3,400	2,475

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Brick (thousand)		--	1,100	$46,000
Cigars	2	10	426,000	17,900
Confect'nery (lbs.)	1	4	7,000	1,500
Olive oil (gallons)		--	2,700	3,900
P'kl'd olives (gals.)		--	2,400	875
Sewer pipe (feet)		7	4,000	275,400
Planing mills	2	--	------	------
Potteries	1	--	----	------
Granite (cars)		--	260	-----
Tiling (feet)		--	175,000	5,000

Productions Shipped Out of State.

	Amount.
Apples, fresh	7,000 boxes
Apricots, fresh	10,400 boxes
Blackberries, fresh	12,400 cases
Cherries, fresh	4,900 boxes
Figs, fresh	8,700 lbs.
Grapes, fresh	3,748,000 lbs.
Nectarines, fresh	1,475 boxes
Oranges	47,400 boxes
Peaches, fresh	1,128,475 boxes
Pears, fresh	92,600 boxes
Plums, fresh	443,700 boxes
Quinces	120,000 lbs.
Raspberries, fresh	124,000 lbs.
Strawberries, fresh	486,400 lbs.
Tomatoes, fresh	17,200 boxes
Tomatoes, canned	1,790 cases
Wool	172,600 lbs.
Lumber	4,000 M. ft

RIVERSIDE COUNTY.

Riverside is one of the youngest counties, having been formed in 1893, from the southwestern part of San Bernardino and the northern part of San Diego.

The progress of the county is practically confined to its northwest corner, embracing the largest orange-growing district in the world. The rest is largely an undeveloped desert region, believed to be a storehouse of useful minerals and metals.

The county recently has had exceptional progress and prosperity, and a considerable area of new land has been brought under cultivation. Many new orchards, both citrus and deciduous, have been set out.

Alfalfa has also been planted on a large scale.

The orange crop in the county is the largest in the State. The growing of citrus fruits is the main industry, although deciduous fruits of most kinds do well, particularly apricots and prunes. The olive thrives, and a very fine grade of oil is produced. Melons and cantaloupes are extensively grown and mature early.

Diversified farming is quite a feature in several sections. Alfalfa grows luxuriantly; broomcorn does well, and is a very prominent and profitable crop. The sugar-beet thrives, and considerable new land has recently been put under cultivation.

Dairying is profitable, and modern creameries with the latest appliances are located in different sections. The stock used for dairying purposes is of a very high grade, mostly pure-bred representatives of the milk strains.

Considerable stock and hogs are fattened for market, and poultry-raising receives considerable attention.

Bee-keeping is another growing industry, and a fine grade of honey is produced.

In 1901 the city of Riverside completed a $40,000 steam-power plant, to generate electricity for power and lighting purposes The sewer system has been extended and the streets extensively improved.

The Riverside Water Company is the chief of the companies that supply Riverside with its fine water system, that has a continuous and ample flow.

The rapid development of Strawberry Valley as a health resort has done much to stimulate local trade.

The importance of Perris has been increased by the rapid development of water, and the consequent large acreage of new land put under cultivation. Thousands of acres in this vicinity have been planted to alfalfa.

Hemet has a large flouring-mill, fruit-drying plant, and broom factory in successful operation. The shipments of olives are large. Fine raisins are produced in this section, and the grain industry is flourishing.

At Elsinore coal mines are successfully operated, and a superior quality of potter's clay is obtained in the vicinity. The domestic water-system is owned by the city. Fine apricots, prunes, olives, and other fruits are raised. Seven miles distant is the Good Hope gold mine, with a stamp mill and cyanide plant. During the open season Lake Elsinore abounds with wild ducks of various kinds, making it an attractive place for sportsmen.

A modern and progressive colony has been established at Ethance, possessing what is undoubtedly the most perfect and complete private irrigation system in the State. The colony has an electric plant of the most modern type, which is utilized to generate power for pumping and lighting purposes. Broomcorn, sugar-beets, and alfalfa produce profitable crops.

Indio is a little health resort that lies below sea-level. A number of artesian wells have been developed, and much land in the vicinity has been placed under cultivation. Watermelons and cantaloupes are extensively grown.

STATISTICS OF RIVERSIDE COUNTY, 1905-6.

General Statistics.

Area, 7,000 square miles, or 4,480,000 acres.

Number of acres assessed	933,210
Value of country real estate	$6,014,842
Of improvements thereon	$3,095,320
Of city and town lots	$1,414,809
Of improvements thereon	$2,256,210
Of personal property	$1,728,610
Total value of all property	$14,509,791
Expended on roads, last fiscal yr.	$56,639
Expended for bridges, last fiscal year	$16,273
Number of miles of public roads	1,282
Road levy per $100, 1906	40 cts.
Value of county buildings	$244,000
Irrigating ditches—miles, 124.88; cost	$975,625
Railroads, steam—miles, 207; assessed value	$2,523,270
Railroads, electric—miles, 10; assessed value	$15,000
Electric power plants—3; assessed value	$12,100
Electric power lines—3; miles	18

One municipal electric light plant, valued at $125,000, in city of Riverside, not assessed.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	1,000	500	1,500
Apricot	24,000	400	24,400
Cherry	4,000	------	4,000
Fig	150	------	150
Lemon	177,700	------	177,700
Olive	67,866	------	67,866
Orange	3,048,600	69,500	3,118,100
Peach	18,000	------	18,000
Pear	6,000	1,200	7,200
Plum	1,200	100	1,300
Prune	24,000	1,500	25,500
Quince	150	------	150
Almond	15,000	5,000	20,000
Walnut	2,460	------	2,460
Total fruit trees	3,360,126	78,200	3,438,326

Fruit Trees and Vines—Continued.

		Bearing.	Non-Bearing,	Total.
Raisin grapes	acres.	160	------	160
Table grapes		515	------	515
Wine grapes		5,185	------	5,185
Total acres grapes		5,860	------	5,860

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,363,200	$13,698
Apricots	1,816,200	18,224
Blackberries	160,000	5,200
Beans	120,960	3,014
Cabbage	126,000	3,780
Cherries	20,000	800
Figs	4,500	2,250
Lemons (boxes)	350,080	592,956
Onions	6,000	120
Oranges (boxes)	1,861,780	2,367,885
Olives	1,584,000	24,900
Pears	260	6
Peaches	1.801,000	18,020
Plums	120.000	1,200
Irish potatoes	93,600	1,872
Sweet potatoes	1,400	350
Prunes	1,800,000	18,000
Quinces	9,000	90
Raspberries	58,330	2,332
Strawberries	387,5 0	19,375
Tomatoes	750,000	11,250
Totals	12,433,810	$3,105,322

Dried—	Pounds.	Value.
Almonds	850	$128
Apricots	77,235	10,040
Onions	1,680	25
Pears	550,000	44,000
Peaches	108,750	10,913
Prunes	30,000	1,030
Raisins	3,500	210
Walnuts	6,000	660

STATISTICS OF RIVERSIDE COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.—Continued.

Canned—	Cases.	Value.
Apricots	7,984	$798
Peaches	14,797	1,479
Totals	22,781	$2,277

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	51,891	31,919	$845,024
Barley	114,158	62,095	1,196,900
Oats	1,730	907	14,899
Corn	20	59	1,770
Total cereals	167,799	94,980	$2,058,593
Alfalfa hay	9,112	42,306	$308,265
Grain hay	61,728	68,541	679,100
Total hay	70,830	110,847	$987,365

Wines, Brandies, Etc.

Number of wineries, 5.

	Gallons.	Value.
Wine—Angelica	67,000	$43,050
Claret	450,000	45,000
Muscatel	39,000	25,350
Port	180,430	113,642
Sherry	285,000	185,250
Totals	1,021,430	$412,292

Livestock Industry.

	Number.	Value.
Cattle—Beef	1,201	$43,745
Stock	8,193	167,250
Dairy Cows—Graded	1,501	63,110
Holsteins	252	8,820
Jersey	932	34,720
Polled Angus	100	3,500
Mixed breeds	1,314	26,480
Shorthorns	80	3,550
Calves	2,729	9,536
Swine	5,373	35,349
Horses—		
Thoroughbred	3	9,000
Standard-bred	1,006	100.600
Common	6,260	150,597
Colts	1,289	33,577
Mules	1,104	149,436
Sheep—Common	30,122	88,914
Lambs	2,800	3,000
Angora Goats	95	376
Common Goats	174	536
Total stock all kinds	64,528	$832,096
Wool (pounds)	151,600	$17,040

Dairy Industry.

	No.	Production.	Value.
Creameries	4	------	------
Skimming stations	7	------	------
Butter (pounds)		127,360	33,631
Condensed milk (cases)		7,300	21,900
Cream (gallons)		25,000	63,184
Total value			$118,715

Poultry and Eggs.

	Dozen.	Value.
Chickens	7,817	$41,385
Ducks	312	988
Geese	58	317
Turkeys	2,915	70,000
Eggs	2,182,688	97,192
Total value		$209,882

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—number, 20,631	------	$57,222
Beeswax	8,005	2,294
Honey	582,815	31,435
Hops	87,000	10,440
Total value		$101,391

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	1	6	------	$20,000
Brick (thousand)	4	125	6,100	89,100
Cigars (thousand)	1	6	225	7,825
Flouring mills (barrels)	1	2	3,600	18,000
Lime (barrels)	1	----	2,500	------
Hides (pounds)		----	11,375	2,275
Olive oil (gallons)	3	----	1,210,823	16,235
Pickled olives (gallons)		----	3,780	2,825
Sewer pipe	2	30	------	121,250
Planing mills	2	49	------	780,000
Potteries	2	100	------	200,000
Artificial stone (tons)	2	12	3,000	30,000
Marble	1	4	------	2,400
Tiling (tons)	1	----	30	600

Productions Shipped Out of State.

	Amount.
Lemons	349,656 boxes
Oranges	1,854,984 boxes
Honey	155,500 lbs.
Wine—Table	299,000 gals.
Olive oil	2,280 gals.
Olives, pickled	1,505 gals.

SACRAMENTO COUNTY.

Sacramento County is among the largest in the Sacramento Valley. It was organized by the first Legislature; within its confines is the seat of State government; the annual fairs of the State Agricultural Society are held in and near Sacramento City.

Its cities and towns are: Sacramento, Folsom, Galt, Elk Grove, Florin, Oak Park, Walnut Grove, Isleton, Franklin, Cosumnes.

The area is almost all a rich alluvial plain from 30 to 75 feet above sea level, gradually rising from the rivers to meet the low rolling foothills of the Sierra Nevada Mountains; these foothills commence at the extreme eastern part, and are from 6 to 8 miles wide. There are no mountains and aside from this foothill belt the surface has only gentle undulations.

The Sacramento River traverses the western boundary tortuously for about 90 miles across the rich bottoms, cutting them up at the lower part into numerous small and several large islands. The Sacramento is the longest and largest river in the State, and is navigable from Red Bluff to San Francisco Bay.

The American River rises in the upper Sierras, and enters the county at the northeast corner, among the low foothills. It flows in a southwest direction through the entire width, a distance of some 35 miles, and empties into the Sacramento just north of Sacramento City.

Geological indications prove that in remote ages the entire Sacramento Valley and a section of the foothills to an altitude of several hundred feet were portions of the bed of a vast island sea or lake, and that into this lake the washings of the surrounding mountains were poured to form the present soils, which are made up of all the fertile mineral and vegetable elements in almost inexhaustible quantities. Many analyses have been made of these soils from the alluvial valleys, the upper lands, and the foothills; these analyses have demonstrated that the soils of this valley are unexcelled for fertility.

In addition to the numerous rivers and streams there is, underlying the entire area of the county, an inexhaustible supply of pure and excellent water for domestic and irrigating purposes. Throughout the greater portion this subterranean supply is easily appropriated by means of a light lifting power.

The first venture in agriculture in the Sacramento Valley was by General John A. Sutter in 1839. He received a concession of a large tract of land from the Mexican Government, and located his fort near the junction of the American with the Sacramento River. His first wheat field was a portion of the land now covered by Sacramento City. He planted the first grapevines and fruit trees, and practically demonstrated the unsurpassed fertility of the soil of the great valley in the north.

Thousands of acres along the river bottoms and on the islands are used for the production of all kinds of vegetables, which are shipped East by the carload and at times by the trainload. A great deal of this product is disposed of to the canneries in this and other counties.

Alfalfa grows luxuriantly without irrigation on all the rich bottom lands, producing from four to eight tons to the acre.

Fruits of all kinds are produced on any of the lands of the county, and particularly on the river bottoms and the islands.

The winter fruits are oranges, lemons, pomegranates, olives, and persimmons, which all ripen in November, December, and January. The Japanese persimmons grow to the size of apples. Olives are very profitable, both for pickling and for oil.

The spring fruits that mature and are marketed in April, May, and June embrace strawberries, raspberries, blackberries, and cherries.

At Florin, on the western division of the Southern Pacific Railroad, 9⅓ miles south of Sacramento City, is the most productive strawberry belt in the State. Its product has a reputation for excellence all over the Western States. Tokay grapes from this district are shipped to Eastern markets through the local associations.

Apricots ripen early, and of all countries in the world California is the only one that has made a thorough success of that fruit, and in this county it reaches its very finest development in size, flavor and productiveness.

A large number of varieties of pears are grown, chief among them the renowned Bartlett.

Plums are very profitable. They grow to large size, and are shipped in vast quantities to the Eastern and home markets.

Nectarines do well, and are cultivated to a considerable extent.

In the fall the fruit products are apples, pears, grapes, quinces, prunes, and peaches.

Sacramento County is preëminently the home of the grape, and on the red lands of the plains it reaches its highest perfection, particularly with irrigation. The table varieties include the Tokay, Muscat, Black Prince, Morocco, Emperor, and Cornichon. They always bring first-class prices for shipment to the Eastern markets. The wineries of the State handle quantities of some of these varieties.

French, or petite, prunes are a leading fruit. They are remarkably prolific, and when cured excel the imported article, and bring a much higher price in the markets of the world.

Figs grow in any part of the county, but on the river bottoms they reach great size and are remarkably prolific. The Smyrna, or "fig of commerce," has been introduced and successfully grown.

Raisins are easily cured, the climate being peculiarly favorable.

Almonds have long been found a reliable and profitable crop. They can be grown in any part of the county.

The English soft-shell walnut has been demonstrated to be a profitable crop. Black walnut trees are extensively grown for shade and ornament.

Broomcorn is grown, as is also Egyptian corn—the latter making an excellent and cheap food for stock.

Hundreds of tons of beans of all kinds are produced on the river and island lands. The interior of Grand and Tyler islands is to a great degree devoted to their production.

Potatoes, both sweet and Irish, are grown in large quantities on the

bottom lands; of the latter, the average yield per acre is from 100 to 150 sacks.

Sacramento City, by reason of natural advantages, geographical relation to various producing sections, and admirable transportation facilities, deservedly bears the reputation of being the largest fruit and vegetable shipping point in the State. It is the recognized outlet for the products of the Sacramento Valley.

The dry atmosphere is specially suited for the drying of fruits, and the article so produced is regarded as first class in the markets of the world.

The California Fruit Canners' Association possesses at Sacramento one of the largest and most modern fruit and vegetable canneries in the world. This cannery is in operation during more months each year than any other in the State, beginning on asparagus the latter part of March, and running steadily for the succeeding eight months, ending the latter part of November on tomatoes and beans.

Sacramento County presents great opportunities to the livestock breeder and the dairyman. The climate is so even, temperate, and mild that animals remain in the open air, practically unsheltered, the year round without hardship. The soil, because of its richness, is peculiarly adapted to the growth of forage crops, especially alfalfa, which is at the same time one of the best and the cheapest of stock feeds. There are quite a number of creameries. The average character of the dairy stock is fair, and is being constantly improved by the introduction of well-bred animals.

Hogs are raised generally by the farmers, and several breed pedigreed Poland-China, Berkshire, and Essex swine quite extensively. The breeding of pedigreed hogs has been very profitable.

The poultry business has steadily increased in importance in the last few years. Elk Grove, 15 miles south of Sacramento City, on the line of the railroad, and but 5 miles east of the Sacramento River, is the principal poultry district.

Near Sacramento City the raising of poultry is made a specialty by many, and with profit.

Along the Sacramento, American, and Cosumnes rivers are the most productive hop fields in the United States. Hop culture on this coast dates back to 1858. It was early demonstrated that the soil and climate of Sacramento County was unsurpassed for hop culture, and that it is the only place known where a crop of from 1,000 to 2,000 pounds per acre can be grown the first year the roots are planted. It is a common occurrence to grow 2,000 or 3,000 pounds on an acre of ground, and in some instances 4,000 pounds.

There are quite a number of wineries in the county. The output is shipped all over the world, and is principally disposed of in the United States, Central America and the Islands. The port is not heavy in body nor dark in color, but is rather more delicate and lighter, having great character, and resembling closely the light, high-grade ports of Portugal. The county has a great reputation for fine sherry.

Few counties contain a greater mileage of railroads than does Sacramento. From the capital city the Central Pacific leads eastward across the continent; the California & Oregon passes to the north into Oregon, and from thence to Washington, and also to the Eastern States. At Galt a branch line runs up into the county of Amador;

the California Pacific runs on the west of the Sacramento River to Oakland; and the Sacramento & Placerville passes along the American River through Folsom, and thence into the county of El Dorado. From most all of these roads branches extend into the various counties of the Sacramento Valley. The Western Pacific, a new transcontinental line, now being constructed, will run through Sacramento from north to south. From its geographical position, Sacramento City is the natural railroad center of the central and northern portions of the State.

The Southern Pacific Company operates two steamboats that make daily trips between Sacramento and San Francisco, touching at the various towns and farm landings to receive and discharge freight. The Sacramento Transportation Company operates eight steamboats and twenty-five barges that are run between Red Bluff and San Francisco. They touch at all landings, and move a great part of the grain that is produced in the up-river counties, as well as all other kinds of freight. The Farmers' Transportation Company is controlled by an association of farmers. Its steamboats run between Colusa and San Francisco, making weekly trips.

Sacramento City, being the center and metropolis of a rich portion of the State, the heart of a vast railroad system, the point from which steamers pass to the north and to the south, and with unlimited water and electrical power at her very doors, presents advantages in manufactures excelled by no other city on the coast. Here are located the extensive shops of the Southern Pacific Company. For years the great power of the swift-flowing American was allowed to go to waste, but in 1888, at the Folsom State Prison, 22 miles from Sacramento City and in the county, a mighty granite dam was constructed across the river. At that point solid bluffs of rock rise on either side, affording a splendid site. The natural fall of the American gives as great a force as any other stream west of the Rocky Mountains, and the artificial assistance rendered by the dam creates added power. From the canal the water falls upon turbine wheels. Five generators produce the electric power, and it is transmitted to Sacramento City by four circuits on two sets of poles, so as to guard against breakages and accidents. The distance of the generators from Sacramento is 22.4 miles. The Sacramento Electric, Gas and Railway Company receives and controls this power. Each of the five generators produces one thousand horsepower. In addition, the company receives current at 40,000 volts from the Bay Counties Company's power plant that is located on the North Yuba, 35 miles above Marysville. This power is transmitted to Sacramento over a circuit 64.2 miles in length. With the combined power so received the street car lines of the company in Sacramento City and suburbs are operated. The lighting of the city is from this source. It also furnishes an aggregate of over three thousand horsepower for manufacturing purposes in and about the city.

The Central California Electric Company derives its power from abrupt drops in the canals of the South Yuba Water Company, located in Placer and Nevada counties. The water company has an immense storage system for municipal supply, irrigation, and water power, and maintains twenty reservoirs on the divide, or in the upper foothills, thirteen distributing reservoirs in the lower foothills, and four hundred miles of canal.

The natural fish in the rivers are salmon, sturgeon, pike, perch, hardheads, and dace. Those planted are striped bass, black bass, shad, and three kinds of catfish. The only fish propagated is the salmon, in the headwaters of the Sacramento. All of the planted fish have multiplied satisfactorily. In the open season large numbers of salmon and other fish are taken and sold in the local and San Francisco markets.

In the line of game, there are geese, ducks, quail, curlew, doves, and larks. All but the geese are protected. The ducks are mostly migratory. Of the non-migratory species are the mallard, spoonbill, and wood duck.

One can drive in any direction, at any time of the year, with no inconvenience, over roads that favorably compare with the streets in many towns elsewhere in the State. All of the bridges and roads are free for travel.

On the American River, in what is called the Folsom District, dredge mining is being carried on. The area of gravel so far acquired for dredge purposes is about 5,000 acres. These mining operations are in the hands of people with plenty of capital and skilled engineers.

Sacramento City, the capital of California and the county seat of Sacramento County, is situated on the east bank of the Sacramento River. The distance by rail from San Francisco is 90 miles. The imposing State capitol building, that cost about $3,000,000, is one of the finest of its kind in the United States. It stands in the middle of a park of thirty-eight acres, almost in the heart of the city. At the east side of the park is located the Exposition Pavilion of the State Agricultural Society, and also the State Printing Office and Bindery. The Federal building, of red sandstone, costing $150,000, accommodates the postoffice, the revenue and land offices, and the weather bureau station. The waterworks are the property of the city. The natural-gas wells in the city yield an abundance of gas for domestic purposes—heating and cooking.

STATISTICS OF SACRAMENTO COUNTY FOR 1906.

General Statistics.

Area, 987$\frac{66}{100}$ square miles, or 632,108 acres.

Number of farms	1,650
Number of acres assessed	607,500
Value of country real estate	$10,409,390
Of improvements thereon	$1,619,740
Of city and town lots	$10,073,270
Of improvements thereon	$9,309,030
Of personal property	$5,702,111
Total value of all property	$37,113,540
Expended on roads, last fiscal yr.	$60,826
Expended for bridges, last fiscal year	$101,840
Number of miles of public roads	1,090
Road levy per $100, 1906	40 cts.
Value of county buildings	$473,150
Irrigating ditches—miles, 25; cost	$75,000
Railroads, steam—miles, 90.25; assessed value	$1,634,035
Railroads, electric—miles, 30½; assessed value	$70,700
Electric power plants—2; assessed value	$300,000
Electric power lines—miles, 54; assessed value	$100,000
Number of acres irrigated	31,000

Wines, Brandies, Etc.

Number of wineries, 8; number of distilleries, 8; number of breweries, 2.

	Gallons.
Wine—Angelica	40,857
Claret	1,140,530
Muscatel	65,774
Port	500,284
Sherry	850,758
Tokay	23,448
Totals	2,621,651
Beer (barrels)	123,169
Brandy (gallons)	391,386
Cider (barrels)	195
Vinegar (barrels)	175

Fish Industry.

	Pounds.
Salmon	777,187
Catfish	534,771
Bass	174,200
Shad	148,294
Other kinds	52,675
Total	1,687,127

STATISTICS OF SACRAMENTO COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.
Apples	394,100
Apricots	2,328,000
Asparagus*	19,161,010
Blackberries	83,347
Beans	131,885,000
Beets	152,000
Cabbage	2,520,000
Celery	220,000
Corn	88,000
Cherries	217,812
Figs	100,000
Grapes	14,338,800
Lemons (boxes)	3,400
Nectarines	14,000
Onions	28,134,000
Oranges (boxes)	25,000
Pears	7,828,225
Peaches	11,168,984
Peas	268,000
Plums and prunes	12,491,406
Irish potatoes†	969,000
Sweet potatoes‡	2,500
Strawberries §	5,222,000

Dried—	Pounds.
Almonds	640,000
Apples	37,000
Apricots	420,000
Beans	131,750,000
Figs	45,000
Nectarines	11,000
Onions	28,100,000
Pears	220,000
Peaches	1,250.000
Peas	110,000
Prunes	2,012.000
Walnuts	22,000
Total	164,617,000

Canned—	Cases.
Apples	785
Apricots	29,000
Blackberries	1,200
Beans	250
Cherries	1,230
Grapes	8,500
Pears	52,000
Peaches	110,000
Plums	3,000
Strawberries	1,600
Tomatoes	39,400
Total	246,965

Poultry and Eggs.

	Dozen.	Value.
Chickens	17,500	$87,500
Ducks	350	2,100
Geese	150	1 800
Turkeys	1,300	31,200
Eggs	745,291	186,322
Total value		$308,922

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* Most of the asparagus is canned.

† Sacks; 111,125,000 pounds.

‡ Sacks; 312,500 pounds.

§ Includes raspberries and loganberries.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.
Wheat	45,000	18,250
Barley	14,100	7,050
Oats	92,000	18,400
Corn	800	523
Total cereals	151,900	44,223
Grain hay	3,500	23,000
Grass hay	62,500	62,500
Total hay	66,000	85,500

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		26,571	1,300	27,871
Apricot		91,129	30,000	121,129
Cherry		20,384	8,500	28,884
Fig		1,250	2,900	4,150
Lemon		3,000	900	3,900
Olive		12,500	6,300	18,800
Orange		35,500	21,500	57,000
Peach		343,764	30,000	373,764
Pear		287,740	47,000	334,740
Plum and prune		327,677	88,000	415,677
Quince		1,750	----	1,750
Other kinds		18,537	1,500	20,037
Almond		65,568	30,000	95,568
Walnut		1,770	1,820	3,590
Raisin grapes	acres.	940	----	940
Table grapes		5,700	----	5,700
Wine grapes		9,750	9,250	19,000
Total acres grapes		16,390	9,250	25,640
Blackberries	acres.	190	----	190
Raspberries and loganberries		250	----	250
Strawberries		750	----	750
Total acres berries		1,190	----	1,190

Livestock Industry.

	Number.	Value.
Cattle—Beef and stock	32,397	$619,825
Dairy Cows	10,800	270,000
Calves	7,200	36,000
Swine	40,250	161,000
Horses—		
Thoroughbred	1,100	330 000
Standard-bred	1,800	270,000
Common	14,150	1,061,250
Colts	3,600	36,000
Mules	3,000	390,000
Sheep—Common	77,600	232,800
Lambs	17,500	35,000
Common Goats	200	400
Wool (pounds)	242,500	------

Dairy Industry.

	No.	Production.
Creameries	9	--------
Skimming stations	21	--------
Butter (pounds)	--	1,578,751
Cheese (pounds)	10	549,219

STATISTICS OF SACRAMENTO COUNTY, 1905-6—Continued.

Forest Products.

	Amount.	Value.
Charcoal (sacks)	29,500	$11,800
Fuel, wood (cords)	35,000	210,000
Sash and door factories	------	35,000
Total value		$256,800

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—number, 1,750	------	$5,250
Beeswax	1,600	400
Flowers and plants (acres)	25	------
Honey	57,000	4,560
Hops	3,986,960	------

Manufactories.

	No.	No. of Employes.	Quantity Produced.	Value of Product.
Bookbinderies	2	10	------	------
Paper boxes	1	3	------	------
Wood boxes	2	41	------	------
Brick (thousand)	1	70	17,500	------
Brooms (dozen)	2	6	4,000	------
Carriages and wagons	4	75	------	------
Cigars (thousand)	17	65	2,464	$110,880
Confectionery	8	118	------	89,000
Cooper shops	2	9	------	22,000
Crackers	1	18	------	82,000
Flouring mills (barrels)	4	130	300,000	------

Manufactories—Continued.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Foundries and iron works	3	35	------	$55,000
Furniture	2	32	------	50,000
Leather goods	7	70	------	95,000
Machinery	11	175	------	450,000
Malt	5	15	------	130,000
Meat products—				
Hides (pounds)		--	640,000	64,000
Lard (pounds)		--	325,000	30,800
Meat packed (tons)	3	55	875	18,600
Tallow (barrels)		--	35,000	59,500
Pickles (gallons)	2	6	------	17,000
Pickled olives (gallons)		--	28,000	16,800
Iron pipe	1	40	------	222,149
Sewer pipe	1	4	------	12,000
Planing mills	7	125	------	360,000
Potteries	3	10	------	5,000
Artificial stone	6	35	------	115,000
Marble	6	30	------	97,000
Syrups and extracts	7	28	------	130,000
Tin and galvanized iron	8	152	------	219,690
Willow and wooden ware	1	2	------	5,000
Fruit baskets	2	70	------	175,000
Tents and awnings	3	12	------	15,000
Barley, rol'd (tons)		--	29,000	------
Cornmeal (barrels)		--	13,000	------
Middlings (tons)		--	2,000	------
Bran (tons)		--	3,000	------

SAN BENITO COUNTY.

San Benito is larger in area than Rhode Island, with its population of half a million; this county has a population of about 6,000.

San Benito County is 95 miles south of San Francisco. It lies 25 miles inland east of the quaint old town of Monterey, and 15 miles east of Moss Landing, on Monterey Bay. The average precipitation is 12 inches annually, which all falls between November and April. In some of the valleys the rainfall is never less than 18 to 20 inches.

The county is 70 miles in length, and averages about 21 miles in width. From Tres Pinos south, the county opens out like a fan, stretching away for miles, following the course of the Tres Pinos Creek and the San Benito River. It is inclosed on two sides by mountains: on the east by the Mount Diablo or Mount Hamilton range, and on the west by the Gabilan range. From these ranges the surface slopes to the valley of the San Benito River, which flows northwesterly through the middle of the county and empties into the Pajaro River, which in turn empties into Monterey Bay, winding through a gap that gives to the county the refreshing ocean breezes.

Hollister, the county seat, is a beautiful town. It is well laid out with cement walks, graded streets, and magnificent shade trees; it has a sewer system, gravity system of water works, and electric light and gas works. The town is well supplied with schools and religious facilities. All the standard fraternal orders are represented by lodge meetings in fine lodge rooms supported by the town.

San Benito County has many elements vitally necessary to be considered in the selection of a home or place of business. Climate is one of its chief attractions. Proximity to the coast makes it a pleasant one, and the fact that is not right on the coast renders it suitable for those who can not live too near the ocean. Sufferers from asthma, lung trouble or catarrh can here find a climate that will at least benefit, if not cure. Mineral springs of different kinds abound, and beautiful mountain scenery can be enjoyed from every front door.

The soil of San Benito County is chiefly sediment, light and loamy. The soil in the valleys is mostly a rich, deep sediment or alluvium. This is particularly true around Hollister, in the San Juan Valley, and at San Felipe. Good public highways lead in and out of Hollister to the west, to the north, to the south, to the southeast, and to the east. These roads are all hard, well graded, and in good condition the year round.

In the southern part of the county are situated the famous New Idria quicksilver mines, the largest producer in the world.

In the way of gorgeous mountain scenery the county presents the Vancouver Pinnacles, the largest conglomerate mass of bowlders in the world, covering seven sections of land and rivaling in beauty the famous Yosemite Valley or the Grand Cañon of the Colorado.

In the Hollister and San Juan valleys poultry-raising has become one of the leading industries, and it is successful beyond anticipation by reason of climatic conditions. The capital required for a start in the poultry business is infinitesimal. Newcomers, even though not experienced, have no difficulty in meeting with success.

The climate is peculiarly adapted to the successful raising of poultry. The trade winds reach the valley after passing over the distance from the coast, shorn of their chill, yet cooling the heat of summer so that it is free from extremes, fog and winds. A person can take five acres in the San Juan or Hollister valleys, embark in the raising of poultry, give the business intelligent attention, and be in possession of a cash income three months after he has finished his improvements.

Hay is the main export. Hollister is the largest single shipping point in the State, the average shipments amounting to 25,000 tons annually. Hollister hay is shipped east to Chicago, New York, St. Louis, Cincinnati, Memphis, Lexington, and other points. The fine quality is due to superior climatic conditions—absence of fogs, extreme heat or cold—making a perfect sun-cured hay. The largest hay warehouses in the world are at the Hollister station, furnishing steady employment to several crews the year round.

Large quantities of grain are shipped, in addition to the large quantities retained at home for use as poultry food. Barley and oats are among the principal products.

There is also shipped a large amount of fruit, consisting principally of prunes, apricots and pears. Walnuts and almonds are receiving some attention.

Other shipments are wine, hogs, cattle, horses, poultry, and eggs.

With San Benito recognized as the section preëminent for successful poultry-raising, the already large business is bound to increase. The demand for incubators, brooders, and other appliances will justify the establishment of a factory here. The poultry business is a demonstrated success.

A thousand acres can profitably be set out in strawberries and other small fruits to fill the demand from near by markets. For the vineyardist there is land at a low figure. Land can be rented on shares, the renter only taking the risk of labor and seed. Many of our prosperous farmers to-day secured their start by renting land.

The San Benito River furnishes winter irrigation to about 3,000 acres in Hollister Valley. This water is used in orchards and on dairy farms; one flooding generally suffices for the former, and two floodings generally keep the pastures green late into the summer. Where land can not be irrigated from the river, pumping from wells is resorted to. The average cost of pumping irrigation can be figured at $1.25 per acre. In almost every section a supply of water can be reached at an average depth of 80 feet. Fifteen miles south of Hollister is the site of an immense storage reservoir. This reservoir, catching and holding the flood water of the San Benito River, will furnish sufficient for summer irrigation.

In the foothills there is room for a hundred thousand beehives. The sagebrush bloom and countless varieties of wild flowers furnish nectar the greater part of the year.

Thousands of acres in the Hollister and San Juan valleys are suitable for seed farms. The seed farms now under cultivation in the vicinity of Hollister show conclusively that the industry is practicable and successful.

Orchards are fast supplanting the hay and grain fields, and adding materially to the wealth of the county. Orchardists are making money wherever they give attention to the business. The San Juan Valley has 10,000 acres especially adapted to the raising of apples, with a market at every man's door. Apricots, prunes, peaches, walnuts, almonds, in fact every fruit, save tropical, can be grown with profit in any section that can be reached with water.

Among the varied industries of the county, that of dairying is rapidly forging to the front, adding to the wealth of the community generally, and making the dairymen independent. The standard feed is alfalfa, which grows to perfection. Underground streams of water are abundant in all sections of the county, and to the extension of the pumping system is largely due the development of the dairy business.

Scattered all through the county are innumerable cheese factories, some of them worked upon the coöperative plan, but others are individual enterprises. All are meeting with success. In one of the suburbs of Hollister there has recently been established the Alpine Evaporated Cream Factory. This installation requires many tons of milk daily to meet the demand for its product.

A careful estimate is given of the number of cows that can be kept upon an acre of alfalfa. Where the growth is vigorous and constant, a cow and a half to the acre will give the animal plenty of feed and allow of storing for winter, but the average is one cow to the acre. The best cows will net a profit of from $4 to $5 per month, or $50 a year upon the average. The climate of the county is ideal for this business.

Vegetable-growing for markets outside the State is an assured and popular occupation. All varieties of vegetables are grown to perfection with and without irrigation. The green vegetable shipments are principally cabbage, cauliflower, celery, onions, and potatoes. Truck-gardeners plant and harvest every month in the year.

The raising of beets has met with success. It is one of the most important branches of agriculture, and gives promise of still greater development. The advantages are: early maturity of the beets, earlier opening of the campaign, longer season for harvesting, longer run of the factory, greater yield per acre, greater per cent of saccharine, immunity from frost and rain at critical periods. The sale of beets is contracted for at the time of planting. The tops are sold to dairymen.

In the artesian belt hop-growing is quite an important industry, and the business is profitable. In the same section tobacco has been successfully grown.

The county produces quicksilver, lime, antimony, hematite, manganese, gypsum, coal, asbestos, and copper. Traces of gold and silver have been found in the mountain ranges. Within three miles of Hollister is an immense bed of pottery clay. In the eastern range ledges of copper have been found which have been pronounced by experts to be another Iron Mountain.

The Southern Pacific Company runs passenger trains daily between San Francisco and Hollister, also one freight.

Tres Pinos, 6 miles south of Hollister, is reached by two trains daily on the Southern Pacific. It is one of the most important shipping points of the county, being the depot for the product of the New Idria quicksilver mines, and the Cienega limekilns. It is the site of immense hay and grain warehouses. The shipments also include livestock, poultry, fruit, and general merchandise.

STATISTICS OF SAN BENITO COUNTY, 1905-6.

General Statistics.

Area, 1,056 square miles, or 676,000 acres.

Number of farms	1,150
Number of acres assessed	559,676
Value of country real estate	$3,971,240
Of improvements thereon	$638 375
Of city and town lots	$320,615
Of improvements thereon	$438,040
Of personal property	$1,165,980
Total value of all property	$6,534,250
Expended on roads, last fiscal yr.	$18,399
Expended for bridges, last fiscal year	$3,600
Number of miles of public roads	414
Road levy per $100, 1906	33 cts.
Value of county buildings	$57,500
Irrigating ditches—miles, 20; cost	$50,000
Railroads, steam—miles, 17.65; assessed value	$286,992
Electric power plants	1
Electric power lines, assessed value	$15,050
Number of acres irrigated	3,500

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	18,340	1,400	$37,800
Barley	21,281	12,320	246,400
Oats	5,125	------	1,750
Corn	200	------	--------
Total cereals.	44,946	13,720	$285,950
Alfalfa hay	2,000	8,000	$64,000
Grain hay	------	45,000	385,000
Total hay	------	53,000	$449,000

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		16,805	2,624	19,429
Apricot		40,690	4,410	45,100
Cherry		2,200	------	2,200
Peach		9,025	2,200	11,225
Pear		9,295	650	9,945
Prune		116,560	2,000	118,560
Almond		4,890	600	5,490
Walnut		405	------	405
Total fruit trees		199,870	12,484	212,354
Table grapes	acres	15	----	15
Wine grapes		117	----	117
Total acres grapes		132	----	132
Blackberries	acres	25	----	25
Currants		12	----	12
Gooseberries		3	----	3
Loganberries		5	----	5
Raspberries		15	----	15
Strawberries		18	----	18
Total acres berries		78	----	78

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,437,500	$8,000
Apricots	1,000,000	25,000
Blackberries	25,000	1,000
Beans	3,000	900
Beets	8,000	80
Cabbage	200,000	2,000
Celery	20,000	400
Corn	200,000	4,000
Currants	20,000	800
Cherries	20,000	1,000
Gooseberries	2,000	100
Grapes	400,000	5,000
Loganberries	25,000	1,000
Pears	1,000,000	5,000
Peaches	2,000,000	17,000
Irish potatoes	550,000	5,500
Raspberries	5,000	200
Strawberries	100,000	4,000
Tomatoes	80,000	1,200
Totals	7,095,500	$82,180

Dried—	Pounds.	Value.
Almonds	30,000	$4,500
Apples	50,000	7,500
Onions	30,000	1,950
Pears	20,000	2,000
Peaches	60,000	5,400
Prunes	4,800,000	100,000
Walnuts	20,000	2,000
Totals	4,980,000	$123,350

Livestock Industry.

	Number.	Value.
Cattle—Beef	15,220	$228,290
Stock	2,120	53,005
Calves	8,307	66,455
Swine	3,129	7,040
Horses—		
Thoroughbred	34	6,850
Standard-bred	2,290	103,070
Common	1,895	47,385
Colts	1,690	33,815
Mules	50	2,000
Sheep—Common	13,420	33,550
Lambs	6,540	6,540
Common Goats	1,240	1,240
Total stock all kinds	55,935	$589,240
Wool (pounds)	5,000	500

Dairy Industry.

	No.	Production.	Value.
Creameries	2	------	------
Skimming stations	3	------	------
Butter (pounds)		26,000	$6,500
Cheese (pounds)		1,250,000	112,500
Condensed milk (cases)		2,400	7,500
Evaporated cream (cases)		45,625	193,363

STATISTICS OF SAN BENITO COUNTY, 1905-6—Continued.

Poultry and Eggs.

	Dozen.	Value.
Chickens	6,375	$31,875
Ducks	75	450
Geese	30	360
Turkeys	240	7,100
Eggs	1,026,520	256,630
Total value		$296,415

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 15		
Honey	20,000	$2,000
Hops	12,000	1,720
Sugar beets (tons)	5,000	500
Macadam (tons)	65,000	32,500
Mineral water (gals.)	500	500
Quicksilver (flasks)	7,764	279,651
Rubble (tons)	64,988	32,494

Forest Products.

	Amount.	Value.
Fuel, wood (cords)	5,000	$45,000

Power used for mills and manufactories in county: Steam—number, 10; electrical—number, 1; water—number, 1.

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Cigars (thous'd)	1	4	1,600	$64,000
Confect'ry (lbs)	3	6	17,500	$3,500
Lime (barrels)		--	15,000	15,000
Malt (tons)	1	--	100	6,000
Hides (pounds)		--	52,000	5,720
Lard (pounds)		--	52,000	6,500
Tallow (barrels)		--	25	100
Planing mills	1	2	------	3,000

SAN BERNARDINO COUNTY.

San Bernardino is not only the largest county in California, but it is the largest in the United States. It is larger than New Hampshire, Vermont, and Rhode Island combined; larger than New Jersey, Delaware, Massachusetts, and Rhode Island combined; very nearly as large as Massachusetts, Connecticut, and New Jersey. There are eight states whose area is less than that of this county.

San Bernardino County is in the southeastern part of the State. The greater portion is desert. In the north is the Mojave Desert; and in the east, the northern end of the Colorado Desert; the arable portion being confined to the southwestern part—the San Bernardino Valley. This valley forms an almost perfect amphitheater, encircled by mountains and hills, open only on the west, allowing the sea breeze from the ocean to sweep its entire length.

Mount San Gorgonio is perpetually snow-capped, and from it is derived much of the water used for irrigation in the summer in the valley below, the remainder coming from the mountain range, giving a bountiful supply for irrigators. The combined waters of the streams, springs, and artesian wells make this valley one of the best watered in Southern California.

The forests on the mountain ranges furnish the supply of lumber and timber used in the valley.

Mount San Bernardino, from its distinctive cone, has been adopted by the United States surveyors as the initial point for land surveys in Southern California, both base and meridian starting from its peak.

The northern and eastern parts of the county are almost absolutely sterile. Yet, along the Mojave River where it debouches from the mountains to the desert, and for many miles, the land on both sides is fertile, easily worked, and produces abundantly as long as the water supply is available.

The soil of San Bernardino Valley varies greatly with locality. In the eastern part it is a sharp gravel or sand, with a large admixture of alluvial deposits. West the soil changes to a heavy, dark loam, with occasional patches of adobe. Still farther west, the soil is of a lighter character, and possesses much more of the soda and potash constituents. Immediately about the City of San Bernardino the soil is a strong adobe, with appearances here and there of soda salts. Along the river bottoms the soil is a heavy clay, and in some places a black adobe. It is cold and damp, and not as suitable for fruit culture as for grazing and the growing of hay.

The rainfall varies a great deal, as does the climate. Passing from the lower levels to the high altitudes the rainfall increases. On the north and east of the mountain ranges, on the Mojave and Colorado deserts, the larger portion of the rainfall comes in July and August, with no rains during the winter. The rains are short, sharp, and heavy, frequently accompanied by thunder and lightning, which latter is almost unknown south of the mountains.

In the number and character of irrigation enterprises, the county stands in the front rank. It has been justly called the "Mother of Irrigation," because here was dug the first irrigation ditch in the State, and here were raised the first crops by irrigation. It is over a hundred years since the mission fathers of San Gabriel established an outlying post, or sub-mission, just west of Redlands, and employed Indian labor to dig what is known as the zanja. This ancient ditch is still in use and within the same banks that were first thrown up by Indian labor almost a century ago.

There are hundreds of miles of canals and pipe-lines, with thousands of miles of laterals and individual pipe-lines. In addition to this, hundreds and hundreds of wells have been bored, each producing a flowing stream without other or further expense, which volume is sufficient not only to irrigate many thousands of acres, but also furnishes the magnificent supply which fructifies and renders fertile the great plain on which the city of Riverside stands.

Almost every variety of fruit can be produced in some part of this county. The only exceptions are those strictly tropical. In the mountain valleys and upon the upper plateaus, apples and cherries are grown. On the lower levels, all the deciduous fruits are produced. The production of oranges, lemons, and pomeloes is large, these fruits being grown to perfection. The production of oranges has increased rapidly during the last few years. The first planting of orange trees were two set out by Anson Van Leuven in his dooryard in Old San Bernardino in the early sixties, and by M. H. Crafts at Crafton, at about the same time or a little later.

In the western part, in the Rialto, Etiwanda, and Cucamonga neighborhoods, there is produced a large quantity of raisins. Another section of the county especially adapted to the culture of grapes is that about Hesperia, which lies along the Mojave River.

In the southwest corner of the valley is located the Chino Ranch, on which is the third largest beet-sugar factory in the world. The acreage devoted to sugar-beet culture is in the neighborhood of 20,000. The factory has a capacity of about 12,000 tons of refined sugar annually. The culture of sugar-beets has been a profitable industry for the farmers. On this ranch are fattened thousands of head of cattle upon the beet pulp, which is siloed for that purpose.

Along the slope of the mountains, and in the mountain valleys and cañons, are numerous bee ranches, from which is produced a large amount of honey.

The raising of cattle and sheep is carried on along the mountain ranges and in the upper mountain valleys. Several large bands of sheep are grazed on the ranges. Dairying is carried on in both the upper and lower valleys. Pure-bred, or grades of high-class dairy cattle are in general use. A stock company for the breeding of the most desirable classes of horses has a large ranch at Victor to be devoted exclusively to their raising.

Wheat, oats, and barley are grown in considerable quantities, and alfalfa is raised with profit.

Vegetables of nearly all descriptions are raised, the yield being large, and a growing shipping trade to outside markets has been established.

The northern and eastern portions are heavily mineralized, and although prospecting has been carried on for fifty years, new and greater finds are being made every year. Almost every known mineral has been discovered. Gold, silver, copper, iron, tin, lead, borax, soda, and nitrates are found in abundance and scattered over a wide area. Some of the richest silver mines in the State are in this county. Copper exists in great abundance. The high cost of freight, the scarcity of water, which renders the life of the prospector precarious as well as interfering with the working of the mines, the scarcity and high cost of fuel—all combined have limited prospecting and retarded mining development. The building of railroads across the desert has partially removed some of these obstacles, and mining recently has been prosecuted with more vigor.

STATISTICS OF SAN BERNARDINO COUNTY, 1905-6.

General Statistics.

Area, 20,160 square miles, or 12,900,400 acres.

Number of farms	4,210
Number of acres assessed	630,860
Value of country real estate	$6,787,615
Of improvements thereon	$2,991,030
Of city and town lots	$2,193,825
Of improvements thereon	$3,147,985
Of personal property	$1,780,590
Total value of all property	$17,020,177
Expended on roads, last fiscal yr.	$85,373
Expended for bridges, last fiscal year	$13,264
Number of miles of public roads	1,463
Road levy per $100, 1906	55 cts.
Value of county buildings	$435,000
Irrigating ditches and pipe lines, cost	$1,938,300
Railroads, steam—miles, 1,109⅓; assessed value	$8,619,563
Railroads, electric—miles, 40½; assessed value	$67,715
Elect'c power and light plants—5; electric power and light lines—159½ miles; assessed value	$102,050
Number of acres irrigated	42,350
Toll roads, 11 miles; assessed value	$25,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Barley	10,307	7,730	$154,600
Corn	825	825	24,000
Total cereals	11,132	8,555	$178,600
Alfalfa hay	3,500	21,000	$252,000
Grain hay	7,900	15,850	174,350
Grass hay	1,400	2,935	44,025
Total hay	12,800	39,785	$470,375

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		14,150	1,500	15,650
Apricot		35,800	900	36,700
Cherry		10,000	1,350	11,350
Fig		2,300	500	2,800
Lemon		185,000	22,000	207,000
Nectarine		1,800	600	2,400
Olive		50,500	800	51,300
Orange		1,650,700	867,000	2,526,700
Peach		13,000	1,500	14,500
Pear		18,000	1,200	19,200
Plum		1,500	500	2,000
Prune		2,500	800	3,300
Walnut		4,500	500	5,000
Limes		1,800	500	2,300
Pomelo		4,800	1,600	6,400
Total fruit trees		1,996,350	901,250	2,897,600
Raisin grapes	acres	600	153	753
Table grapes		441	28	469
Wine grapes		14,669	187	14,856
Total acres grapes		15,710	368	16,078
Blackberries	acres	10	----	10
Loganberries		2	----	2
Raspberries		1	----	1
Strawberries		13	----	13
Total acres berries		26	----	26

Wines, Brandies, Etc.

Number of wineries, 6.

	Gallons.	Value.
Wine—Angelica	250,500	$62,625
Burgundy	1,000	200
Claret	1,150,000	172,500
Hock	150,000	30,000
Muscatel	6,200	1,240
Port	125,000	31,250
Riesling	5,800	2.176
Sherry	18,500	4,625
Zinfandel	115,000	25,300
Totals	1,822,000	$329,016
Brandy	30,380	$15,190

Dairy Industry.

	No.	Production.	Value.
Dairies	8	------	------
Skimming stations	1		------
Butter (pounds)		209,500	$73,325
Cheese (pounds)		250,182	35,025
Cream (gallons)		10,614	10,614

STATISTICS OF SAN BERNARDINO COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	178,000	$35,610
Apricots	196,000	4,900
Blackberries	40,000	4,000
Beets	90,000,000	202,500
Corn	1,650,000	20,625
Cherries	160,000	9,600
Figs	20,000	1,000
Grapes	93,260,000	705,920
Grape-fruit (boxes)	18,100	36,200
Lemons (boxes)	156,000	468,000
Loganberries	8,200	820
Melons	400,000	4,000
Onions	241,000	4,800
Oranges (boxes)	3,264,000	6,539,800
Olives	1,734,000	34,680
Pears	200,000	6,000
Peaches	2,879,600	57,592
Plums	140,000	4,200
Irish potatoes	2,350,000	29,375
Sweet potatoes	50,000	1,000
Prunes	120,000	4,800
Raspberries	8,000	800
Strawberries	55,000	5,500
Tomatoes	154,000	4,620
Total value		$8,186,342

Dried—	Pounds.	Value.
Apricots	1,141,000	$148,330
Figs	20,000	2,000
Peaches	968,000	96,800
Prunes	250,000	10,000
Raisins	2,000,000	80,000
Walnuts	125,000	15,000
Totals	4,504,000	$352,130

This county reports, under the head of canned fruit, 3,000 cases of apricots, worth $6,000.

Livestock Industry.

	Number.	Value.
Cattle—Beef	5,500	$220,000
Stock	4,000	80,000
Thoroughbred	210	31,500
Dairy Cows—Graded	1,250	50,000
Calves	2,370	23,700
Swine	4,180	41,800
Horses—		
Thoroughbred	65	69,200
Standard-bred	10,420	1,302,500
Common	1,000	75,000
Colts	830	16,600
Sheep—Imported	100	10,000
Common	10,000	30,000
Lambs	7,500	15,000
Total stock all kinds	47,425	$1,965,300
Wool (pounds)	40,000	$4,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	5,600	$25,200
Ducks	72	360
Geese	24	240
Turkeys	310	5,580
Eggs	572,000	171,600
Total value		$202,980

Forest Products.

	Amount.	Value.
Area of timber lands—		
Pine (acres)	118,000	$2,360,000
Sawmills, 3	......	60,000
Fuel, wood (cords)	11,045	44,180
Lumber—Cedar (feet)	650,000	13,000
Pine (feet)	11,850,000	237,000
Sash and door factories, 1	--------	60,000
Total value		$2,774,180

Power used for mills and manufactories in county: Steam—number, 29; electrical—number, 1; water—number, 6; gasoline, 4.

Manufactories.

	No.	No of Employés.	Quantity Produced.	Value of Product.
Wood boxes	2	32	------	$172,680
Brick (thous'd)	2	--	2,077	15,577
Cement (tons)	1	118	21,300	190,000
Cigars (thous'd)	3	6	369	15,735
Clothing	5	10	------	30,850
Confect'ry (lbs.)	6	10	74,880	18,728
Flouring mills (bbls.)	2	15	59,116	236,465
Foundries and iron works	2	8	------	49,000
Leather goods	3	10	------	17,000
Lime (bbls.)		---	183,006	201,312
Machinery	4	620	------	531,747
Meat products—(pounds)	2	63	562,000	393,400
Hides		---	362,000	362,000
Lard (lbs.)		---	52,000	4,680
Tallow (lbs.)		---	181,000	7,240
Olive oil (gals.)		---	905	13,575
Pickled olives (gals.)	2	---	13,600	10,880
Iron pipe (ft.)	2	---	100,000	70,000
Cement sewer pipe (ft.)	2	---	26,000	34,100
Planing mills	8	29	------	195,000
Artificial stone	3	10	------	34,675
Granite	1	1	------	2,000
Marble (tons)	1	15	500	20,000
Marble dust (tons)	2	38	6,800	22,500
Sugar, beet (tons)	1	350	4,750	522,500
Stone paving blocks (cu. ft.)	1	7	540,000	26,500
Tin and galvanized iron	8	29	------	99,000
Wood turning and carving	3	3	.....	5,000
Rubble (tons)	2	130	229,185	229,185

Products Shipped Out of State.

Of products shipped out of the State, San Bernardino County reports 1,141,000 boxes of fresh apricots, 3,000 boxes of dried apricots, 18,100 boxes of grape-fruit, 600,000 pounds of fresh grapes, 156,000 boxes of lemons, 3,264,900 boxes of oranges, 197,115 barrels of flour, 96,800 pounds of dried peaches, 2,000,000 pounds of raisins, 30,000 pounds of walnuts, 12,000 pounds of beeswax, 4,000 pounds of honey, 5,970 cases of fruit preserves, and 33,956 tons of crude borax.

STATISTICS OF SAN BERNARDINO COUNTY, 1905-6—Continued.

Miscellaneous Products.

	Amount.	Value.
Bees (hives)—No., 17,000	------	$51,000
Beeswax (pounds)	12,000	3,000
Flowers and plants (acres)	15	73,436
Honey, almost total failure (pounds)	40,000	2,000
Sugar beets (tons)	45,000	202,500

Miscellaneous Products—Continued.

	Amount.	Value.
Ice plants, 5; (tons)	45,195	$271,170
Orange marmalade	------	11,943
Gold	------	473,983
Silver	------	15,595
Copper	------	8,206
Crushed rock (tons)	9,000	9,000
Borax, crude (tons)	33,956	848,890

SAN DIEGO COUNTY.

San Diego County occupies the southern part of the State, and has an area slightly larger than Massachusetts. The Pacific Ocean washes its shores for upward of 75 miles. The land rises gently from the ocean for a distance of about 50 miles to a chain of peaks forming the backbone of the county, descending again quite rapidly to the Colorado River Valley, the greater part of which is below sea-level.

The arable portion of the western slope is divided into a series of irregular terraces or plateaus. The lower or coast terrace comprises a number of valleys with the intervening mesas. This large acreage is practically frostless. Next come a series of higher valleys, Poway Valley, varying in elevation from 400 to 500 feet. The third terrace, the altitude of which ranges from 1,000 to 2,500 feet, comprises the foothill region, with numerous smaller intervening valleys, nooks, and glens. Next comes the mountain region. The area of tillable land in these valleys and mesas is approximately 600,000 acres, a still larger area being suited to pasturage and grazing. The elevation of the mountain valleys varies from 2,500 to 4,500 feet. They are chiefly devoted to stock-raising, but many of them are well adapted to the growing of small fruits and vegetables and to diversified farming.

The arable soil of the county may be classed under two heads: granitic and adobe; though there is often a mixture of both, resembling adobe.

To the east of the mountains, in the delta of the Colorado, is the famous Imperial Valley. After many months of labor, and a large expenditure of money, a generous share of the flow of the Colorado River has been diverted into this great valley, the first delivery of water for irrigation being made in June, 1901, and so rapidly have the main canals and laterals been extended that many thousands of acres are now under cultivation, this rapid development affording employment and resulting in the building of homes for thousands of settlers, thus adding millions to the wealth of the county. The center of this wonderfully fertile section is reached by a spur from the main line of the Southern Pacific Railroad. The central town is Imperial. There is a good hotel, an ice factory, creamery, and other evidences of prosperity. What until recently was described in our geographies as the dreaded Colorado Desert, bids fair to soon become the leading stock and dairy section of the great Southwest.

The intermountain region, the hills and valleys between the plains of Imperial and the western slope of the county, is rich in minerals, and affords excellent pasturage for several thousand cattle. The mineral wealth of San Diego County, though known to be great, is largely undeveloped, and offers an excellent field for the prospector and capitalist. Lepidolite and amblygonite, containing lithia and other valuable products, exist in greater quantities than in any other known deposit in the world. San Diego is producing the finest tourmaline in the United States. The crystals are of exceptional hardness, possess exquisite delicacy of coloring, and when cut form gem-stones of great brilliancy. Kunzite, a new gem, not found in any other part of the world, was recently discovered at Pala, and is attracting a greal deal of attention. Gem experts are manifesting a deep interest in the remarkable crystallizations found in San Diego County.

According to a bulletin on the "Climatology of California," recently published by the U. S. Department of Agriculture, San Diego County has the heaviest and most reliable rainfall of any part of Southern California. The rainfall increases, and greater extremes of temperature occur, as you leave the coast, the higher mountain peaks being often covered with snow to quite a depth during a part of the winter.

Water is impounded mainly for the citrus orchards of the coast section, the higher valleys requiring but little or no irrigation for their crops of cereals, deciduous fruits, olives, vegetables, etc.

As an evidence that education keeps pace with the population, there are more than one hundred and fifty school houses distributed through the county, the instruction in which is up to the usual high standard found throughout California.

The Board of Supervisors has done and is doing good work in the way of road-building, the most distant and mountainous places being readily reached over excellent highways.

The orange, lemon, and pomelo, or grape-fruit, do well. The largest single lemon grove contains about 800 acres.

Raisin grapes are a profitable crop, and the industry has a bright future. The wine industry is large and growing.

Olive-growers are making money. An olive grove, to be a commercial success, should be set out with a view to supplying pickling fruit, oil olives being treated as a by-product. The demand for pickled ripe olives is already in excess of the supply, and steadily growing.

Peaches, apricots, pears, quinces, plums, cherries, and other deciduous fruits do well. The mountain region around Julian has attained a special reputation for the crisp, finely flavored apples.

A good walnut orchard, properly located with reference to soil and water, is a safe investment. Small areas well suited to this crop may be found in different parts of the county—notably in the Tia Juana Valley. Almonds do well, and there are some thriving orchards.

San Diego County is celebrated for its deliciously perfumed and fine-flavored honey, which always finds a ready market at top prices. The apiaries are located for the most part among the hills and valleys back from the coast.

There is reason to believe that the cultivation of the silkworm may hold a most important part in the industrial development of San Diego County—the climatic conditions are so perfectly adapted to the delicate constitution of the worm, and the foliage of the mulberry may be had in such wholesome condition practically during the entire year. Many acres have been set out to mulberry trees, and those interested feel greatly encouraged over the outlook.

The dairy industry has shown a healthy growth, having trebled in the past four years.

The modern city of San Diego was founded by A. E. Horton, in 1867. The situation is not only sanitary and attractive, but it is also admirably adapted for a large ocean commerce. Numerous wharves extend into deep water, and in their neighborhood may be found lumber yards, planing-mills, warehouses, foundries, etc. The electric street railway system is equipped with modern cars and complete in every respect. Water is provided in abundance, the supply and distribution being controlled by the municipality. The streets of the city are well lighted by electricity. The schools, private and public, have an excellent reputation. A fine, large opera-house, perfect in its appointments, is on the circuit of the very best theatrical and operatic companies. There are also several smaller theaters. The different religious organizations worship in attractive edifices; secret societies and benevolent associations have their lodge-rooms, and numerous musical and literary clubs are supported by an active membership. There are several strong banking institutions. The hotel accommodations are excellent, and there are a number of sunny modern lodging-houses. San Diego is thrown into special prominence as being the first port of call on the Pacific Coast of the United States north of Panama, and the magnificent bay, around the shores of which the city is built, will soon become an important naval rendezvous. The Government has concluded arrangements for the erection of a large coaling station here, and is fast completing the building of a modern military post at Fort Rosecrans, the big guns of which command the entrance to the bay.

Just across the bay from San Diego, ten minutes by ferry, is the peninsular city of Coronado, with its world-famous Hotel del Coronado and many beautiful homes.

National City, the second largest city, is situated on the southeast shore of the bay. The land here rises gently from the water-front, and is admirably suited for the location of manufacturing establishments or other plants requiring a comparatively large area of level ground with good water frontage. There are a number of attractive homes within the city limits and nestling among the lemon and orange groves in the fertile valleys near by. The church and school facilities of the place are excellent. A large manufactory of citrus products is in successful operation, turning out citric acid, oil of lemon, lemon extracts, etc. There is also an olive oil factory, and its product is equal to the best.

Passing through Old Town, you come to Pacific Beach, a very attractive suburb of San Diego. The land is quite level near the ocean, affording one of the widest, smoothest, hardest and most attractive beaches along the coast.

Escondido is some 35 miles northeast of San Diego, being connected by a spur with the main line of the Southern California Railway. A large area of productive country is tributary to Escondido, from which are made shipments of hay, grain, cattle, hogs, oranges, lemons, raisins, wine, honey, chickens, eggs, butter, etc. The school and church accommodations of the place are excellent.

STATISTICS OF SAN DIEGO COUNTY, 1905-6.

General Statistics.

Area, 8 580 square miles, or 5,491,200 acres.

Number of farms	6,231
Number of acres assessed	1,355,843
Value of country real estate	$4,904,949
Of improvements thereon	$1,037,128
Of city and town lots	$9,154,720
Of improvements thereon	$4,225,252
Of personal property	$3,430,697
Total value of all property	$22,752,746
Expended on roads, last fiscal yr.	$54,863
Expended for bridges last fiscal year	$13,047
Number of miles of public roads	6,000
Road levy per $100, 1906	60 cts.
Value of county buildings	$350,550
Irrigating flumes, etc.—miles, 740; cost	$3,050,000
Railroads, steam—miles, 334⅔; assessed value	$3,052,216
Railroads, electric — assessed value	$90,800
Electric power plants—2; assessed value	$19,250
Electric power lines—miles, 20; assessed value	$35,000
Number of acres irrigated	153,668

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	52,104	12,223	$293,352
Barley	136,568	47,798	955,960
Oats	20,449	5,412	129,888
Corn	13,500	8,250	189,750
Total cereals	222,621	73,683	$1,568,950
Alfalfa hay	11,825	47,300	$473,000
Grain hay	125,000	125,000	1,250,000
Grass hay	7,100	7,100	28,400
Total hay	143,925	179,400	$1,751,400

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	51,362	20,841	72,203
Apricot	44,134	5,972	50,106
Cherry	4,744	1,500	6,244
Fig	15,000	2,600	17,600
Lemon	255,000	41,106	296,106
Olive	223,000	24,600	247,600
Orange	105,000	4,953	109,953
Peach	75,000	55,265	130,265
Pear	12,000	5,829	17,829
Plum	6,720	4,108	10,828
Prune	80,000	2,359	82,359
Almond	8,000	1,274	9,274
Walnut	7,000	3,234	10,234
Pomelo	15,000	2,320	17,320
Total trees	901,960	175,961	1,077,921
Raisin grapes, 4,000 acres	1,500,000	100,000	1,600,000
Table grapes, 1,945 acres	428,000	350,000	778,000
Wine grapes, 680 acres	260,000	12,000	272,000
Total grapes	2,188,000	462,000	2,650,000

Fruit Trees and Vines—Continued.

	Bearing.	Non-Bearing.	Total.
Blackberries, 50 acres	40,000	......	40,000
Loganberries, 75 acres	60,000	......	60,000
Strawberries, 45 acres	150,000	30,000	180,000
Total berries	250,000	30,000	280,000

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	2,000,000	$50,000
Apricots	1,500,000	37,000
Blackberries	250,000	12,500
Cherries	90,000	5,400
Figs	15,000	375
Grapes	3,360,000	84,000
Grape-fruit	436,800	12,480
Lemons (boxes)	257,464	617,914
Onions	12,000	1,500
Oranges (boxes)	76,768	134,344
Olives	5,400,000	135,000
Pears (boxes)	3,000	4,500
Peaches	330,000	9,900
Prunes	45,000	900
Cantaloupes (cars)	375	193,500
Watermelons (cars)	20	10,320
Strawberries	225,000	18,000
Total value		$1,327,633

Dried—	Pounds.	Value.
Almonds	40,000	$6,400
Apricots	75,000	10,125
Beans	300,000	7,500
Peaches	80,000	6,400
Prunes	95,000	4,275
Raisins	2,200,000	99,000
Walnuts	60,000	7,500
Totals	2,850,000	$141,200

Canned—	Cases.	Value.
Olives (quarts)	5,833	$30,620
Olives (pints)	4,166	29,162
Totals	9,999	$59,782

Wines, Brandies, Etc.

Number of wineries, 100; number of distilleries, 5; number of breweries, 1.

	Gallons.	Value.
Wine—Angelica	8,000	$2,400
Claret	300,000	48,000
Muscatel	3,000	900
Port	20,000	6,000
Riesling	2,000	400
Sherry	2,000	620
Totals	337,000	$58,320
Beer (barrels)	31,800	$254,400
Brandy	4,000	3,000
Cider	1,000	600

STATISTICS OF SAN DIEGO COUNTY, 1905-6—Continued.

Fish Industry.

	Pounds.	Value.
Various kinds	2,127,052	$106,353
Salt fish	1,000,000	35,000
Turtles	7,092	355
Lobsters	65,208	5,217
Totals	3,199,352	$146,925

Livestock Industry.

	Number.	Value.
Cattle—Beef	10,500	$367,500
Stock	48,319	1,207,975
Thoroughbred	69	6,900
Dairy Cows—Graded	13,296	474,000
Calves	7,332	51,324
Swine	33,005	264,040
Horses—		
Thoroughbred	59	8,850
Standard-bred	1,550	124,000
Common	12,243	428,505
Colts	2,209	24,180
Mules	1,204	72,240
Sheep—Common	11,530	46,120
Lambs	4,600	13,800
Common Goats	2,800	5,600
Total stock all kinds	148,716	$3,095,034
Wool (pounds)	600,000	$60,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	38,500	$175,325
Ducks	1,650	9,075
Geese	600	5,400
Turkeys	1,650	33,000
Eggs	1,519,386	379,846
Total value		$602,646

Productions Shipped Out of State.

	Amount.
Barley (crushed)	1,440 tons
Apricots, dried	60,000 lbs.
Grape-fruit	3,120 boxes
Lemons	211,224 boxes
Oranges	54,288 boxes
Peaches, dried	80,000 lbs.
Prunes, dried	80,000 lbs.
Raisins	2,000,000 lbs.
Walnuts	60,000 lbs.
Beans, dried	200,000 lbs.
Beeswax	40,000 lbs.
Honey	1,140,000 lbs.
Wool	60,000 lbs.
Fish	501,090 lbs.
Cigars	2,718 C.
Olive oil	10,000 gals.
Olives, pickled	8,000 gals.
Cantaloupes (300 cars)	120,000 crates
Watermelons (15 cars)	6,000 crates
Olives, canned (quarts)	2,333 cases
Olives, canned (pints)	1,666 cases
Semi-precious gems (rough)	25,000 carats
Semi-precious gems (cut)	10,000 carats
Mineral waters (18 cars)	7,200 cases

Dairy Industry.

	No.	Production.	Value.
Dairies	195	------	--------
Creameries	4	------	--------
Skim'ing stations	4	------	--------
Butter (pounds)	--	670,000	$167,500
Cream (gallons)	--	6,000	6,000

Forest Products.

	Amount.	Value.
Area of timber lands—(acres)	30,000	------
Pine (acres)	22,000	$220,000
Oak (acres)	8,000	80,000

Power used for mills and manufactories in county: steam—number, 10; electrical—number, 35; gasoline—number, 30.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 75,000	--------	$225,000
Beeswax	50,000	13,250
Honey	1,280,000	76,800
Alfalfa seed	25,000	2,500
Mineral water (cases)	8,000	48,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	2	8	------	$9,500
Brick (thousand)	6	62	8,750	70,000
Brooms (dozen)	1	3	1,350	5,725
Cigars (thousand)	2	43	2,718	141,336
Coffee, spices, etc. (pounds)	2	8	326,000	85,000
Confect'ry (lbs.)	1	14	208,000	50,000
Barley mills (tons)	5	16	7,500	187,500
Foundries and iron works (tons)	5	83	1,465	117,850
Furniture (office)		9	------	20,000
Gasoline engines—number	1	20	100	50,000
Hides (pounds)	3	10	384,000	52,800
Lard (pounds)		--	30,000	3,000
Meat pa'ked (tons)		--	1,200	21,600
Olive oil (gals.)	4	40	14,600	36,575
Pickled olives (gallons)			10,000	5,000
Planing mills (ft.)	4	88	9,100,000	280,000
Salt (tons)	2	33	6,000	75,000
Soap (cases)	1	10	7,500	22,500
Artificial stone	3	23	90,000	28,500
Citric acid products (lbs.)	1	10	------	------
Sugar beet (tons)		--	72,000	30,960
Oil lemon (lbs.)		--	10,000	6,000
Gypsum (tons)		--	150	900
Liquid melade (gallons)		--	300	1,200
Lapidaries (carats)	6	20	18,142	162,560
Marine engines	1	10	72	44,400
Insect powder (lbs.)		--	6,000	3,000
Sal soda (lbs.)		--	720,000	10,800
Citrus washing powder (lbs.)		--	360,000	18,000

SAN JOAQUIN COUNTY.

San Joaquin County spans the great interior valley of California directly east of San Francisco Bay, extending from the coast mountains to the Sierras, and comprises the only natural gateway to that vast agricultural region stretching from the Mokelumne River to the Tehachapi. In most part, San Joaquin County is a level plain, every foot of which is cultivated or utilized for agriculture. Practically the whole area is fertile, but the different kinds of soil require different treatment.

San Joaquin County is better provided with natural facilities for the transportation of agricultural products than any other like area in America. The natural channels of the San Joaquin River and its branches supply 269 miles of navigable waterways in the county, and the work of reclamation has added navigable channels in many directions, making a network of water highways about 400 miles in total length.

Irrigation has made wonderful strides. Besides two great irrigation companies which distribute water from the Mokelumne and Stanislaus rivers, virtually the entire 250,000 acres of delta land is irrigated from the adjacent waters of the San Joaquin River. The truck gardens and small farms are many of them irrigated by pumps driven by windmills or gasoline engines. Water is abundant everywhere in San Joaquin County at a depth of from 15 to 25 feet.

Stockton is the entrepôt for the San Joaquin Valley. It is supplied with natural gas and cheap oil fuel, and two electric lines bring power from the Sierras.

The county of San Joaquin in 1900 was the chief barley county in the United States and one of the ten leading wheat counties. It is still the barley county, but its wheat fields are being converted into orchards, vineyards, and gardens. It produces about 65 per cent of the potatoes grown in California. Its agricultural output for 1906 will exceed $10,000,000 in value, and its factory output has also passed the ten million mark.

STATISTICS OF SAN JOAQUIN COUNTY, 1905-6.

General Statistics.

Area, 1,365 square miles, or 873,600 acres.	
Number of farms	3,257
Number of acres assessed	881,163
Value of country real estate	$17,060,752
Of improvements thereon	$2,312,035
Of city and town lots	$5,683,216
Of improvements thereon	$5,110,425
Of personal property	$4,047,823
Total value of all property	$36,741,655
Expended on roads, last fiscal yr.	$95,764
Expended for bridges, last fiscal year	$24,810
Number of miles of public roads	1,073
Road levy per $100, 1906	40 cts.
Value of county buildings	$747,000
Irrigating ditches, cost	$140,380

General Statistics—Continued.

Railroads, steam—miles, 208½; assessed value, county	$3,428,733
Railroads, elect'c, assessed value	$120,140
Electric power plants, assessed value	$204,240
Electric power lines—miles, 69; assessed value	$46,062
Number of acres irrigated	285,000

Forest Products.

	Amount.	Value.
Fuel, wood (cords)	5,000	$20,000

Power used for mills and manufactories in county: Steam—number, 20; electrical—number, 43; gas and gasoline—number, 12.

STATISTICS OF SAN JOAQUIN COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	93,000	48,825	$1,171,800
Barley	142,901	106,996	2,139,948
Oats	34,630	8,998	214,725
Rye	8,100	3,159	69,498
Corn	2,310	1,908	53,405
Buckwheat	20	9	237
Total cereals	280,156	163,895	$3,649,613
Alfalfa hay	18.343	55,029	$440,232
Grain hay	110,243	176.409	1,577.681
Grass hay	1,421	3,942	27,594
Total hay	130,007	235,370	$2,045,507

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		11,394	2,246	13,640
Apricot		81,235	5,254	86,489
Cherry		29,121	10,677	39,798
Fig		6,203	1,300	7,503
Lemon		1,525	236	1,761
Nectarine		941	927	1,868
Olive		45,002	5,867	50,869
Orange		8,732	3,240	11,972
Peach		185,485	31,354	216,839
Pear		26.842	2,529	28,371
Plum		20.846	1,634	22,480
Prune		45,063	10,483	55,546
Quince		7,181	879	8,060
Almond		147,524	12,691	160,215
Chestnut		103	50	153
Pecan		99	42	141
Walnut		4,211	1,270	5,481
Other nuts		37	----	37
Total fruit trees		620,544	90,679	711,223
Raisin grapes	acres.	10	----	10
Table grapes		8,000	6,000	14,000
Wine grapes		7,500	10,000	17,500
Total acres grapes		15,510	16,000	31,510
Blackberries	acres.	156	15½	171½
Currants		2	----	2
Gooseberries		3	----	3
Loganberries		47	5	52
Raspberries		19	2	21
Strawberries		46	7	53
Total acres berries		273	29½	302½

Wines, Brandies, Etc.

Number of wineries (4 large, 20 small), 24; number of distilleries, 4; number of breweries, 2.

	Gallons.	Value.
Wine—		
Dry	500,000	------
Sweet	1,500,000	------
Totals	2,000,000	$400,000
Beer (barrels)	1,245,000	$310,700
Brandy (gallons)	20,000	14,000
Cider (barrels)	60	300
Vinegar (barrels)	500	5,000

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,535,400	$1,760
Apricots	------	5,000
Asparagus	5,000,000	70,000
Blackberries	195,613	9,780
Beans	12,333,600	317,850
Beets	5,074,000	10,000
Cabbage	------	17,660
Celery	------	14,800
Cauliflower	------	12,600
Corn	------	14,532
Currants	11,060	553
Cherries	873,600	26,220
Figs	1,350,000	13,500
Gooseberries	570	48
Grapes (tons)	25,400	1,031,820
Lemons (boxes)	305	752
Loganberries	71,628	3.581
Nectarines	56,450	2.823
Onions	25,436,000	152,372
Oranges (boxes)	8.732	17,464
Olives	12,250,100	45,000
Pears	2,354,920	31.012
Peaches	13,354,920	133,540
Peas	450,000	18.225
Plums	625,381	9,374
Irish potatoes	106.200,000	1,062.000
Sweet potatoes	6,321,000	19,012
Prunes	1,500,000	30,115
Quinces	215,430	3,215
Raspberries	28.500	1,425
Strawberries	63,360	3,375
Tomatoes	------	16,432
Total value		$3,095,840

Dried—	Pounds.	Value.
Almonds	340,000	$27,200
Apricots	------	5,000
Beans	12,033,600	300,850
Chestnuts	19.560	978
Figs	80.006	2.400
Onions	23.436.000	141,050
Peaches	340,000	34.000
Peanuts	------	1,000
Prunes	600.000	24,000
Walnuts	33,688	3,368
Total value		$539,846

Canned—	Cases.	Value.
Apples	2.281	$5.930
Grapes	19,145	51.691
Pears	16.928	67,712
Peaches	44,169	152,261
Plums	9,482	25,601
Tomatoes	28,000	49,000
Asparagus	40.000	100,000
Totals	160,005	$452,195

Poultry and Eggs.

	Dozen.	Value.
Chickens	18,040	$108,240
Ducks	260	2,600
Geese	204	2,448
Turkeys	1,039	15,585
Eggs	1,803,925	360,785
Total value		$489,658

STATISTICS OF SAN JOAQUIN COUNTY, 1905-6—Continued.

Dairy Industry.

	No.	Production.	Value.
Creameries (employés, 35)	3	------	------
Butter (pounds)	--	1,935,000	$576,300
Cream	--	------	200 000

Livestock Industry.

	Number.	Value.
Cattle—Beef	5,340	$160,200
Stock	22,330	379,600
Dairy Cows—Graded	15,886	635,440
Holsteins	170	34,000
Calves	9,842	68,894
Swine	31,540	63,080
Horses—		
Standard-bred	12,206	1,525,750
Common	5,340	320,400
Colts	4,010	42,000
Mules	5,415	812,250
Sheep—Common	51,416	102,832
Common Goats	392	784
Total stock all kinds	163,889	$4,145,230
Wool (pounds)	152,098	$25,350

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—number, 2,304	------	$4,608
Beeswax	2,447	------
Chicory (tons)	4,500	45,000
Flax (tons)	800	8,000
Flowers and plants (acres)	5	4,516
Honey	48,903	2,445
Flax seed	180,000	3,300
Grass seed	1,800	150

Productions Shipped Out of State.

	Amount.
Barley	75,000 tons
Wheat	5,000 tons
Almonds	340,000 lbs.
Apples, canned	2,281 cases
Apricots, dried	5,000 lbs.
Cherries, fresh	25,000 boxes
Figs, fresh	8,006 lbs.
Grapes, fresh	31,578,000 lbs.
Grapes, canned	19,143 cases
Peaches, fresh	183,850 boxes
Peaches, dried	340,000 lbs.
Peaches, canned	44,169 cases
Pears, fresh	4,371 boxes
Pears, canned	16,928 cases
Prunes, dried	600,000 lbs.
Walnuts	33,688 lbs.
Asparagus, canned	40,000 cases
Beans, dried	12,033,600 lbs.
Beeswax	2,447 lbs.
Chicory	2,400,000 lbs.
Onions, dried	23,436,000 lbs.
Irish potatoes	900,000 sacks
Tomatoes, canned	28,000 cases
Hides	12,480
Horses	1,000
Mules	3,000
Wool	136,000 lbs.
Brandy	20.000 gals.
Wine, sweet	1,500,000 gals.

Productions Shipped Out of State—Cont'd.

	Amount.
Wine, table	500,000 gals.
Machinery, wooden ware, leather, and other products, to the value of	$2,000,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	4	125	------	$246,400
Art goods (pcs.)	2	8	4,750	11,500
Awnings, etc.	1	12	10,000	25,000
Bags (thousand)	1	10	2,482	120,000
Brick (thousand)	3	190	31.500	282,500
Bakeries (lbs.)	7	62	2,331,000	189,468
Boats	4	44	------	54,500
Carriages and wagons	6	61	1,558	144.000
Boilers	1	10	19	12,000
Insec'cide (tons)	7	--	20	30,000
Cigars	3	16	490,000	19,000
Clothing (suits)	13	37	2,072	79,188
Gas engines	1	95	400	250,000
Conf'tion'y (lbs.)	5	21	128,000	44,500
Wire fencing (miles)	1	30	360	50,000
Window glass (boxes)	1	60	60,000	375,000
Gloves (dozen pairs)	2	55	13,900	65,000
Flouring mills (barrels)	4	140	900,000	3,208,894
Foundries and iron works	2	86	------	152,000
Furniture	2	6	4,600	12,400
Jewelry	1	5	------	12,000
Leather goods	3	18	----	58,000
Ice (tons)	1	7	7,145	21,350
Machinery (tons)	5	400	------	1,525,000
Structural iron (tons)	2	10	1,000	48,000
Ladders	1	6	2,750	7,000
Macaroni	2	9	------	40,000
Meat products	8	50		
Hides		--	62,400	81,120
Meat packed (tons)		--	106	31,200
Tallow (bbls.)		--	3,120	24,968
Olive oil (gals.)	3	13	6,000	10,500
Mealfalfa	1	7	------	62,000
Medicines	3	13	------	37,000
Mineral water (cases)	1	14	6,000	12,000
Pickled olives	3	7	------	35,000
Wire screens	1	3	6,000	4,000
Planing mills	10	124	------	419,650
Potteries	1	--	------	------
Paints and oils (gallons)	3	6	30,000	35,000
Plows	2	56	------	170,000
Soap	1	9	------	30,000
Saratoga chips (pounds)	1	3	10,080	2,700
Scrapers	1	8	------	9.000
Marble	3	17	------	48.000
Soda water (cas.)	1	4	1,800	5,500
Tools	1	5	---	7,200
Tanks	1	3	70	2,000
Tanneries (sides)	1	70	65,000	400,000
Windmills	1	15	------	60,000
Woolen mills	1	140	------	175,500

SANTA BARBARA COUNTY.

Santa Barbara County lies in the angle formed by the eastward trend of the coast from Point Concepcion. Parallel with the southern coast, and distant from 2 to 5 miles, is the rugged range of the Santa Ynez Mountains, from 3,000 to 4,000 feet in altitude. The eastern part north of this range is occupied by the San Rafael Mountains, forming one of the Government forest reserves. The western part north of the Santa Ynez is broken into several valleys, separated by ranges of hills. That portion lying south of the Santa Ynez range and along the channel is the Santa Barbara Valley. The channel islands of San Miguel, Santa Rosa, Santa Cruz, and Anacapa are also included in the county.

Traversed by mountains, there must be waste land, but there is a total of 1,088,000 acres available for practical uses.

Santa Barbara Valley lies between the Santa Ynez Mountains and the sea. It has a world-wide celebrity for fertility of soil and healthfulness of climate.

Santa Ynez Valley, between the Santa Ynez and San Rafael ranges, comprises about 120,000 acres of excellent arable land, mostly rolling. Santa Ynez River runs the whole length of the valley, which is also watered by numerous creeks. The climate differs from that of Santa Barbara, being warmer in summer and cooler in winter.

Los Alamos Valley comprises about 40,000 acres of rich agricultural land, and as much more of excellent grazing land in the hills that are tributary.

Santa Maria Valley, the largest and northernmost, lies along the river of that name. This valley, including its upper extension, the Sisquoc, is 30 miles from the foothills to the sea. Many tributary cañons break into it through the hills, mostly small, but containing rich, protected, and generally well-watered land, adapted to all kinds of deciduous and citrus fruits. The beet-sugar industry is now assuming large importance in this valley.

The oil development about Santa Maria is attracting much attention. Many wells have been drilled, and the oil is found at a great depth, showing its permanent and inexhaustible character. The wells are from 2,000 to 3,000 feet deep, and in some instances the stratum of oil sand is 1,000 feet thick. Several gushers have been struck. The product is of good quality, running from 22 to 32 degrees gravity.

Lompoc is the center of a fertile farming and dairying section. It is on a branch of the Southern Pacific, 9 miles from the main line at the ocean, and is an up-to-date town. The section tributary is well adapted to dairying, and the people are justly proud of their creamery, the product of which is the most popular butter made in this section of the State. Lompoc seems the natural home of the apple, and its exhibit took the first prize at the great fair at New Orleans, and at Chicago was awarded a diploma for excellence. Another production of which

Lompoc has a monopoly for the United States is English mustard, which is grown on a large scale.

The arable soils of the county are mostly alluvium and adobe. The alluvial soil is generally deep and rich, and will grow all kinds of field crops, such as beans, potatoes, corn, vegetables, strawberries, and all other varieties of small fruits. In addition to the fruits usually grown in the Eastern States, this soil will produce prunes, figs, olives, peanuts, English walnuts, grapes, plums, lemons, limes, oranges, loquats, guavas, persimmons, cherimoyers, dates, bananas, and other semi-tropical fruits. In fact, nearly every tree, shrub or plant that grows in the world can be grown out of doors in the southern part of the county. The adobe soil is rich, but more difficult to work. It produces large crops of oats, wheat, barley, flax, and mustard, and affords the richest of pasturage. The principal crops are hay, barley, wheat, English mustard, apples, olives, lemons, walnuts, beans, and sugar-beets. The principal mineral productions are asphaltum and petroleum. A large portion of the county, especially that of a hilly or broken character, is devoted to stock-raising.

The decided improvement in the industrial and commercial conditions in the county, which began in 1901, continues unabated; every line of effort shows improvement. Not only has the wonderful oil development made the northern part most prosperous, but Santa Barbara City and the contiguous valleys are going ahead at a satisfactory rate.

STATISTICS OF SANTA BARBARA COUNTY, 1905-6.

General Statistics.

Area, 2,630 square miles, or 1,683,200 acres.

Number of acres assessed	1,068,953
Value of country real estate	$8,095,045
Of improvements thereon	$1,126,825
Of city and town lots	$3,760,960
Of improvements thereon	$3,072,895
Of personal property	$2,556,120
Total value of all property	$18,611,845
Expended on roads, last fiscal yr.	$82,820
Expended for bridges, last fiscal year	$8,000
Number of miles of public roads	800
Road levy per $100, 1906	40 cts.
Value of county buildings	$175,000
Railroads, steam—miles, 158.69; assessed value	$1,916,395
Railroads, elect'c—assessed value	$19,000
Electric power plants—4; assessed value	$54,600
Number of acres irrigated	12,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	12,000	6,500	$156,000
Barley	50,000	28,000	550,000
Oats	15,000	4,500	90,000
Corn	3,500	1,750	42,000
Total cereals	70,500	39,750	$838,000
Alfalfa hay	640	1,920	$19,200
Grain hay	32,000	64,000	528,000
Total hay	32,640	65,920	$547,200

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	12,220	11,000	23,220
Apricot	8,000	5,000	13,000
Cherry	250	100	350
Fig	2,000	500	2,500
Lemon	84,120	11,000	95,120
Nectarine	1,200	200	1,400
Olive	21,370	8,000	29,370
Orange	3,200	1,800	5,000
Peach	5,300	1,200	6,500
Pear	18,000	2,500	20,500
Plum	2,000	400	2,400
Prune	1,800	500	2,300
Quince	2,000	300	2,300
Other kinds	5,000	400	5,400
Almond	3,000	------	3,000
Walnut	60,000	55,000	115,000
Total fruit trees	229,460	97,900	327,360
Table grapes (ac's)	250	------	250
Blackberries	100	------	100
Loganberries acres.	10	------	10
Strawberries	250	------	250
Total acres berries	360	------	360

Fish Industry.

	Pounds.	Value.
Various kinds	1,095,000	$43,800
Crawfish	900,000	45,000
Totals	1,995,000	$88,800

STATISTICS OF SANTA BARBARA COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	617,500	$20,000
Apricots	4,000,000	40,000
Blackberries	33,600	1,860
Beets (tons)	52,500	262,500
Grapes (boxes)	500	1,250
Grape-fruit (boxes)	400	1,100
Lemons (boxes)	124,800	245,000
Oranges (boxes)	1,000	2,500
Persimmons	60,000	3,200
Strawberries	400,000	20,000

Dried—	Pounds.	Value.
Beans	5,375,000	$161,250
Corn	1,400,000	16,800
Walnuts	3,000,000	300,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	18,760	$750,400
Stock	37,200	744,000
Dairy Cows—Graded	11,340	340,200
Calves	6,000	48,000
Swine	7,800	78,000
Horses—		
Thoroughbred	40	8,000
Standard-bred	40	8,000
Common	10,000	400,000
Colts	1,000	20,000
Mules	2,000	150,000
Sheep—Common	35,000	110,000
Lambs	10,000	10,000
Total stock all kinds	149,180	$2,666,600
Wool (pounds)	230,000	--------

Dairy Industry.

	No.	Production.	Value.
Creameries	7	------	------
Skimming stations	12	------	------
Butter (pounds)		260,000	$65,000
Cheese (pounds)		153,300	32,000
Cream (cans)		30,000	100,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	6,000	$30,000
Ducks	300	1,500
Geese	90	900
Turkeys	1,200	10,000
Eggs	150,000	30,000
Total value		$72,400

Forest Products.

	Amount.	Value.
Fuel, wood (cords)	1,400	$14,000
Piles	1,000	10,000
Total value		$24,000

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 3,000	------	$6,000
Flowers and plants (acres)	50	20,000
Honey	150,000	9,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	1	6	------	$4,000
Brick		--	300,000	3,000
Cigars	8	--	------	18,250
Flouring mills	1	3	------	------
Sugar, beet	1	--	------	------

Productions Shipped Out of State.

Barley	6,000 tons
Corn	200 tons
Apricots, dried	20,000 lbs.
Grape-fruit	400 boxes
Lemons	124,800 boxes
Oranges	1,000 boxes
Walnuts	3,000,000 lbs.
Beans, dried	2,500,000 lbs.
Persimmons	5,400 boxes

SANTA CLARA COUNTY.

Santa Clara County is situated on the south arm of San Francisco Bay, and is separated from the Pacific Ocean by one tier of counties. The county seat is San José, and is distant 50 miles from San Francisco. The county is 47 miles wide from north to south, and through the center runs the favored Santa Clara Valley with an average width of 15 miles. The country from the valley slopes upward through rolling hills to the summit of the Mount Diablo range of mountains on the east, and to the summit of the Santa Cruz Mountains on the west. Its peculiar location with reference to prevailing winds and ocean currents has a marked effect on the climate, rendering it pleasantly cool in summer and not too cold in winter. The average winter temperature is about 40° and in summer 70°. It is preëminently the horticultural county of California. The statistics accompanying this report show the variety and quantity of its products.

Its roads are excellent and make all points easily accessible. More than 300 miles of these roads are sprinkled during the summer months. Three lines of railroads connect it with the outside world. Its population is 70,000, San José, the county seat, has a population of 30,000. Many flourishing towns and valleys are within its borders.

Educational interests are represented by the Leland Stanford Junior University, the Santa Clara College, the University of the Pacific, the College of Notre Dame, and the State Normal School, together with numerous private seminaries and institutions for special educational work. In the public school system there are 8 high schools and 104 grammar and primary schools. The annual expenditure for public schools is $311,500. This is in addition to the municipal expenditures by cities and towns for this purpose. The value of school property is $910,832.

The valley is drained by a number of streams. In summer their watercourses greatly diminish and the smaller ones wholly disappear. Having their sources in the surrounding hills and sinking as they approach the valley, they augment the subterranean supply of the artesian wells. These are all over the valley, usually from 60 to 100 feet in depth, though some find a larger and more permanent supply at a much greater depth.

The extent and value of agricultural, horticultural, and industrial interests can be gathered from the accompanying statistics.

STATISTICS OF SANTA CLARA COUNTY, 1905-6.

General Statistics.

Area, 1,355 square miles, or 867,200 acres.	
Number of farms	23,456
Number of acres assessed	727,905
Value of country real estate	$21,726,465
Of improvements thereon	$7,386,625
Of city and town lots	$13,060,810
Of improvements thereon	$8,354,995
Of personal property	$4,655,880
Total value of all property	$57,479,365
Expended on roads, last fiscal yr.	$158,578
Expended for bridges, last fiscal year	$13,350

General Statistics—Continued.

Number of miles of public roads	962
Road levy per $100, 1906	40 cts.
Value of county buildings	$958.050
Irrigating ditches, cost	$15,210
Railroads, steam, assessed value	$1,788,060
Railroads, electric, assessed value	$421,190
Electric power plants, assessed value	$200 600
Electric power lines, assessed value	$82.250
Number of acres irrigated	125,000

STATISTICS OF SANTA CLARA COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	530	250	$6,500
Barley	15,200	12,000	253,200
Oats	530	280	7,860
Corn	80	120	3,500
Total cereals	16,340	12,650	$271,060
Grain hay	8,500	13,000	$130,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	17,400	37,000	54.400
Apricot	531,020	10,300	541,320
Cherry	128,000	22,500	150,500
Fig	1,400	640	2,040
Lemon	415	600	1,015
Nectarine	820	500	1,320
Olive	225,000	4,970	229,970
Orange	977	825	1,802
Peach	584.000	40,050	624,050
Pear	124,175	16,040	140,215
Plum	270,000	20,500	290,500
Prune	4,035,400	392,970	4,428,370
Quince	2,470	290	2,760
Almond	16,120	4,700	20,820
Walnut	10,030	2,840	12,870
Total fruit trees	5,947,227	554,725	6,501.952
Table grapes } acres.	213	250	463
Wine grapes } acres.	2,550	3,040	5,590
Total acres grapes	2,763	3,290	6,053

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	350.000	$58,000
Apricots	7,500,000	187,500
Asparagus	1,230,000	41,500
Beans	160,000	4,000
Beets	200,000	1,000
Cabbage	300,000	2,000
Celery	100,000	3,000
Cauliflower	120,000	3,600
Corn	1,000,000	10,000
Cherries	1,750,000	105,000
Figs	140,000	4,825
Grapes, table	1,275,000	60,250
Lemons (boxes)	1,200	960
Loganberries	75,000	2,250
Nectarines	3,500	350
Onions	5,000,000	37,500
Oranges (boxes)	2,500	1,250
Olives	475,000	14,950
Pears	8,000,000	120,000
Peaches	25,000,000	225.000
Peas	500,000	10,000
Plums	300,000	7,000
Irish potatoes	6,000,000	61,200
Prunes	225,000,000	2,250,000
Quinces	175,000	1,750
Raspberries	150,000	9,000
Strawberries	200,000	10,000
Tomatoes	10,000,000	50,000
Total value		$3,281,000

Fruit, Vegetables, Etc.—Continued.

Dried —	Pounds.	Value.
Almonds	200,000	$8,000
Apricots	600,000	48,000
Beans	640,000	16,000
Onions	1,260,000	17,650
Peaches	20,000,000	170,000
Prunes	100,000,000	3,250,000
Walnuts	450,000	16,250
Total value		$3,525,900

Canned—	Cases.	Value.
Apples	30,000	$105,000
Apricots	140,000	420,000
Cherries	30,000	120,000
Grapes	20,000	50,000
Pears	200,000	600,000
Peaches	250,000	750,000
Peas	25,000	87,500
Plums	60,000	90,000
Tomatoes	225,000	93,750
Total value		$2,216,250

Wines, Brandies, Etc.

Number of wineries, 50; number of distilleries, 11; number of breweries, 6.

	Gallons.	Value.
Wine, dry	1,000.000	$250,000
Wine, sweet	28,000	28.000
Champagne (bottles)	280,000	280,000
Total value		$558,000
Beer (barrels)	107,000	$749,000
Brandy	27,000	40,500
Alcohol	1,600,000	2,080,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	2,300	$82,000
Stock	20,000	400,000
Thoroughbred	403	20,150
Dairy Cows—Graded	1,830	73,500
Herefords	73	3,650
Holsteins	79	5,050
Jersey	48	2,400
Shorthorns	203	10,150
Calves	5,490	43,020
Swine	5,000	15,000
Horses—Thoroughbred	115	28,750
Standard-bred	250	37,500
Common	12,800	448,000
Colts	2,250	33,750
Mules	160	3,200
Sheep—Common	1,600	4,800
Lambs	300	600
Angora Goats	125	625
Common Goats	400	400
Total stock all kinds	53,023	$1,201,445

Dairy Industry.

	No.	Production.	Value.
Creameries	5	------	------
Skimming stations	60	------	------
Butter (pounds)	--	200,000	$40,000
Cheese (pounds)	--	875,000	87,500
Cream (gallons)	--	27,000	40,500

STATISTICS OF SANTA CLARA COUNTY, 1905-6—Continued.

Poultry and Eggs.

	Dozen.	Value.
Chickens	22,000	$66,000
Ducks	2,600	10,400
Geese	250	3,000
Turkeys	250	4,500
Eggs	82,000	18,400
Total value		$102,300

Forest Products.

		Amount.	Value.
Area of timber lands	acres.	60,000	------
Oak	acres.	50,000	$500,000
Redwood	acres.	10,000	30,000
Fuel, wood (cords)		5,000	25,000
Sash and door factories (number)		6	85,000
Shingles (thousand)		4,000	8,000
Total value			$648,000

Power used for mills and manufactories in county: Steam, 207; electrical, 63; water, 2.

Miscellaneous Products.

	Pounds.	Value.
Flowers and plants (acres)	122	$76,000
Garden seed	3,360,000	680,000
Sugar beets (tons)	41,000	123,000

Manufactories.

	No.	No. of Employes.	Quantity Produced.	Value of Product.
Bookbinderies	2	53	----	$70,000
Wood boxes (ft.)	3	38	6,250,000	------
Brick (thousand)	4	180	40,000	360,000
Brooms (dozen)	1	1	792	3,160

Manufactories—Continued.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Carriages and wagons	13	112	--------	$133,000
Cigars (thous'd)	9	54	1,552	57,820
Coffee, spices, etc.	2	11	--------	133,250
Confectionery	15	31	--------	110,630
Cooper-shops	3	20	--------	38,000
Foundries and iron works	12	101	--------	346,300
Furniture	5	13	--------	15,090
Leather goods	17	23	--------	74,250
Meat products —				
Slaughtering stations	21	79	--------	125,000
Hides (pounds)		--	750,000	82,500
Lard (pounds)		--	32,000	3,200
Tallow		69	--------	1,449
Olive oil (gals.)		--	15,000	45,000
Pickled olives (gallons)		--	39,700	23,820
Planing mills	11	750	--------	1,500,000
Potteries	1	16	--------	30,000
Soap (pounds)	1	2	58,000	1,640
Artificial stone (cu. ft.)	3	25	382,000	120,000
Granite and marble	6	62	--------	293,000
Tanneries	2	130	--------	398,500
Iron	6	80	--------	179,560
Wood turning and carving	1	1	--------	2,000
Woolen mills	1	103	--------	225,000
Ice (tons)	2	32	34,825	208,950
Quicksilver (flasks)	2	--	36,000	12,600
Petroleum (13 barrels)	1	13	9,000	4,500
Other manufactories	66	524	--------	4,581,138

SANTA CRUZ COUNTY.

Santa Cruz County fronts its entire length on the Pacific Ocean. It lies midway between Oregon and Lower California, and is in the heart of Central California. It is separated from San Mateo and Santa Clara counties by the Santa Cruz Mountains, and from Monterey by the Pajaro River. It is one of the smallest counties, and comprises a narrow strip of mountainous land about 40 miles long and 18 broad, forming a vast amphitheatre, and sloping from the summits of the Santa Cruz range, whose highest elevation, Loma Prieta, is 4,000 feet, southward and westward to the bay of Monterey.

The curving line of shore and the corresponding curve of the mountain line inclose an irregular, crescent-shaped tract of country, with an average width of 20 miles, which for grandeur, beauty, and variety of scenery equals any expanse of similar size in the world. The sides of the mountains are closely set with forests of pine, redwood, madrone, and other trees, the redwoods having, in many cases, attained gigantic growth. A number of streams rise in these hills, and bring down the rich alluvial loam into the valleys, which, in their normal condition, teem with native grasses and flowers, and when cultivated yield phenomenal results. These streams are, agriculturally as well as topographically, an important feature, watering as they do every section of land. Besides these, natural springs are innumerable. Nearing the coast, there are many interesting topographical features. The leagues of wide, high, wind-swept grassy plateaus which form remarkable grazing and dairy lands; the succession of chalk terraces; the broad amphitheatrical valley of the Pajaro; the salt lagunas, picturesque in configuration and surrounded by park-like groves of live oaks; the high sandstone cliffs along the shore; the magnificent ocean drives—all are materials for pleasant investigation.

Along the coast line, a series of raised benches form a strip of elevated land. This widens to the south of the city of Santa Cruz, and affords a large area of fruitful soil, which has been brought into a high state of cultivation. From Santa Cruz City south the soil consists of a light loam, abounding in lime, potash, and phosphoric acid. In the Pajaro Valley there is a great variety, from the rich sedimentary alluvial wash to the light sandy soil of the foothills. In the lower part of the valley a clayey loam predominates. This is followed by a heavy adobe higher up, and then the dark, reddish loam of the plains. The latter is the favorite with fruit-growers, and it is here that flourish the best orchards.

The average annual rainfall, taken from a record of thirty-two consecutive years, is 25.26 inches, showing that this is a well-watered district.

The charm of Santa Cruz is her infinite variety. In lumber products she ranks third in the State. Her butter, cheese, and cream might well win her a place in the dairy districts. Hay, grain, potatoes, and the whole range of cereals and vegetables give enormous yields, and while she does not claim to wear the citrus belt, yet oranges are raised for home consumption, and the cultivation of the lemon is a profitable business, since the immunity from frosts and the equable seasons favor its arriving at fine maturity. But her deciduous fruits, large and small, her table and wine grapes, her fine wines, are winning renown. From the summit of the range, more than 2,000 feet above the sea, down to the wide and fruitful valleys along the coast, grow and flourish delicious fruits. Prunes, pears, apricots, lemons, peaches, cherries, Japanese and native plums, figs, walnuts, persimmons, olives, and nectarines thrive, but the crop of the largest profit is that of apples. The quality and size are astonishing, and the yield as much so. From Bellflowers in September to Newtown Pippins in December the supply is steady. From two depots, in a late season, there were shipped to Eastern points, exclusive of other sales, 420,000 boxes of apples, weighing 21,000,000 pounds. The market for apples extends to England and the Continent, Germany being a large buyer. The especial home of the apple, as well as of the strawberry, is the fertile valley of the Pajaro River, and the flavor and color of the foothill apples are renowned.

Of the small fruits, the strawberry is most widely grown and furnishes a practically continuous crop. Raspberries, blackberries, Japanese wineberries, and the loganberry, which originated in Santa Cruz, yield unfailing crops. The loganberry is a cross between the wild blackberry and the Antwerp raspberry, and fruits in two varieties, red and black. The berry is large and luscious, and is grown widely in the Eastern-Southern States, as well as in California.

The wines of this county are winning the place they deserve, and the product of our vineyards is shipped to the heart of the wine countries of Europe.

The sugar-beet industry is profitable. A large acreage in the southern part of the county is devoted to the growth of the beets.

Potatoes yield phenomenally in the rich bottom lands; asparagus is grown for outside markets; hops and beans are each good enough in results for farmers to give them special attention.

Market gardening is profitable, and many comparatively small industries are making a good living for those who follow them. Among these are cucumber-growing for San Francisco and Eastern cities; seeds, bulbs, and cut flowers for metropolitan markets.

Dairying is a flourishing and profitable interest, and the fifty thousand and more acres of grazing lands have for years supported herds of well-selected stock. The grasses are rich, and the county's products of cream, milk, butter, and cheese have a good repute at home and abroad. A typical dairy and creamery farm lies just north of the city of Santa Cruz.

The poultry interest needs fostering all over California. While Santa Cruz produces and ships many eggs, the business might easily be increased many hundred per cent, especially as not enough chickens and turkeys are raised to supply the home market.

The deep-sea fisheries are important factors, and here again is room for indefinite expansion. The waters of the bay teem with food fish, the pools and rocks along the shore support quantities of shell-fish, and the streams that come down to the ocean and bay are the home of the mountain trout.

Many industries have developed to the profit-producing point, and the general air of thrift and prosperity is satisfactory. Redwood lumber is durable, not inflammable, and capable of receiving a rich finish for interior and cabinet work. The output has been large for many years, but great tracts of forest remain, and the redwood is rapidly reproductive, giving promise that the supply shall be continuous. Many of the trees are giants of ancient growth, and it is not uncommon to see 35,000 feet of clear lumber cut from a single tree. The by-products of shakes, shingles, railroad ties, piles, telegraph poles, fruit-box shooks, pickets, posts, etc., are manufactured in large quantities. Eight varieties of oak grow, among them the chestnut oak, which supplies tanbark for the making of superior leather. The manufacture of powder, besides requiring redwood and oak for fuel, utilizes willow, alder, and madrone. Redwood, laurel, and madrone are all practically used as cabinet woods, and this industry is susceptible of an indefinite development, so numerous and varied are these products. Naturally, wood is the fuel in general use, and it is of the best quality and cheaper in Santa Cruz than in any Central California county. "Big Tree Grove" is but five miles from town, on the line of the railway in the cañon of the San Lorenzo. This is an ancient grove of giants—not the *Sequoia gigantea* of the Sierras, but the *Sequoia sempervirens*. It covers twenty acres, and numbers scores of trees from 10 to 20 feet in diameter, and a dozen or more which exceed that diameter and reach a height of 300 feet.

In the mountains near the coast there were discovered years ago deposits unique and strange in substance, which under the name of bituminous rock have proved of untold value as a natural pavement material. It has been used on the streets and sidewalks of Santa Cruz and other places for years, and when laid on a proper foundation is durable, clean, and elastic. It is a natural combination of bitumen, sand, and crude petroleum. It is shipped to all nearby cities, and goes as well to Salt Lake, Tacoma, Seattle, Phœnix, and to Honolulu.

Similar conditions exist regarding the vast deposits of high-grade lime rock throughout the mountains. Five kilns are in active operation, and many cargoes per month are shipped to distant points. The employés and their families, like those of the lumber mills, constitute populous little settlements.

Santa Cruz, Watsonville, Soquel, Aptos, Felton, Glenwood, and Boulder Creek are the principal towns.

STATISTICS OF SANTA CRUZ COUNTY, 1905-6.

General Statistics.

Area, 500 square miles, or 320,000 acres.

Number of farms	1,765
Number of acres assessed	258,926
Value of country real estate	$4,117,385
Of improvements thereon	$1,647,005
Of city and town lots	$3,096,920
Of improvements thereon	$2,402,510
Of personal property	$1,644,715
Total value of all property	$12,909,175
Expended on roads, last fiscal yr.	$70,000
Number of miles of public roads	458

Road levy per $100, 1906; inside, $1.75; outside, $2.20.

Value of county buildings	$162,500
Railroads, steam—miles, 72.93; assessed value	$915.629
Railroads, electric — assessed value	$39,985
Electric power plants—2; assessed value	$45,320
Number of acres irrigated	1,260

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	317	240	$7,220
Barley	2,900	5,670	113,400
Oats	2,700	3,221	64,420
Corn	325	499	13,473
Total cereals.	6,242	9,630	$198,493
Alfalfa hay	225	1,188	$9,170
Grain hay	7,420	17,035	170,350
Total hay	7,645	18,223	$179,520

Dairy Industry.

	Production.	Value.
Butter (pounds)	465,600	$116,400
Cheese (pounds)	301,500	31,500
Cream (gallons)	4,500	9,000

Dairies, 16.

STATISTICS OF SANTA CRUZ COUNTY, 1905-6—Continued.

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		317,794	306,476	624,270
Apricot		34,025	31,063	65,088
Cherry		20,544	6,538	27,082
Fig		206	156	362
Olive		541	145	686
Orange		133	79	212
Peach		14,361	987	15,248
Pear		15,253	1,754	17,007
Prune (French)		120,824	6,722	127,546
Other kinds		19,367	2,830	22,197
Quince		12	------	12
Lemons		76	83	159
Almond		347	77	424
Walnut		1,896	5,969	7,865
Total fruit trees		545,379	362,879	908,158
Table grapes	acres	480	514	994
Wine grapes		745	939	1,684
Total acres grapes		1,225	1,453	2,679
Blackberries	acres.	105	----	105
Loganberries		211	----	211
Raspberries		23	----	23
Strawberries		400	----	400
Total acres berries		739	----	739

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	121,761,390	$975,800
Apricots	1,568,750	28,180
Asparagus	50,000	3,600
Blackberries	1,420,000	49,000
Beans	2,840,000	55,000
Beets	56,000,000	86,000
Grapes	7,000,000	140,750
Onions	1,875,000	26,000
Peaches	1,551,800	26,380
Irish potatoes	14,214,500	184,145
Raspberries	174,420	14,000
Strawberries	7,000,000	249,160
Totals	211,455,860	$1,838,015

Dried—	Pounds.	Value.
Apples	6,327,704	$433,494
Apricots	1,575,400	140,000
Prunes	920,700	36,828
Totals	8,823,804	$610,322

Canned—	Cases.	Value.
Apples	11,000	$56,000
Blackberries (gals.)	7,156	--------

Poultry and Eggs.

	Dozen.	Value
Chickens	3,230	$16,150
Ducks	140	70
Turkeys	180	360
Eggs	310,100	77,525
Total value		$94,105

Wines, Brandies, Etc.

Number of wineries, 12; number of breweries, 3.

	Gallons.	Value.
Claret	364,980	$58,508
Riesling	48,945	7,945
Totals	413,925	$66,453
Beer (barrels)	9,400	$42,360
Cider (gals.)	51,250	7,680
Vinegar (gals.)	68,600	5,400
Beer (bottled)	28,500	10,000
Mineral waters	55,592	33,350

Fish Industry.

	Pounds.	Value.
Various kinds	2,652,064	$79,560

Livestock Industry.

	Number.	Value.
Cattle—Beef	713	$11,426
Stock	100	1,800
Jacks	4	70
Mules	120	4,620
Calves	312	1,690
Swine	1,345	7,025
Horses—		
Thoroughbred	14	2,800
Common	1,516	41,385
Colts	266	5,060
Sheep—		
Imported or fine	21	50
Graded	150	3,601
Common	1,668	3,165
Goats—Angora	725	1,450
Common	325	405
Total stock all kinds	7,179	$81,306

Forest Products.

	Amount.	Value.
Sawmills (number)	9	----------
Fuel wood (cords)	79,991	$375,161
Lumber (feet)	38,400,000	783,567
Grape stakes	560,000	8,200
Pickets (pieces)	300,000	9,500
Posts (pieces)	602,000	38,260
Tan bark (cords)	7,200	103,236
Shakes	1,225,000	13,475
Shingles	11,063,000	16,048
Total value		$607,447

Manufactories.

	No.	No. of Employés	Quantity Produced.	Value of Product.
Berry drawers	-	----	500,000	$10,000
Wood boxes			550,000	32,800
Lime (barrels)	3	260	30,000	354,091
Paper (pounds)	1	20	1,200,000	360,000
Packing-houses (boxes)	37	755	1,890,000	975,800
Planing mills	3	105	--------	465,000
Powder mills	1	201	279,840	313,181
Powder (kegs)		---	1,276,196	437,524
Soap (pounds)	2	4	200,000	7,080
Tanneries (lbs.)	1	50	1,250,000	300,000
Wood turning and carving	1	12	--------	11,000

STATISTICS OF SANTA CRUZ COUNTY, 1905-6—Continued.

Productions Shipped Out of State.

	Amount.
Apples, fresh	1,890,000 boxes
Apples, dried	6,327,704 lbs.
Apples, canned	11,000 cases
Apricots, fresh	1,568,750 lbs.
Apricots, dried	1,575,400 lbs.
Blackberries, fresh	1,420,000 lbs.
Blackberries, canned	7,156 gals.
Figs, dried	7,000,000 lbs.
Peaches, fresh	1,551,800 lbs.
Prunes, fresh	463,000 lbs.
Prunes, dried	920,700 lbs.
Raspberries, fresh	174,420 lbs.
Strawberries, fresh	7,000,000 cases
Onions, dried	1,875,000 lbs.
Lime	218,084 bbls.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 1500		$2,700
Hops, 120 acres	200,000	40,000

SHASTA COUNTY.

Shasta County is at the head of the Sacramento Valley. Its greatest length from east to west is 90 miles, and its greatest breadth from north to south 60 miles.

The mountains of the Sierra Nevada and Coast Range cover a large portion of the county on all sides except the south. They are rugged and lofty, rising more than 5,000 feet above the sea. On the east there are four peaks of special prominence. Lassen Peak, altitude of 10,577 feet, is timbered for two thirds of the way up; the others are bald, and usually covered with snow. Other peaks and buttes are numerous, and all indicate volcanic origin, as shown by extinct craters, cones, sulphur deposits, beds of lava, etc. Hot and boiling springs are of frequent occurrence. In the southern portion is a foothill region, half circular, forming the northern end of the Sacramento Valley proper, and embracing about 500,000 acres, the altitude of which is from 500 to 2,500 feet above sea-level. The southwestern portion of this region is a succession of rounded hills, varying in height from 50 to 200 feet, and the central and southern portion consists of table-lands, varying in altitude from 500 to 700 feet. It has many narrow valleys.

Shasta is noted for the number and beauty of its streams. First in importance is the Sacramento River, flowing through the county from north to south; all but 20 miles is through a rocky cañon. The McCloud River, bursting from Mount Shasta's side, rushes through the mountains of the north in a southerly direction and empties into Pitt River. The most beautiful stream of the northeast is Fall River. In its meanderings it is 40 miles in length, and empties into the Pitt. Besides these larger streams there are a score of tributaries, while springs abound in the foothills and mountains.

The soil of the valleys is an alluvium, a rich sedimentary deposit, largely intermixed with disintegrated rock, and in some parts with a gravel. The usual color is light red or reddish brown. It is very fertile, and excellent for plums, prunes, pears, figs, and small fruits. The mesa lands bordering the valleys are of a sandy loam, with a large percentage of clay, and carrying in many portions, especially in the higher parts, considerable gravel and bowlders. Fruit does well on these mesa lands. On the foothills is a red loam or clay, productive and adapted to berries. On the elevated plateaus of the north and northwest the soil varies from a black, sandy loam to a red loam or clay, while to the southwest the soil is generally adobe, productive of grain and rich in natural grasses.

Irrigation is unnecessary for most crops, as the rainfall is sufficient. The rainy season begins in September and extends, at intervals of two or three weeks, from that time until May. During this time the ground is thoroughly saturated with moisture, and the rainy period covers the entire growing season. At the end of the wet season grains, grasses, etc., are ready for the harvest, and fruits, grapes, etc., are beginning to ripen.

Beautiful resorts and health-giving springs abound. The high mountains are heavily timbered with sugar pine, cedar, fir, and other valuable timbers. There are some large valleys and extensive plateaus, mostly devoted to general farming, stock-raising, and wool-growing. The foothills are more or less timbered with oak and pine, and their higher portions yield all kinds of minerals and stone—gold, silver, copper, iron, platinum, quicksilver, lead, marble, sandstone, limestone, coal, onyx, etc.—affording also opportunities for lovely homes to the small farmer, fruit-grower, stock-raiser, poultryman and gardener. The climate is pleasant, not extremely hot in summer nor cold in winter. The valleys are fertile and capable of producing all things grown in the temperate or semi-tropical regions. At certain altitudes, crisp and luscious apples are produced, and the quantity and quality can not be surpassed.

Shasta orchards are a success, producing heavy crops and of the best quality. The prune, peach, pear, plum, apple, apricot, almond, fig, lemon, orange, and olive thrive. Grapes of wine, table, and raisin varieties have proven a success in the valley portions, and many gallons of wine are made and shipped to different parts of the country; so with raisins. Wheat, grass, and alfalfa are grown successfully. The markets are the best, as there is home consumption for everything produced except fruit, and hundreds of carloads in addition to the products raised here are shipped in annually, consisting mostly of grain, hay, butter, eggs, and vegetables. The home-seeker will find land adapted to grain-growing, hay-making, poultry-raising, or gardening at less prices than in the older settled portions of the State.

Stock-raising is an important factor. The mild winters in the lower altitude obviate the necessity of feeding, while the summer ranges in the mountains make it possible for the stock-raiser to keep his herd upon green feed the greater portion of the year.

The sawmills annually distribute thousands of dollars for labor. The Terry Lumber Company's mills are the largest in the county. They are connected with Bella Vista by flume, and there have planing-mills, yards and dryhouses, and a railway to the main line at Anderson. The wood camp is in the big bend of the Pitt, and has been sending thousands of cords of wood annually down the Pitt to the smelters. In the Shingletown country there are several large sawmills, and there have been graded about twenty-five miles of road for traction-engine work. Over this road, with engines, they transport their lumber to the railroad. At or near Whitmore there are also a number of sawmills. There are some large flouring mills.

The resorts are numerous and easy of access.

Redding, the county seat, is one of the most beautifully located places on the Pacific Slope, commanding a view of both the Sierra and Coast ranges, with their lofty, snow-clad peaks, and an equally beautiful view of the Sacramento south and cañon north.

The next town of importance is Keswick, at the smelters of the Iron Mountain Company, six miles from Redding.

Shasta, once the county seat, is famous the State over for its former glory.

Anderson, on the California & Oregon Railroad, 12 miles south from Redding, is the chief shipping point for the fruit industry of the county. The country surrounding the town is largely valley land, and thousands of acres of bearing orchards are tributary to it.

While Shasta's preëminence in mineral production is largely due to the development in copper, her output in the more precious metals is very large; and the production of these metals as a by-product of the copper sulphide ores will, with the extension of the industry, exceed the present output many times.

Statistics showing the "Mineral Productions" of Shasta County for the last preceding year are included herein. These items are important to the county and State, as a vast amount of revenue is derived therefrom.

The production of copper in Shasta County, although a great and growing industry, is yet in its infancy, having almost doubled in the past year.

In an agricultural way, Shasta County has, besides her vast output of grain, fruit, and stock, important possibilities yet in their experimental stage. A great many crops that can be grown at immense profit have only been tested, the large land-holdings being occupied in raising less profitable crops that admit of greater investment.

Irrigation is receiving more notice than ever before, and as our choicest lands, of which the acreage is large, lie along the numerous streams of the county, where water in abundance is easily and cheaply accessible, together with the fact that our climate is such as to admit of the successful growth of semi-tropical vegetation, this feature is destined to become an important one.

STATISTICS OF SHASTA COUNTY, 1905-6.

General Statistics.

Area, 4,050 square miles, or 2,592,000 acres	
Number of farms	1,000
Number of acres assessed	1,355,479
Value of country real estate	$7,003,980
Of improvements thereon	$1,500,260
Of city and town lots	$578,863
Of improvements thereon	$972,360
Of personal property	$1,389,112
Total value of all property	$11,444,575
Expended on roads, last fiscal yr.	$37,253
Expended for bridges, last fiscal year	$20,610
Number of miles of public roads	1,000
Road levy per $100, 1906	40 cts.
Value of county buildings	$110,000
Irrigating ditches—miles, 50; cost	$2,500
Railroads, steam—miles, 117.54; assessed value	$1,771,578
Electric power plants—2; assessed value	$212,000
Electric power lines—miles, 134¾; assessed value	$48,100
Number of acres irrigated	3,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	3,000	1,500	$36,000
Barley	10,000	7,500	150,000
Oats	400	175	5,250
Total cereals	13,400	9,175	$191,250
Alfalfa hay	900	2,500	$17,500
Grain hay	------	3,000	30,000
Grass hay	------	5,000	30,000
Total hay	------	10,500	$77,500

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		15,000	1,000	16,000
Apricot		500	-------	500
Cherry		500	-------	500
Fig		800	-------	800
Lemon		250	-------	250
Olive		9,000	-------	9,000
Orange		800	-------	800
Peach		25,000	2,000	27,000
Pear		27,000	2,000	29,000
Plum		1,000	-------	1,000
Prune		70,000	-------	70,000
Other kinds		6,500	-------	6,500
Almond		3,500	-------	3,500
Walnut		250	-------	250
Total fruit trees		160,100	5,000	165,100
Raisin grapes	acres.	5	----	5
Table grapes		5	----	5
Wine grapes		20	----	20
Total acres grapes		30	----	30
Blackberries	acres.	25	----	25
Currants		5	----	5
Loganberries		10	----	10
Strawberries		40	----	40
Total acres berries		80	----	80

Poultry and Eggs.

	Dozen.	Value.
Chickens	250	$1,000
Ducks	25	200
Turkeys	500	10,000
Eggs	4,500	900
Total value		$12,100

STATISTICS OF SHASTA COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	115,000	$2,500
Apricots	16,000	325
Blackberries	33,000	1,400
Cabbage	50,000	1,000
Cherries	8,000	400
Figs	80,000	800
Grape-fruit	350,000	3,500
Loganberries	5,000	200
Onions	20,000	400
Olives	85,000	4,000
Pears	4,820,000	95,000
Peaches	3,300,000	40,000
Plums	40,000	600
Irish potatoes	200,000	3,000
Sweet potatoes	10,000	300
Prunes	6,640,000	75,000
Strawberries	35,000	2,000
Tomatoes	85,000	1,300
Total value		$231,725

Dried—	Pounds.	Value.
Almonds	20,000	$2,000
Apples	8,000	250
Apricots	1,000	1,000
Beans	28,000	1,000
Figs	4,000	250
Grapes	20,000	1,000
Onions	10,000	200
Pears	600,000	50,000
Peaches	560,000	56,000
Prunes	4,200,000	110,000
Total value		$221,700

Wines, Brandies, Etc.

Shasta reports one brewery, with an output of 8,700 barrels of beer, worth $36,000.

Livestock Industry.

	Number.	Value.
Cattle—Beef	4,000	$100.000
Stock	15,000	200,000
Thoroughbred	20	2,000
Dairy Cows—Graded	60	2,400
Herefords	100	5,000
Shorthorns	25	1,250
Calves	4,000	40,000
Swine	8,000	30,000
Horses—		
Thoroughbred	2	1,500
Standard-bred	25	5,000
Common	4,000	160,000
Colts	500	16.000
Mules	300	12,000
Sheep—		
Imported or fine	500	7,000
Common	25,000	50,000
Lambs	9,000	13,000
Common Goats	14,000	28,000
Total stock all kinds	84,532	$667,150
Wool (pounds)	200,000	$15,000
Mohair (pounds)	70,000	9,000

Dairy Industry.

	Pounds.	Value.
Butter	70,000	$1,400

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	350,000	--------
Sawmills (number)	11	$40,000
Charcoal (sacks)	20,000	--------
Fuel, wood (cords)	2,000	6,000
Laths (thousand)	120	300
Lumber—Cedar (ft.)	150,000	2,250
Pine (feet)	30,000,000	375,000
Posts (pieces)	12,000	1,200
Shakes (thousand)	200	1,000

Power used for mills and manufactories in county: Steam—number, 10; water—number, 1.

Miscellaneous Products.

	Pounds.	Value.
Hops	65,000	$8,000
Chrome	40,000	300
Copper	10,830,865	1,688,614
Limestone	7,200,000	3,600
Gold	--------	684,952
Silver	--------	167,548

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Brick (thousand)	2	45	3,500	$25,000
Cigars "	3	6	300	14,000
Flouring mills (barrels)	3	12	10,000	40,000
Foundries and iron works (tons)	1	15	300	25.000
Lime (barrels)	2	30	10,700	9,500
Matches	1	1	1,000	900
Hides (pounds)		--	150,000	15,000
Lard (pounds)		--	70,000	5,500
Tallow (barrels)		--	200	------
Pickled olives (gals.)			10,000	7,500
Planing mills	3	50	------	------

Productions Shipped Out of State.

	Amount.
Almonds	10,000 lbs.
Peaches, fresh	10,000 boxes
Peaches, dried	560,000 lbs.
Pears, fresh	50,000 boxes
Pears, dried	580,000 lbs.
Prunes, fresh	320.000 lbs.
Prunes, dried	4,200,000 lbs.
Hops	60,000 lbs.
Cattle	3,500
Hides	15,000
Horses	220
Swine	4,000
Wool	200,000 lbs.
Lumber	30,000 M ft.
Olives, pickled	10,000 gals.

SIERRA COUNTY.

Sierra County has an area practically all mountainous. The altitude ranges from 2,000 to 8,600 feet, the highest elevation being that of the Sierra Buttes; but the greater portion has an elevation of from 4,000 to 5,000 feet.

The main ridge of the Sierra Nevadas crosses the eastern part from south to north. Several spurs traverse the county from east to west, forming the watersheds of the four principal streams which make the drainage system of the western part. These streams consist of the Middle Yuba River on the south, the North Yuba near the center, and Cañon Creek and Slate Creek on the north; and in the eastern end the many streams that form the headwaters of the Feather and Truckee rivers. Of the peculiar topographical features are the expansive valleys and lakes lying among the loftiest peaks of the Sierras. The lakes vary from one eighth of a mile to three or four miles in length, most of them circular, and, considering their small size, remarkable for their depth.

The important body of agricultural land is Sierra Valley. It extends over the boundary line into Plumas County, and is the largest and the most elevated of the valleys of the Sierras, being 4,750 feet above sea-level. It is 30 miles in length and 10 in width. This valley is particularly adapted to stock-raising and dairy purposes, and a fine quality of timothy and alfalfa hay is raised. There are several creameries in the valley, and a superior quality of butter is made, of which almost all is shipped to the outside. Considerable beef cattle are fattened for San Francisco and other markets; besides large shipments of sheep. The soil is a deep, black loam, largely admixed with rich vegetable mold, the result of ages of forest growth.

Since 1849 the principal industry has been gold mining. One hundred and ninety millions of dollars have been taken from its rivers, gravel deposits and quartz veins.

The greater portion is practically covered with a virgin belt of soft timber. The lumber cut runs into many millions of feet. The Floriston Paper Mill Company owns timber lands, and uses a large amount of Sierra County timber.

Population, according to census of 1900, was 4,017.

Average temperature winter 47°, summer 72°, summer nights are pleasantly cool.

Annual rainfall, about 60 inches.

Character of agricultural soil: black loam, very rich.

The principal towns are: Downieville, Forest City, Sierraville, Loyalton, Sierra City.

Natural products : white, yellow, and sugar pine, fir, spruce, and cedar, livestock, fruit, berries, and garden truck.

Manufactured products : lumber, boxes, sashes, doors, etc., creamery butter.

Minerals: gold, iron, copper, asbestos, and lime.

Irrigation and power facilities are unlimited.

Transportation facilities: Boca & Loyalton Railroad, Central Pacific Railway, Nevada-California-Oregon Railway, and Hobart-Mills Railroad. Communication facilities: Sunset Telephone Company, Western Union Telegraph Company, and Sierra Valley Telegraph Company.

Educational facilities: first-class common and grammar schools.

Health resorts: Campbell's Hot Springs, Webber, Independence, and Gold lakes.

Hunting and fishing abundant—trout, mountain quail, grouse, duck, snipe, deer, and bear.

STATISTICS OF SIERRA COUNTY, 1905-6.

General Statistics.

Area, 1,000 square miles, or 640,000 acres.

Number of farms	101
Number of acres assessed	43,804
Value of country real estate	$1,204,060
Of improvements thereon	$258,660
Of city and town lots	$55,915
Of improvements thereon	$239,630
Of personal property	$263,010
Total value of all property	$2,029,665
Expended on roads, last fiscal yr.	$7,779
Expended for bridges, last fiscal year	$1,322
Number of miles of public roads	300
Road levy per $100, 1906	50 cts.
Value of county buildings	$14,000
Irrigating ditches, miles, 6; cost	$1,270
Railroads, steam—miles, $29\frac{48}{100}$; assessed value	$198,310
Electric power plants—4; assessed value	$3,500
Number of acres irrigated	20,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	550	298	$10,430
Barley	355	218	6,540
Oats	383	173	5,536
Rye	283	81	2,430
Total cereals	1,571	770	$24,936
Alfalfa hay	1,332	1,872	$13,104
Grain hay	848	1,015	6,598
Grass hay	13,624	17,606	114,439
Total hay	15,804	20,493	$134,141

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	4,730	190	4,920
Cherry	110	12	122
Peach	300	50	350
Pear	225	48	273
Plum	240	48	288
Quince	20	--	20
Chestnut	30	10	40
Walnut	25	20	45
Total fruit trees	5,680	378	6,058

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	100,000	$2,230
Cabbage	24,000	480
Cherries	22,000	880
Onions	6,000	120
Pears	5,000	75
Peaches	800	40
Plums	800	24
Irish potatoes	520,000	10,400
Totals	678,600	$14,249

Beer—Butter.

Sierra County reports one brewery with an output of 247 barrels of beer, worth $3,000.

Also an output of 315,000 pounds of butter, worth $63,000.

Livestock Industry.

	Number.	Value.
Cattle—Beef	3,800	$111,600
Stock	5,300	106,000
Thoroughbred	100	5,000
Dairy Cows—Graded	2,100	8,400
Calves	1,250	11,250
Swine	500	3,000
Horses—		
Standard-bred	2	1,000
Common	900	40,000
Colts	160	4,800
Mules	40	2,000
Sheep—Common	3,300	11,550
Lambs	2,000	6,000
Goats—Common	100	200
Total stock all kinds	19,552	$310,800
Wool (pounds)	25,400	$5,000
Mohair (pounds)	200	40

Poultry and Eggs.

	Dozen.	Value.
Chickens	1,300	$6,500
Turkeys	12	240
Eggs	26,000	6,500
Total value		$13,240

STATISTICS OF SIERRA COUNTY, 1905-6--Continued.

Forest Products.

		Amount.	Value.
Area of timber lands	acres.	213,000	$650,000
Cedar	acres.	1,000	------
Pine	acres.	213,000	------
Sawmills (number)		12	91,000
Fuel, wood (cords)		10,000	20,000
Laths		1,000,000	2,500
Lumber—Cedar (feet)		200,000	30,000
Pine (feet)		57,000,000	684,000
Posts (pieces)		20,000	1,200
Railroad ties (pieces)		100,000	32,000
Shingles (thousand)		1,300	3,600
Total value			$1,514,300

Power used for mills and manufactories in county: Steam—number, 12; water—number, 4.

Miscellaneous.

Sierra reports one foundry with two employés and an output valued at $2,500; 2,100 hides valued at $8,400, 6,000 pounds of lard valued at $750, and 22,000 pounds of tallow valued at $880.

The county's exports are reported as 1,800 cattle, 2,100 hides, 5,000 sheep, 24,000 pounds of wool, 100,000 pounds of butter, and 46,000,000 feet of lumber.

There are four box factories in the county that employ 140 people and turn out an annual product valued at $230,000.

SISKIYOU COUNTY.

Siskiyou is one of the northern counties. Its north line joins Oregon for 80 miles. Of its area, 1,000 square miles are valley, the remainder mountainous; however, among the mountains are hundreds of upland farms and stock ranches, well wooded and watered. It contains a large area of farming, mining, desert, swamp, and timber lands. The so-called desert lands are fertile when water can be applied, and for this object the Legislature ceded to the Federal Government all the lake lands along the boundary of the county and Oregon, where hundreds of thousands of acres will soon be reclaimed, by lowering the level of the lakes, using the water for irrigating the arid districts, and draining the swamp lands. This land will be open to homestead entry, and will make homes for thousands of settlers.

The mining section comprises the west half, and produces nearly a million in gold annually. There are deposits of iron ore, marble equal to the best, and sandstone in vast quantities that, owing to the lack of lime, is regarded as the best on the coast. In Scott Valley are large deposits of limestone and granite.

It has been demonstrated that sugar-beets grow to perfection in Scott and Shasta valleys. The agricultural district lies chiefly in the central and eastern parts of the county. Timber is everywhere. There are thousands of sections that will cut from ten to twenty million feet of yellow and sugar pine, from trees that will produce logs from five to eight feet clear. Besides there is much red fir and cedar.

The Sierra Nevada and Coast Range mountains meet here, forming the head of the Sacramento Valley. The altitude ranges from 2,000 feet in the valley to 14,000 on the mountain peaks. There are localities where snow seldom falls, and there are regions of perpetual snow. Such conditions make it one of the most scenic of the counties.

Many of the waterfalls have been harnessed for electrical power. The notable one is the plant at Fall Creek, where the Siskiyou Light and Power Company has the third largest electric plant in California, and has stretched aluminum wires to all parts of the county, supplying cheap and abundant power.

The principal river is the Klamath, which drains almost the entire county, and flows into the Pacific Ocean at the border line between Humboldt and Del Norte. This stream is not navigable. It is a natural dumping-ground for the placer mines, its swift current carrying the tailings out to the ocean. Placer mining has been carried on along its watershed for more than fifty years, and yet nowhere is there any indication of the channel filling up.

The Southern Pacific Railroad passes through the county from north to south, entering at Dunsmuir, where are located its roundhouse and machine shops. Sisson is a popular summer resort, as also is the Shovel Creek hot springs and mud baths, at Beswick. Hornbrook, the most northerly town in California, is 8 miles from the State line. It is located in a fertile valley, near the Klamath River, surrounded by mountains, which contain valuable placer and quartz mines.

Yreka, the county seat, is the principal town. The courthouse and jail are splendid buildings. Two electric plants furnish light and power. The city owns its water system, and it is equal to any in the State, the water being filtered through banks of gravel.

The electric light plants will be the means of opening a number of rich gravel mines lying along the low creeks, too deep for hydraulicking, and too wet for drifting. With plenty of cheap and convenient power, dredges are being built to work this ground.

There are large lumber mills at McCloud, with railroad from the main line at Upton. The Weed Lumber Company is another large concern. It has a railroad into the timber region. Lumbering is the principal industry, with mining and livestock a close second and third.

The mountain districts furnish splendid range nine months in the year for thousands of cattle. New gold mines are being discovered, and the old ones continue good with depth. The timber will last for a hundred years; lime, building stone, and marble quarries are being opened; railroads have been built; swamp lands have been drained, arid plains irrigated, and pasture lands have been converted into hop fields. All this, added to our present prosperity, our temperate climate, and natural advantages, promises for Siskiyou County a bright future’

STATISTICS OF SISKIYOU COUNTY, 1905-6.

General Statistics.

Area, 6,048 square miles, or 3,870,720 acres.

Number of farms	900
Number of acres assessed	875,000
Value of country real estate	$7,579,435
Of improvements thereon	$1,100,921
Of city and town lots	$256,300
Of improvements thereon	$780,130
Of personal property	$1,606,494
Total value of all property	$11,501,836
Expended on roads, last fiscal yr.	$46,711
Expended for bridges, last fiscal year	$88,873
Number of miles of public roads	1,000
Road levy per $100, 1906	35 cts.
Value of county buildings	$75,000
Irrigating ditches—miles, 350; cost	$125,000
Railroads, steam—miles, 150; assessed value	$2,733,205
Electric power plants, 5; electric power lines, 75 miles; assessed value	$50,000
Number of acres irrigated	15,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	130,000	43,000	$946,000
Barley	2,000	600	14,652
Oats	1,000	500	16,000
Total cereals	133,000	44,100	$976,652
Alfalfa hay	------	50,000	$350,000
Grain hay	------	4,000	32,000
Grass hay	------	15,000	105,000
Total hay		69,000	$487,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	12,350	1,700	14,050
Apricot	500	------	500
Cherry	800	75	875
Nectarine	100	------	100
Peach	4,000	1,000	5,000
Pear	2,500	500	3,000
Plum	3,000	600	3,600
Prune	3,000	600	3,600
Walnut	300	------	300
Total fruit trees	26,250	4,475	30,725

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,152,200	$23,044
Apricots	5,000	200
Beans	61,500	3,075
Beets	115,400	1,154
Cabbage	56,500	1,130
Onions	37,500	750
Pears	94,000	1,880
Peaches	81,000	1,620
Plums	72,000	720
Irish potatoes	1,600,000	24,000
Prunes	45,000	900
Strawberries	12,500	1,250
Totals	2,332,600	$59,723

Dairy Industry.

	No.	Production, Pounds.	Value.
Creameries	5		
Butter		500,000	$125,000
Cheese		25,000	3,750

STATISTICS OF SISKIYOU COUNTY, 1905-6—Continued.

Miscellaneous Products.

	Amount.	Value.
Bees (hives)—number, 2,000	------	$4,000
Honey (pounds)	100,000	10,000
Foundries and iron works (number)	2	------
Cigars	200,000	------
Hides (pounds)	150,000	------
Lard (pounds)	100,000	------

Livestock Industry.

	Number.	Value.
Cattle—Beef	6.000	$150,000
Stock	30,000	$450,000
Thoroughbred	20	2,000
Dairy Cows—Graded	3,000	------
Calves	6,000	36,000
Swine	10,000	50,000
Horses—		
Thoroughbred	6	6,000
Standard-bred	4	2,000
Common	6,000	600,000
Colts	500	5,000
Sheep—Common	8,000	$20,000
Lambs	1,000	1,250
Angora Goats	300	450
Total stock all kinds	70,830	$1,322,700
Wool (pounds)	50,000	------

Poultry and Eggs.

	Dozen.	Value.
Chickens	5,000	$30,000
Geese	142	1,704
Eggs	300,000	75,000
Total value		$106,704

Forest Products.

Area of timber lands (acres)	2,000,000
Sawmills (number)	36
Lumber—Pine (feet)	150,000,000

SOLANO COUNTY.

Solano County is midway between the northern and southern extremities of the State. It is not exactly square, but about 40 miles from north to south, and averages almost as much east and west.

Swamp lands border on the Sacramento River and on Suisun and San Pablo bays. A large portion of the county—about two thirds—is valley, the remainder being foothills. The slopes and smaller valleys are noted for their early production of fruit and vegetables.

The soil varies from red gravel to black sandy loam; from barren patches of alkali to rich alluvium; and all classes of soil may be found. That of the swamp and overflowed lands is largely composed of decayed vegetable matter, admixed with sedimentary deposits. In the trough of Vaca Valley the soil varies from a sandy to a clayey loam, and sometimes to adobe. Throughout the hilly land to the east and northeast of Ulattis Creek it varies from sandy to clayey, according to the character of the parent formation. Experience has proved that the heavier soils are the best for pears, and the more sandy for peaches and apricots. In wells dug in this district, the surface soil varies from 1 to 10 feet in depth, beneath which sandstone, interstratified with shale, exists to a depth of about 200 feet.

Solano ranks among the leading horticultural counties, and during the past ten years has made wonderful strides. In climate and soil Solano is eminently adapted to horticultural pursuits, and the earliness and superiority of her fruit products have given her a national reputation. In Vaca Valley fruit and vegetables ripen and find their way to market in the early season. This valley is 12 miles long and 2 wide, and owes its advantages to elevation, location, and surroundings—the encircling hills protecting it from chilling winds, and the slopes giving to it the full benefit of the spring sunshine, while the deep, rich, fertile soil gives all the required constituents for plant life. Fruit-trains leave daily during the season for the East. The earliness with which fruits ripen in the Vaca and Pleasant valleys is attested by the fact that cherries are shipped early in April, and apricots early in May, with all others proportionately. Vegetables are grown in large quantities, and find a ready sale in the San Francisco market..

The chief fruit sections are Suisun, Vacaville, and Laguna, and the principal varieties of fruits grown are apricots, peaches, pears, plums, prunes, and table grapes. A large proportion of the crop is shipped green for table use.

The livestock and dairying interests are extensive and profitable.

Poultry interests are quite large and increasing every year, and a profitable field is open to this industry.

The tule land itself is but the richest soil in process of slow formation, and throughout its broad area, particularly along its border, may be found some of the best dairying sections of the State. But in the wheat ranches of the Montezuma Hills may be found a part of the 45,000 acres which go to make up eastern Solano, and which are about evenly divided into lowland and upland. Here the yield is large, and the production certain.

The grain sections of the county are rich by nature's gifts, and by the accumulations of her people. It is not every locality which can boast millionaires whose lives have been devoted to wheat-growing, but they can be found in this county.

In manufacturing Solano County is prominent, with the location of the navy yard at Mare Island, opposite Vallejo. In Benicia, in addition to the Government arsenal, there is an extensive manufactory of agricultural implements, also extensive tanneries, which are continually being enlarged. The Bay Counties power line, which traverses Solano County transversely from the northeast to the southwest, furnishes Dixon, Elmira, Vacaville, Suisun, Fairfield, Cordelia, Benicia, and Vallejo a potentiality that surpasses Holyoke or Fall River as manufacturing centers. It is being taken advantage of north of Suisun by an extensive plant for making cement. Benicia is a former State capital, as was Vallejo, has a population of several thousand, a climate that is cool and exhilarating, and is an attractive residence location tributary to San Francisco.

Vallejo is the metropolis of the county. It is a money city. It is a progressive city. Its people are up and doing. They have abundant faith in public utilities, and they practice it as well. The spirit of self-reliance predominates. It is coming to be a city of homes. Located on a magnificent waterway, and built on hills that lend grandeur to the view; with a climate that is balmy with the rigor of sea air, equable in its character, and practically free from fogs, Vallejo is an ideal residence city. There is an air of stability in its physical make-up. Ever since the Mare Island Navy Yard, its chief dependence, was taken from a political and placed upon a civil-service basis, thus insuring retention of employés regardless of changes in national administrations, Vallejo has been advancing. One good thing has led to another as the result of this policy, and not the least meritorious is the confidence it gives the people to engage in business for themselves. It owns and operates its own water works. The system is a gravitation one, the water being brought to the city from the mountains, 15 miles distant in a direct line. No city in the State has better results or better water. In the meantime, the city has constructed a most perfect sewer system, put down substantial sidewalks, has bituminized streets, and has many hundreds of new and modern cottages that make for attractiveness. Its latest move is to secure the construction of electric railroads that are to connect Benicia, in this county, and Napa and St. Helena, in Napa County. The large plant at Mare Island is to-day equipped with the finest machinery for the construction of men-of-war.

STATISTICS OF SOLANO COUNTY, 1905-6.

General Statistics.

Area, 911 square miles, or 583,000 acres.	
Number of farms	2,900
Number of acres assessed	518,777
Value of country real estate	$9,869,554
Of improvements thereon	$1,692,649
Of city and town lots	$1,269,133
Of improvements thereon	$2,700,000
Of personal property	$2,360,000
Total value of all property	$17,891,326
Expended on roads, last fiscal yr.	$56,320
Number of miles of public roads	650

General Statistics—Continued.

Road levy per $100, 1906	40 cts.
Value of county buildings	$60,000
Railroads, steam—miles, 73.45; assessed value	$1,101,750
Railroads, electric—miles, 3.5; assessed value	$8,000
Electric power plants—6; assessed value	$125,000
Electric power lines—miles, 117½; assessed value	$95,850
Number of acres irrigated	1,500

STATISTICS OF SOLANO COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	135,600	25,000	$500,000
Barley	55,840	30,000	500,000
Oats	7,300	1,000	30,000
Corn	600	200	6,000
Total cereals	199,340	56,200	$1,036,000
Alfalfa hay	------	15,000	$150,000
Grain hay	------	25,000	150,000
Total hay	------	40,000	$300,000

Number of Fruit Trees and Vines.

	Bearing.
Apple	2,350
Apricot	34,175
Cherry	35,680
Fig	5,515
Lemon	2,040
Nectarine	3,540
Olive	2,960
Orange	2,000
Peach	335,640
Pear	204,730
Plum	6,000
Prune	368,000
Almond	90,160
Walnut	3,870
Total fruit trees	1,096,660
Table grapes (acres)	500
Wine grapes (acres)	1,380

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	10,000	--------
Apricot	320,000	$14,000
Beans (sacks)	175,000	--------
Corn	100,000	2,250
Cherries	1,200,000	200,000
Figs	1,250,000	9,000
Grapes	8,000,000	100,000
Nectarines	80,000	2,000
Pears	18,000,000	180,000
Peaches	12,000,000	--------
Peas	27,500	1,100
Plums	1,000,000	60,000
Irish potatoes (sacks)	15,000	22,500
Tomatoes	100,000	4,000
Dried—	Pounds.	Value.
Almonds	200,000	$28,000
Apricots	80,000	12,000
Figs	200,000	7,500
Nectarines	20,000	1,400
Pears	1,200,000	102,000
Peaches	2,400,000	228,000
Plums	40,000	2,800
Prunes	6,000,000	180,000
Walnuts	72,000	1,080
Silver prunes	120,000	8,400
Imperial prunes	60,000	3,600
Ruby prunes	450,000	16,875
Canned—	Cases.	Value.
Tomatoes	20,000	--------
Asparagus	12,500	--------

Wines, Brandies, Etc.

Number of wineries, 3; number of distilleries, 3; number of breweries, 3.

	Gallons.	Value.
Wine—Angelica	10,000	$5,000
Claret	700,000	175,000
Port	30,000	15,000
Sauterne	100,000	25,000
Sherry	40,000	20,000
Tokay	20,000	4,000
Zinfandel	100,000	25,000
Totals	1,000,000	$269,000
Beer (barrels)	14,000	$84,000
Brandy	200	5,000
Vinegar	40	300

Fish Industry.

	Pounds.	Value.
Salmon	1,000,000	$40,000
Cured	400,000	50,000
Cured codfish	700,000	52,500

Livestock Industry.

	Number.	Value.
Cattle—Beef	7,500	$15,000
Dairy Cows—Graded	9,200	184,000
Holsteins	210	10,500
Jersey	100	5,000
Shorthorns	300	30,000
Calves	6,000	30,000
Swine	15,000	90,000
Horses—		
Thoroughbred	100	5,000
Standard-bred	100	6,000
Common	12,000	400,000
Colts	1,000	20,000
Mules	1,500	150,000
Sheep—		
Imported or fine	1,000	10,000
Common	75,000	450,000
Lambs	60,000	120,000
Wool (pounds)	1,000,000	200,000

Dairy Industry.

	No.	Production.	Value.
Creameries	6	------	------
Skimming stations	90	------	------
Butter (pounds)		2,470,000	$450,000
Cond. Milk (cases)		10,000	20,000
Cream (gallons)		134,000	107,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	7,000	$30,000
Ducks	100	500
Turkeys	150	5,000
Eggs	600,000	118,000

Forest Products.

	Amount.	Value.
Fuel, wood (cords)	5,000	$30,000

STATISTICS OF SOLANO COUNTY, 1905-6—Continued.

Miscellaneous Products.

	Number.
Bees (hives)	600

Manufactories.

	No.	No. of Employes.	Quantity Produced.	Value of Product.
Cement (tons)	1	500	125,000	$1,250,000
Flouri'g mills (bbls.)	2	100	300,000	1,200,000
Artific'l stone	1	8	100,000	25,000

Manufactories—Continued.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Foundries and iron works (tons)	1	200	2,500	$275,000
Leather goods (sides)	3	295	315,000	2,000,000
Tanneries (sides)	3	295	315,000	2,000,000
Crushed rock (tons)	1	200	100,000	78,000

SONOMA COUNTY.

Sonoma County is bounded on the west by the Pacific Ocean, for more than 65 miles that boundary conforming to the irregularities of the shore, while on San Pablo Bay it has a frontage of 20 miles.

There is no sameness in the surface of the county. Variety is a leading characteristic. Valleys, and hills, and mountains appear to have been planned and distributed to give the best effect. The great central valley extends the entire length of the county from south to north, and commands attention by remarkable fertility. The area on which rough stone interferes with farming operations is small. Out of the area of land in the county at least 200,000 acres are valley land, the richest soil known, being a black loam; 200,000 acres are rolling or higher table-land, of an exceedingly rich alluvial brown soil, with considerable sand. This is the best fruit land. We may class 200,000 acres as foothill lands, adapted to many kinds of agricultural and horticultural products and pasturage. At least 100,000 acres of mountain land are adapted to grazing, and about 80,000 acres are covered with redwood timber of a magnificent growth.

On the coast line are several small but valuable harbors, bays, and beaches.

Sonoma Valley is about 20 miles in length, with an average width of 8 miles. It lies parallel to Petaluma Valley, from which it is separated by a range of mountains.

The streams and watercourses of Sonoma County are numerous. Russian River, the largest stream, enters on the north, flows in a southeasterly direction for 20 miles, turns Fitch Mountain, and finds its way to the lowest depression in the Santa Rosa basin, from which it breaks through a gap in the Coast Range to the Pacific Ocean. This river gathers the waters from three fifths of the area of the county.

Sonoma County, besides her great wine, fruit, dairy, stock, and other large industries, produces as much poultry and eggs as all the balance of the State put together. The advantages of the poultry and egg industry are its nearness to a reliable market, quick cash returns, and length of season. The vicinity of Petaluma is largely devoted to this industry; possibly one half of the poultry and eggs shipped from the county are from there. On an acre of ground can be raised and kept successfully 400 laying hens, the year round. These chickens, with ordinary care and attention, such as an intelligent and industrious man would give to any business, will net the owner from $1 to $1.25 a hen clear profit a year, over and above the cost of feed, which is all purchased and paid for, except such as vegetables, kale, and feed raised in the garden. With a few acres well stocked with chickens a family can make a good, independent living. The poultry business is like the banking business—cash on the spot, and there is no surer road to success than along the chicken route in Sonoma County.

Cattle are raised on a large scale, principally for dairying purposes. Our grazing land is unsurpassed. In the valley lands it requires about 5 acres per cow per year for dairying purposes; in the hill lands from

10 to 15 acres per cow. In the northern part of the county sheep-raising forms an important industry. Much of the coast region is devoted to pasturage purposes.

The moisture that rises from the ocean near the coast is absorbed by the ground, and from this fact the pastures are kept green nearly the year round, making this section the ideal spot for the dairyman and stock-raiser. The breeds of milch cows represented are mostly Jerseys, Holsteins, and Ayrshires, with some strains of Durhams, and fine American breeds. All milk used at the creameries is bought and sold by weight. In well-managed dairies the yield of butter per cow per annum is from 150 to 200 pounds.

The value of the growth of stock cattle is $10 per head per year, until the limit is reached, and this without other feed than that obtained by grazing upon lands valued at from $10 to $40 per acre.

In the production of hops Sonoma County leads the world. There is no other country that can produce the quality equal to a choice Sonoma. Nearly all other hop-raising sections, outside of a few counties in this State, are subject to crop failures, caused chiefly by vermin, mold, honey-dew, rust, red-spider, or severe storms. Such calamities are unheard of in this county. During the hop harvest the growers are favored with bright, sunshiny days. The very best quality of soil—and there is plenty of it—together with an excellent climate, is required for a successful culture of hops. In New York state hops grow on elevated land, while in Sonoma County the rich, sandy loam of the river and creek bottoms is employed. The richness of the soil, together with the adaptable climate, assures an average crop of about 1,800 pounds of dried hops to the acre. Most of the hops are shipped to Eastern and European markets, but there is a growing demand for our product in Australia, New Zealand, and the Orient.

This county produces large quantities of wheat, oat, barley, and alfalfa hay. Good hay can be raised wherever one can plow. It is harvested in May and June.

The soil is particularly adapted to oats, which many consider the most profitable of our grain crops. However, wheat, barley, and corn are extensively cultivated in every locality at a splendid profit. Corn is grown mostly on river-bottom land, and yields on an average 65 bushels to the acre.

One of the chief industries is fruit-growing. The estimated value of a fruit tree from the time it is planted to the time it comes into bearing is $1 per year. The right season for planting is during February and March. While many fruit-driers are operated, many authorities prefer the sun-drying process, which involves no expense and can always be relied upon. The sun-dried product is of superior quality and flavor, and will bring a correspondingly higher price.

The peach is a great favorite, as the trees commence to bear the second year after planting. The soil best suited to them is a sandy loam, and they may be cultivated with equal success either on the hill-sides or in the valleys. After the trees come into bearing the income will depend principally upon the care bestowed upon them. Peaches of standard size for the market are those that will fill a 2-inch hole. If larger they are called "extras," and if smaller, "seconds." The latter are mostly used for drying. All varieties of the peach thrive.

Prunes should have the best quality of soil, for the tree is a heavy bearer.

The growing of citrus fruits, though comparatively a recent industry, has gained a strong foothold, and present indications point to a steady increase in acreage.

While the olive requires a good, well-drained soil, there are many orchards that are planted around the rocky foothills. They come into bearing after five or six years. Olive culture is making rapid strides. The oil produced has established an excellent reputation, and is usually sold ahead of its production.

Sonoma County is the true home of the English walnut. It is only recently that the walnut has attracted the attention of growers in this county, but now that its possibilities as a money-maker are becoming more widely known, the acreage devoted to its cultivation is rapidly increasing, and it promises to become one of our great industries.

Sonoma is the greatest blackberry county. The blackberry season begins in the latter part of June, and runs into September. Raspberries are harvested in May, June, July, and August.

Gooseberries are a valuable product, and here are raised the largest and finest varieties.

Many strawberries are not shipped, most of the supply being used for home consumption, but those raised are of the very best quality.

Sonoma grows vegetables throughout the year, and often raises from two to three crops annually. Potatoes are grown in almost every section, attain large size, and are of the finest quality. Asparagus is particularly adapted to the soil and climate. Tomatoes are produced in great quantities for canning. String beans are also grown extensively for this purpose. Sonoma watermelons are of large size and fine flavor.

Sonoma is the largest and most important grape- and wine-producing county in the State. Her wines are justly famed throughout the world, and took first premium at the Genoa Exposition in Italy in 1892. A gold medal was awarded at the World's Fair in Chicago in 1893, and also at the Midwinter Fair in San Francisco in 1894; and the grand prize, the highest award, was given her wines at the St. Louis World's Exposition by a jury composed of twenty-one members, most of whom were French and German experts. In order to accommodate the enormous yield of its own section alone, one wine company has erected a wine tank with a capacity of half a million gallons, the largest in the world.

Tobacco-growing has made a fair start, and is one of the coming industries. The plant will thrive in almost every section, and is now quite extensively grown and manufactured in many localities, and the quality is excellent. David Hetzel has raised tobacco for many years near Guerneville.

The amount of lumber manufactured by the sawmills runs into millions of feet. A large amount of shingles, pickets, and shakes is made in the county.

John Schindler, near Melitta, has several hundred tea plants in his garden, and thinks he will be able to place his tea on the market in a year or so.

Labor commands good prices, especially competent and experienced farm hands.

Sonoma County has a large number of mineral springs.

The principal cities are: Santa Rosa, Sonoma, Petaluma, Healdsburg, Cloverdale, and Sebastopol.

The Japan current gives us unfailing rains, and regulates the temperature both summer and winter.

Compared with the East, our roads are more solid and permanent. This is due to the absence of excessive frosts, which crack and break up the hardest ground, of whatever material it is composed.

The many and varied health-giving mineral waters, fishing and hunting locations, and summer resorts, make this county a paradise for the pleasure-seeker. Thousands of visitors spend the summer living in tents pitched along the many beautiful streams and in the numerous picturesque spots.

STATISTICS OF SONOMA COUNTY, 1905-6.

General Statistics.

Area, 1,500 square miles, or 960,000 acres.

Number of acres assessed	877,395
Value of country real estate	$14,086,265
Of improvements thereon	$4,368,540
Of city and town lots	$3,768,290
Of improvements thereon	$3,797,945
Of personal property	$3,566,990
Total value of all property	$29,588,030
Number of miles of public roads	1,500
Road levy per $100, 1906	36 cts.
Railroads, steam—miles, 174.54; assessed value	$2,281,431
Railroads, elect'c, assessed value	$183,475
Electric power plants—2; assessed value	$103,220
Electric power lines—miles, 40; assessed value	$37,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	2,620	1,500	$37,500
Barley	1,520	800	12,500
Oats	5,810	2,550	51,000
Corn	870	1,200	21,600
Alfalfa hay	350	1.000	8.000
Grain hay	38,560	74,000	555,000

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		211,210	68,420	279,630
Apricot		19,920	20,110	40,030
Cherry		43,130	17,120	60,250
Fig		4,150	975	5.125
Lemon		780	150	930
Nectarine		810	120	930
Olive		61,650	40,210	101,860
Orange		9,120	1,575	10,695
Peach		247,640	69,110	316,750
Pear		78,110	20,140	98,250
Plum		6,240	1,150	7,390
Prune—French		517,450	85,670	603,120
Other kinds		45,870	4,160	50,030
Quince		1,270	365	1,635
Almond		7,540	2,265	9,805
Walnut		4,470	910	5,380
Table grapes	acres.	490	290	780
Wine grapes		17,210	4,440	21,650
Blackberries	acres.	700	----	700
Currants		50	----	50
Gooseberries		20	----	20
Raspberries		100	----	100
Strawberries		150	----	150
Loganberries		250	----	250

Fruits, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,000,000	$75,000
Asparagus	40.000	2,000
Blackberries	1,400,000	98,000
Beans	3,000	150
Cabbage	4.000	40
Celery	1,000	100
Corn	14,000	280
Currants	2,000	140
Cherries	225,000	11,250
Gooseberries	2,000	------
Lemons (boxes)	100	400
Onions	100,000	1,000
Oranges (boxes)	500	2,000
Pears	40,000,000	40,000
Peaches	10,000,000	20,000
Persimmons	1,000	500
Plums	100,000	10,000
Potatoes—Irish (s'ks)	60,000	60,000
Prunes—French	10,000,000	175,000
Quinces	10,000	200
Raspberries	80,000	4,000
Strawberries	50,000	3,000
Tomatoes	140.000	1,500
Walnuts	5,000	1.000
Loganberries	200,000	40,000

Dried—	Pounds.	Value.
Apples	2,000,000	$13,000
Apricots	2,000	150
Blackberries	40,000	3,200
Pears	10,000	800
Peaches	300,000	21,000
Plums	80.000	4,800
Prunes—French	4,000,000	300,000

Wines, Brandies, Etc.

Number of wineries, 77; number of distilleries, 44; number of breweries, 5.

	Gallons.	Value.
Wine—Angelica	288,000	$43,200
Burgundy	304,000	60,800
Cabernet	400,000	60,000
Chianti	1,500	300
Champagne	1,000	500
Claret	4,224,000	633,600
Hock	776,000	155,200
Port	8,000	2,000
Riesling	528,000	105,600
Sauterne	384,000	76,800
Sherry	168,000	42,000
Zinfandel	7,080.000	1,062,000
Beer (barrels)	16,000	96,000
Brandy	83,200	16,640

STATISTICS OF SONOMA COUNTY, 1905-6—Continued.

Livestock Industry.

	Number.	Value.
Cattle—Beef	600	$18,000
Stock	11,400	228,000
Dairy Cows—Graded	22,150	443,200
Ayrshire	20	1,000
Devon	30	1,500
Holsteins	30	1,500
Jersey	100	5,000
Red Polled	20	1,000
Shorthorns	320	16,000
Calves	5,850	58,500
Swine	2,750	8,250
Horses—		
Thoroughbred	60	9,500
Standard-bred	45	4,500
American	7,540	301,600
Common	5,110	127,750
Colts	1,780	26,500
Sheep—Imported	31	310
Graded	1,200	4,200
Common	20,960	41,920
Lambs	1,800	900
Goats—Angora	1,050	2,100
Common	1,340	2,010
Wool (pounds)	125,500	12,550

Poultry and Eggs.

	Dozen.	Value.
Chickens	42,535	$212,775
Ducks	600	3,250
Geese	400	3,600
Turkeys	500	6,000
Eggs	4,797,321	959,465

Dairy Industry.

	No.	Production.	Value.
Dairies	250	------	------
Creameries	10	------	------
Butter (pounds)	--	3,110,000	$466,500
Cheese (pounds)	--	96,000	9,600

Forest Products.

	Amount.	Value.
Sawmills (number)	10	$80,000
Charcoal (sacks)	100,000	2,500
Fuel, wood (cords)	500,000	1,000,000
Lumber—redwood (ft)	46,900,000	469,000
Pickets (pieces)	200,000	500,000
Piles	4,000	12,000
Posts (pieces)	100,000	10,000
Railroad ties (pieces)	50,000	15,000
Shakes	100,000	1,200
Shingles	15,000,000	37,500

Miscellaneous Products.

	Acres.	Pounds.	Value.
Hops	2,200	2,200,000	$300,000
Tobacco	10	------	------

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value. of Product.
Brick (thous'd)	3	100	2,500	$20,000
Brooms (doz.)	1	10	1,250	3,750
Cigars (thous'd)	9	32	1,800	54,000
Confectionery	10	20	------	------
Flouring mills	2	31	------	------
Flour (bbls.)		--	36,000	------
Meal (tons)		--	150	------
Bran (tons)		--	625	------
Shorts (tons)		--	625	------
Barley (tons)		--	5,200	------
Shoes (dozen)	2	105	9,000	230,000
Olive oil (gals.)	3	25	10,000	30,000
Planing mills	5	--	------	------
Tanneries (sid's)	6	195	203,000	963,500
Woolen mills	1	25	------	50,000

Productions Shipped Out of State.

	Amount.
Hay	65,000 tons
Oats	5,000 tons
Apples	100,000 boxes
Apricots	2,000 boxes
Blackberries	3,000 cases
Cherries	500 boxes
Currants	3,000 boxes
Peaches	30,000 boxes
Pears	20,000 boxes
Plums	1,000 boxes
Prunes—French	5,000 lbs.
Quinces	2,000 lbs.
Raspberries	1,000 lbs.
Chickens	41,580 doz.
Turkeys	490 lbs.
Eggs	497,000 doz.
Asparagus	30,000 lbs.
Beans	1,000 lbs.
Hops	2,150,000 lbs.
Onions—Dried	4,000 sacks
Potatoes—Irish	60,000 sacks
Tomatoes	1,500 boxes
Butter	3,095,000 lbs.
Cheese	68,000 lbs.
Beer	1,000 bbls.
Brandy	81,000 gals.
Lumber	44,000 M ft.
Brick	1,000 M
Cigars	5,000 C

STANISLAUS COUNTY.

Stanislaus County is near the geographical center of the State, and extends entirely across the northern end of the San Joaquin Valley, with its western edge at the summit of the Coast Range Mountains, and its eastern line extending along the foothills of the Sierra Nevadas.

The San Joaquin River, which drains the valley, traverses the county a little west of the center. Its two most important tributaries on the east are the Stanislaus and Tuolumne rivers, which, like the San Joaquin River, are navigable for the greater part of the year. The former, for some distance, forms the northern boundary of the county, while the latter flows nearly parallel to it through the center of the county. One or two small and unimportant streams find their way to the San Joaquin from the western hills.

The general nature of the land is that of a level plain, sloping gently from the foothills on the east and west, down to the San Joaquin. This condition not only assures good drainage, but also offers excellent facilities for irrigation, of which advantage has already been taken in several localities.

There are three separate irrigation systems in the county, the largest of which is comprised in the Modesto and Turlock joint districts. The former lies between the Stanislaus and Tuolumne rivers, and the latter between the Tuolumne and Merced rivers—both being on the eastern side of the San Joaquin River. Both of these districts receive their water supply from the Tuolumne River at the La Grange dam, which was built at the cost of $550,000, and they contain together over 260,000 acres of most excellent land. This water, coming from the Tuolumne River, which has the largest watershed of the San Joaquin's tributaries, is given in an endless supply by the melting of the eternal snows of the Sierra Nevadas. These districts were originated under the Wright law, by which the ownership of the water is vested in the land. Two privately owned irrigation systems are also to be found in the county. One of these lies along the Stanislaus River in the northern part of the county, and the other is on the west side of the San Joaquin River.

This great county, formerly devoted almost entirely to the production of grain, is now entering into an era of phenomenal horticultural development. This is due to the recently acquired irrigational advantages which have made possible the production of any form of vegetable life known to the temperate and semi-tropical zones. Alfalfa production and dairy industries have come to the front with surprising rapidity. At present, among the principal products of the county are sweet potatoes, nuts, grapes, oranges, lemons, and other fruits.

The county is traversed by four parallel railroads, three of which are the property of the Southern Pacific Railroad Company, the other being the transcontinental line of the Santa Fé Railroad. A fifth line, the Sierra Railroad, runs from Oakdale up into the Sierra Nevada Mountains, tapping the rich mining region of Tuolumne, and a short line, known as the Oakdale Western, connects this railroad with the Santa Fé at Riverbank.

The principal cities of the county are Modesto, the county seat, with an estimated population of 4,000, Oakdale on the eastern side of the county, and Newman on the west side of the San Joaquin River. The other towns are Turlock, Westley, Grayson, Salida, Ceres, Waterford, Montpellier, Knights Ferry, and La Grange—all centers of richly producing localities.

STATISTICS OF STANISLAUS COUNTY, 1905-6.

General Statistics.

Area, 1,486 square miles, or 965,900 acres.

Number of farms	3,090
Number of acres assessed	965,900
Value of country real estate	$9,142,695
Of improvements thereon	$987,460
Of city and town lots	$632,430
Of improvements thereon	$967,740
Of personal property	$2,268,495
Total value of all property	$13,998,820
Expended on roads, last fiscal yr.	$47,668
Expended for bridges, last fiscal year	$48,021
Number of miles of public road	673
Road levy per $100, 1906	40 cts.
Value of county buildings	$70,000
Irrigating ditches—miles, 300; cost	$587,900
Railroads, steam—miles, 120.18; assessed value	$1,865,495
Electric power plants—3; assessed value	$18,150
Electric power lines—miles, 64; assessed value	$18,700
Number of acres irrigated	46,930

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	195,600	70,500	$1,250,000
Barley	80,175	35,460	861,040
Oats	19,854	8,460	186,120
Rye	2,874	1,150	20,700
Corn	435	750	14,900
Total cereals	298,938	116,320	$2,332,760
Alfalfa hay	34,560	310,480	$1,510,480
Grain hay	------	873,470	5,461,840
Total hay	------	1,183,950	$6,972,320

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	13,560	2,160	15,720
Apricot	22,620	4,870	27,490
Cherry	6,485	1,320	7,805
Fig	49,760	98,650	148,410
Lemon	5,940	1,763	7,703
Nectarine	1,246	480	1,726
Olive	21,640	8,858	25,498
Orange	19,270	4,680	23,950
Peach	52,830	116,940	169,770
Pear	12,490	4,289	16,779
Plum	10,960	1,420	12,380
Prune	19,850	2,680	22,530

Fruit Trees and Vines—Continued.

		Bearing.	Non-Bearing.	Total.
Quince		2,810	2,290	5,100
Almond		21,640	4,890	26,530
Chestnut		3,510	1,470	4,980
Walnut		11,580	1,320	12,900
Total fruit trees		276,191	253,080	529,271
Raisin grapes	acres.	234	723	957
Table grapes		130	915	1,045
Wine grapes		576	1,164	1,742
Total acres grapes		940	2,802	3,742
Blackberries	acres.	18	----	18
Loganberries		20	----	20
Raspberries		15	----	15
Strawberries		63	----	63
Total acres berries		116	----	116

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,164,832	$58,241
Apricots	1,856,927	37,138
Asparagus	7,585	379
Blackberries	16,845	834
Beans	42,000	2,100
Beets	83,000	2,075
Cabbage	75,000	1,500
Celery	58,000	5,800
Cauliflower	17,450	1,745
Corn	26,000	1,520
Cherries	685,420	34,271
Figs	116,500	5,825
Grapes	43,960,500	439,605
Limes (boxes)	210	630
Lemons (boxes)	15,618	15,618
Loganberries	15,480	770
Nectarines	74,620	5,223
Onions	31,000	620
Oranges (boxes)	81,420	81,420
Olives	8,940	178
Pears	875,340	17,506
Peaches	4,562,810	91,256
Peas	66,940	3,347
Plums	39,460	789
Irish potatoes	140,000	2,100
Sweet potatoes	9,650,000	144,750
Prunes	1,438,560	71,925
Quinces	431,200	21,560
Raspberries	64,800	3,240
Strawberries	182,300	9,115
Tomatoes	31,705,600	634,112

STATISTICS OF STANISLAUS COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.—Continued.

Dried—	Pounds.	Value.
Almonds	896,520	$89,652
Apples	64,520	6,452
Apricots	95,140	9,514
Beans	120,400	12,040
Corn	86,400	1,728
Figs	293,500	8,805
Grapes	173,450	8,672
Onions	1,250	125
Pears	6,480	648
Peaches	82,400	8,240
Prunes	540,300	54,030

Wines, Brandies, Etc.

Number of wineries, 1; number of distilleries, 3.

	Gallons.	Value.
Wine—Angelica	2,000	$2,000
Claret	60,000	15,000
Madeira	8,000	4,000
Port	4,000	4,000
Sherry	3,000	3,000
Tokay	350	350
Totals	77,350	$28,350
Brandy	10,000	25,000
Cider	850	255

Livestock Industry.

	Number.	Value.
Cattle—Beef	7,580	$227.400
Stock	21,794	653,820
Thoroughbred	270	12.700
Dairy Cows—Graded	11,230	336,900
Dutch Belted	30	1,800
Herefords	35	2,100
Holsteins	42	2,100
Jersey	97	4,850
Red Polled	20	1,000
Calves	21,235	106,175
Swine	35,842	215,052
Horses—		
Thoroughbred	9	13,500
Standard-bred	53	5,300
Common	7,283	291,320
Colts	1,986	39,720
Mules	5,893	294,650
Sheep—Imported	150	600
Common	45,860	91,720
Lambs	20,845	20.845
Common Goats	1,683	3,366
Wool (pounds)	624,886	62,488

Dairy Industry.

	No.	Production.	Value.
Creameries	6	------	------
Butter (pounds)	--	1,585,235	$315,467
Cream (gallons)	--	7,314,145	2,461,485

Poultry and Eggs.

	Dozen.	Value.
Chickens	29,460	$147,300
Ducks	240	1,440
Geese	30	420
Turkeys	365	6,570
Eggs	412,000	82,400
Total value		$238,130

Forest Products.

	Cords	Value.
Fuel, wood	42,131	$152,786

Power used for mills and manufactories in county: Steam—number, 17; electrical—number, 11; water—number, 1, electric generator; gas—number 1, pumping plant; gasoline—number, 5.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 912	------	$912
Beeswax	2,400	600
Honey	35,000	1,250
Grass seed	500	125

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Brick	1	5	110,000	$1,100
Cigars	1	3	150,000	6,000
Confect'ry (lbs.)	4	10	2,000	200
Flouring mills (barrels)	1	152	25,000	75,000
Hides (pounds)		--	600,000	60,000
Lard (pounds)		--	750,000	75,000
Meat packed (tons)	1	17	27,500	55,000
Tallow (barrels)		--	4.000	23,500
Olive oil (gals.)	3	16	3,300	13,200
Pickled olives (gallons)		--	550	360
Planing mills	3	18	------	145,000

SUTTER COUNTY.

Sutter County is skirted on the west by the Sacramento River; on the east by Feather River; the former a navigable stream, the latter navigable only during stages of high water. The Butte County Land Company is now extending its main ditch into the upper part of the county, but irrigation from it has not begun as yet.

The Northern Electric Company is building its railroad through the northern part of the county, and will be in operation in a few months. The Western Pacific Company is building across the southeast part of the county. At present all irrigation is done by private plants.

Important industries—Agriculture and horticulture.

STATISTICS OF SUTTER COUNTY, 1905-6.

General Statistics.

Area, 580 square miles, or 374,515 acres.

Number of farms	955
Number of acres assessed	373,000
Value of country real estate	$4.220,830
Of improvements thereon	$727,375
Of city and town lots	$77,970
Of improvements thereon	$174,950
Of personal property	$875,220
Total value of all property	$6,076,350
Expended on roads, last fiscal year	$23,389
Expended for bridges, last fiscal year	$1,100
Number of miles of public roads	700
Road levy, 1906	$21,000
Value of county buildings	$41,000
Irrigating ditches—cost	$10,000
Railroads, steam — miles, 26.63; assessed value	$601,450
Electric power lines—miles, 46¼; assessed value	$23,375
Number of acres irrigated	400

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	22,763	5,235	$104,700
Barley	22,828	5,136	81,315
Oats	------	------	43,980
Corn	800	1,000	25,000
Buckwheat	400	3,000	7,500
Total value	------	------	$262,495
Alfalfa hay	1,800	5,400	$32,400
Grain hay	------	-----	104,500
Total value	------	------	$136,900

Dairy Industry.

Milk shipped to outside creameries, 200,000 gallons, valued at $19,500.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	5,500	500	36,000
Apricot	9,000	600	9,600
Cherry	3,000	------	3,000
Fig	5,700	------	5,700
Lemon	570	------	570
Olive	1,000	------	1,000
Orange	2,000	------	2,000
Peach	132,700	5,010	137,710
Pear	10,645	531	11.176
Plum	4,000	------	4,000
Prune	35,650	------	35,650
Quince	100	------	100
Almond	30,079	9,645	39,724
Walnut	150	------	150
Total fruit trees			286,380

		Bearing.	Non-Bearing.	Total.
Raisin grapes	acres.	1,800	232	2,032
Table grapes		75	----	75
Wine grapes		700	----	700
Total grapes		2,575	232	2,807
Blackberries	acres.	----	----	4
Loganberries		----	----	5
Strawberries		----	----	2
Total berries				11

Fruit, Vegetables, Etc.

	Total Production. Pounds.	Value.
Green—		
Apples	35,000	$350
Apricots	300,000	6,000
Beans	900,000	22,000
Cauliflower	2,000,000	25.000
Cherries	40,000	4,000
Grapes	2,300,000	23,000
Lemons (boxes)	100	200
Loganberries	10,000	1.000
Oranges (boxes)	5,000	2,500

STATISTICS OF SUTTER COUNTY, 1905-6—Continued.

Fruit, Vegetables, Etc.—Continued.

Green—	Total Production, Pounds.	Value.
Pears	600,000	$150,000
Peaches	8,000,000	160,000
Plums	40,000	400
Irish potatoes	400,000	2,000
Sweet potatoes	200,000	4,000
Tomatoes	120,000	1,200
Total value		$401,650

Dried—	Pounds.	Value.
Almonds	150,000	$15,000
Figs	1,000,000	30,500
Prunes	320,000	10,800
Raisins	1,200,000	96,000
Total value		$152,300

Canned—	Cases.	Value.
Peaches	38,000	$104,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	100	$4,000
Stock	61,000	80,400
Dairy Cows—Graded	3,250	82,680
Calves	2,630	25,850
Swine	5,870	16,205
Horses—Thoroughb'd	5	6,500
Standard-bred	16	1,855
Common	3,032	124,575
Colts	955	21,535
Mules	2,120	112,930
Sheep—		
Imported or fine	199	825
Common	55,250	134,555
Lambs	12,118	6,065
Total stock all kinds	146,545	$617,975

Poultry and Eggs.

	Dozen.	Value.
Chickens	3,410	$12,900
Turkeys	68	740
Eggs	170,000	61,200
Total value		$74,840

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 1,093		$1,545
Broomcorn	3,200,000	140,000
Honey	10,930	1,095
Hops	120,870	12,985
Clover seed	21,000	1,500

Manufactories.

Flouring mills, 1; number of employés, 4; quantity produced, 18,000 barrels, valued at $80,000.

Productions Shipped Out of State.

	Amount.
Barley	4,500 tons
Corn	500 tons
Broomcorn	3,000,000 lbs.
Oats	2,000 tons
Wheat	5,100 tons
Almonds	150,000 lbs.
Cherries, fresh	2,000 boxes
Grapes, fresh	100,000 boxes
Peaches, dried	20,000 lbs.
Peaches, canned	15,000 cases
Raisins	1,150,000 lbs.
Chickens	450 dozen
Turkeys	5,760 lbs.
Eggs	160,000 dozen
Irish potatoes	4,000 sacks
Sweet potatoes	500 sacks
Cheese	150,000 lbs.
Flour	15,000 bbls.

TEHAMA COUNTY.

Tehama County occupies the upper or northern portion of the Sacramento Valley. It is 200 miles north of San Francisco, and 120 miles north of Sacramento. Part of its eastern boundary follows the summit of the Sierra Nevada Mountains, and its western boundary lies along the summit of the Coast Range. Its greatest length is 78 miles; its width from north to south, 38 miles. Of its area, speaking roughly, 700,000 acres are agricultural lands, 800,000 grazing, and 500,000 timber.

Red Bluff is the county seat. It is a clean, modern little city, located upon an elevated plain, with superior drainage, and with the Sacramento River washing the foot of the bluffs at one side. Other towns are Corning, Tehama, Vina, Paskenta, and Kirkwood.

The county is easily reached, being on the line of the California and Oregon branch of the Southern Pacific Railroad. Two lines of this road converge at the town of Tehama, 12 miles below Red Bluff; one coming up the valley on the west side and the other on the east side of the Sacramento River. North of Tehama there is but one line of track. The Sacramento River is navigable to Red Bluff, and steamboats from San Francisco and Sacramento make weekly trips up and down during most of the year.

Telegraph and telephone lines follow the railroad, and several private lines are in operation.

The public school system is complete and excellent. A school is maintained wherever there is need of one.

The Sacramento River runs through the county from north to south. From this river there is a rise to the east and west until the summit of the mountain ranges is reached. South of Red Bluff and west of the river lie broad plains; beyond these rolling hills developing into the foothills of the mountains, and then the mountains themselves, which rise quite abruptly to a height of from 3,000 to 9,000 feet.

In the alluvial land along the river the soil is mainly a dark brown, almost black, sandy loam, rich and deep. The table-land to the east is so rocky as to be of no use except for stock ranges. On the west of the river the loamy lands merge into clayey loam second bottom; farther west is the sandier soil of the plains, gray, brown, and red in color; then the hills with reddish soil and gravelly loam. The creek bottoms have generally a yellowish soil. North of Red Bluff, in the hilly country, it is chiefly reddish clay and gravelly loam.

Tehama County is well watered. Numerous creeks carry streams from the mountain snows to the river. Wells can be dug anywhere to reach water at a moderate depth.

Irrigation is really not necessary, but experience has shown that plenty of water means an increase in product and variety. It is practiced to some extent, but mostly for the cultivation of alfalfa. There is a great deal of unappropriated water available for irrigation and the development of electric power, awaiting only the capital and energy to make it return a large profit.

The principal industries are horticulture, agriculture, stock-raising, and lumbering. There is practically no mining. A large deposit of chrome ore to the west, valuable sulphur springs to the east, some indifferent placer claims to the north, and the story of mining is told.

The fruit industry gives employment to a large number of people, who can engage in healthful outdoor work in summer. Several thousand persons are directly or indirectly engaged in some branch of the fruit business.

Olives are fast coming into favor as a crop and as a food. The tree grows readily and yields abundantly. The fruit brings a good price, and the demand is constant and growing. The fruit is pickled green or ripe.

Oranges and lemons do well and bear abundantly. No attempts were made to plant them in quantity until within the past few years. There are in yards all over the county numberless trees that bear profusely. Several small orchards have been planted within the last few years, but they have not yet come into bearing. The trees are healthy and vigorous.

Almonds are being grown with success.

Raisin grapes, and indeed all grapes, grow remarkably well. The raisins can be cured in the sun during the long summer days.

An immense winery is located on the Stanford ranch in the southern part of the county.

Peaches are the principal fruit. They are shipped green, and are canned and dried. The bulk of the crop is dried.

Prunes are readily cultivated and yield abundantly.

The apricot is the third fruit in importance. All the apricots are dried. The pits are sold for fuel, or for extracting the oil, which is used by druggists and confectioners.

Pears do well. The fruit is nearly all shipped green. The Bartlett is the favorite.

Figs are attracting more attention since the procurement of blastophaga, the insect which fertilizes the Smyrna fig. A great many of these trees are now being planted, and no doubt this fruit will assume a larger place in the output of the county hereafter.

Apples are grown only in the foothills. The chief apple-producing region of the county is at Manton, 35 miles to the northeast of Red Bluff, where very fine apples are raised.

Berries and all small fruits do well. They come into market early and sell readily.

In agriculture there has been a gradual change from the growing of wheat to fruit or other grains.

Hay is made from a mixture of wild oats and wheat grown together and cut when just on the point of turning. It is cured on the ground and then stacked.

Alfalfa, where water can be obtained, is the best of all forage crops. It is a splendid feed for cattle, hogs, and horses.

Experiments are being made looking toward the cultivation of hops and sugar-beets.

The stock business is carried on under conditions that differ from those of the Eastern States, and are differing from those of former years here. The owner of cattle, sheep, and goats finds it necessary to own or control two ranges: one in the valley for the winter months, and one in the mountains for the summer season. Considerable land has been withdrawn into temporary forest reserves. The number of men engaged in the stock business has greatly increased, and range land has been in greater demand as a consequence.

Sheep-raising is easily the favorite branch of the stock business. This is the principal wool-producing county of Northern California, and indeed of the State. Twice each year the buyers come here, and there is a busy time until the wool is sold. It is sometimes bought before the sheep are sheared. The favorite breeds of sheep are Spanish Merino, French Merino, Southdown, and Cotswold for wool, and Shropshire more particularly for mutton.

The cattle business is conducted in much the same general way as the sheep business, except that the animals do not require constant care and herding; there is a further difference, that nearly every farmer has at least a few head of cattle, while but few of them have any sheep. The favorite breeds of cattle are Holstein, Hereford, Jersey, and Durham.

Of late years Angora goats have come into greater favor. They are hardy animals, readily adapting themselves to a mountainous and hilly country which no other animal can occupy. They will eat almost anything, can protect themselves from wild animals, and their wool or mohair is in demand and brings a good price.

There is everywhere plenty of timber of various kinds for fuel, posts, etc., for immediate local use. Oaks are the principal trees of the valley, except along the streams, where willows, cottonwoods, and sycamores abound. Oak wood is the favorite fuel. But in the Sierras there is a magnificent belt of timber containing a great preponderance of sugar pine, which is one of the finest of timber trees. Several sawmills are located in this timber belt and most of the land, if not all, is now owned by private individuals or corporations.

The wool, lumber, stock, fruit, hay, grain, etc., can all be sold at Red Bluff. A market is always available at San Francisco; and in Red Bluff, the county seat, there are local individuals and firms ready and willing to buy all of these products that are offered. There are two large packing-houses for fruit, warehouses for wool and grain, livery stables for hay, a flouring-mill for wheat, and railroad and river means of transportation.

The large land holdings are being broken into smaller tracts to encourage immigration and settlement. The outlook is most hopeful.

STATISTICS OF TEHAMA COUNTY, 1905-6.

General Statistics.	
Area, 3,200 square miles, or 2,048,000 acres.	
Number of farms	1,200
Number of acres assessed	1,237,462
Value of country real estate	$6,550,370
Of improvements thereon	$962,165
Of city and town lots	$555,745
Of improvements thereon	$1,030,985
Of personal property	$2,171,430
Total value of all property	$11,270,695
Number of miles of public roads	500
Expended on roads, last fiscal yr.	$22,398
General Statistics—Continued.	
Expended for bridges, last fiscal year	$5,135
Road levy per $100, 1906	35 cts.
Value of county buildings	$83,000
Irrigating ditches—miles, 350; cost	$52,500
Railroads, steam—miles, 57.81; assessed value	$1,247,205
Electric power lines—miles, 55½; assessed value	$20,250
Number of acres irrigated	10,260

STATISTICS OF TEHAMA COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	38,635	20,863	$500,709
Barley	29,865	17,919	358,380
Oats	2,300	1,242	33,534
Corn	150	126	3,150
Total cereals	70,950	40,150	$895,773
Alfalfa hay	1,370	6,850	$41,100
Grain hay	35,760	35,760	447,000
Total hay	37,130	42,610	$488,100

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		18,000	650	18,650
Apricot		62,400	2,010	64,410
Cherry		4,600	470	5,070
Fig		10,350	2,775	13,125
Lemon		585	200	785
Nectarine		200	------	200
Olive		12,000	55,460	67,460
Orange		7,870	4,910	12,780
Peach		607,250	72,150	679,400
Pear		49,860	13,190	63,050
Plum		7,000	------	7,000
Prune		93,495	10,650	104,145
Other kinds		9,935	1,720	11,655
Almond		34,325	970	35,295
Walnut		3,200	300	3,500
Total fruit trees		921,070	165,455	1,086,525
Raisin grapes	acres.	175	------	175
Table grapes		100	------	100
Wine grapes		2,500	------	2,500
Total acres grapes		2,775	------	2,775
Blackberries	acres.	24	------	24
Raspberries		10	------	10
Strawberries		50	------	50
Total acres berries		84	------	84

Livestock Industry.

	Number.	Value.
Cattle—Beef	74	$2,590
Stock	26,354	368.955
Thoroughbred	202	12,120
Dairy Cows—Devon	47	2,820
Herefords	75	4,500
Holsteins	80	4,800
Calves	6,520	39,120
Swine	7,288	21,865
Horses—		
Thoroughbred	20	8,150
Common	2,391	68,020
Colts	633	13,270
Mules	1,167	116,700
Sheep—		
Imported or fine	2,003	10,115
Common	224,387	448.775
Lambs	165,000	165,000
Common Goats	18,525	32,120
Total stock all kinds	454,766	$1,318,920
Wool (pounds)	1,277,190	$217,125
Mohair (pounds)	92,625	13,894

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	879,230	$10,980
Apricots	338,101	1,690
Blackberries	72,000	2,160
Beans	96.000	1,920
Beets	5,240	219
Cabbage	75,000	1,500
Celery	3,120	156
Corn	85,000	2,550
Figs	1,035,000	2,587
Grapes	16,050,000	96,300
Loganberries	1,000	100
Nectarines	31,957	479
Onions	126,000	1,260
Oranges (boxes)	850	1,275
Olives	163,250	4,897
Pears	1,622,504	16,225
Peaches	11,907,282	59,536
Peas	35,000	1,050
Plums	375,930	1,879
Irish potatoes	865,250	4,320
Sweet potatoes	275,500	2,755
Prunes	10,739,273	53,196
Quinces	2,000	40
Raspberries	5,000	400
Strawberries	60,000	4,200
Tomatoes	200,000	4,000
Total value		$275,674

Dried—	Pounds.	Value.
Almonds	69,621	$6,962
Apricots	35,443	2,381
Beans	130,000	3,250
Chestnuts	804	160
Corn	252,000	3,150
Figs	43,000	2,150
Nectarines	3,851	308
Onions	432,562	2,163
Pears	39,130	6,104
Peaches	2,039,822	142,787
Peanuts	4,000	200
Plums	92,350	3,694
Prunes	3,513,091	105,392
Raisins	8,500	512
Walnuts	1,125	140
Totals	6,665,299	$279,353

Wines, Brandies, Etc.

Number of wineries, 1; number of distilleries, 1.

	Gallons.	Value.
Wine—Angelica	34,820	$5,220
Muscatel	44,340	6.650
Port	379,280	56,800
Sherry	104,890	15.730
Totals	563,330	$84,400
Brandy	6,000	$2,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	2,580	$10,320
Turkeys	1,856	55,680
Eggs	25,800	5,160
Total value		$71,160

STATISTICS OF TEHAMA COUNTY, 1905-6—Continued.

Fish Industry.

	Pounds.	Value.
Salmon	375,000	$18,750

Dairy Industry.

Creameries, 2.

	Pounds.	Value.
Butter	51,000	$10,200

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	85,470	------
Sawmills (number)	2	------
Fuel, wood (cords)	6,000	$30,000
Lumber—Pine (feet)	12,987,000	389,610
Fir (feet)	3,465,000	69,300
Posts (pieces)	10,000	1,000
Railroad ties (pieces)	25,000	3,125
Sash and door factories (number)	1	100,000

Power used for mills and manufactories in county: steam—number, 4; electrical—number, 1.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 215	------	$215
Honey	6,420	513
Hops	237,033	28,443
Alfalfa seed	1,069	212
Sugar beets (tons)	840	4,200

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Brick	1	7	700,000	$49,000
Cigars	2	6	220,000	11,367
Conf'tion'y (lbs.)	3	3	20,000	3,000
Flouring mills (barrels)	2	8	26,500	119,250
Foundries and iron w'ks (tons)	1	3	30	6,000
Hides		6	4,435	7,088
Lard (pounds)		3	9,500	3,950
Meat p'ked (tons)		--	35	8,750
Tallow (barrels)		--	76	798
Pickled olives (gallons)		--	11,302	2,260
Planing mills—Sash and door (feet)	1	125	9,820,000	491,000
Granite (tons)	1	2	100	4,000
Marble (tons)	1	1	35	5,500

Productions Shipped Out of State.

	Amount.
Almonds	50,000 lbs.
Apricots, dried	35,443 lbs.
Nectarines, dried	3,851 lbs.
Peaches, dried	1,921,822 lbs.
Pears, dried	39,130 lbs.
Plums, dried	92,350 lbs.
Prunes, dried	513,091 lbs.
Hops	237,033 lbs.
Brandy	25,000 gals.
Wine, sweet	450,000 gals.
Lumber	1,050 M ft.

TRINITY COUNTY.

Trinity County is oblong in shape, its greatest length running north and south for 90 miles, while its width from east to west at its widest part will not exceed 55 miles. Mountain barriers inclose it on three sides. The entire surface is, in consequence, broken, rugged, and precipitous. To this formation the section is indebted for its abundant moisture, as it is watered by numerous streams, all having their sources in the county, and flowing eventually into the ocean. Trinity River, the largest of these, rises in the north, flows south for about 40 miles, and then turns sharply to the northwest, receiving in its course the waters of many tributaries. The southern part has also many streams, and is a mass of high, rugged mountains.

Weaverville, the county seat, has an altitude of 2,000 feet, and its climate differs little from that of other places similarly located. Owing to the altitude of the county, the atmosphere is dry and pure, and the extremes of heat and cold do not cause so much discomfort as they would in less elevated regions.

Trinity is essentially a mining county, and but little attention has been paid to agriculture. Some fruit is grown for home consumption, and apples, pears, and plums do well. Berries of all kinds thrive and yield abundantly.

While it is not a fruit-growing county, along the streams and rivers, in the mining towns, and on stock ranches, are small family orchards, the chief of which are at Weaverville, Junction City, and vicinity. The apples raised are choice, and other fruits are of excellent flavor.

The area of agricultural lands under cultivation is small, the principal products being barley, oats, and wheat. Vegetables are raised for consumption in the towns and mining camps.

Nature has been most lavish in her bestowal of natural resources upon this region. A temperate climate; hills stocked with game; streams supplied with trout; mountainsides ribbed with veins of metal-bearing ores; hills, river bars, and benches covered with auriferous gravels; mountain scenery unsurpassed for beauty and grandeur; springs of pure, cold water; streams of heavy grade, with abundance of water for mining, irrigation, domestic and power purposes; forests of pine and spruce and sugar pine; stock ranges covered with abundant crops of natural grasses; agricultural lands capable, with moderate irrigation, of producing all the varieties of fruit, grass, grain, and berry of temperate climes—such are some of the gifts of nature in this section.

The industry first in importance and opportunity in Trinity County is that of gold mining in its various branches—hydraulic, quartz, and dredge. With all the mines in operation, but a small portion of the auriferous gravel has so far been worked. For the comparatively new industry of dredge mining. because of its large river bars and numerous facilities for obtaining electric power, the county offers splendid opportunities. That the river bars have the necessary values, and that they can be so worked, have been demonstrated.

In quartz mining the county offers equally as good opportunities as in placer mining. Though quartz mining is an industry which was not prosecuted in Trinity until about 1880, since that time it has been constantly followed, with most profitable results, in nearly every section. There are numerous bodies of comparatively low-grade ores which would be opened up and worked if the county had communication by rail with outside points.

Besides gold, copper, iron, platinum, quicksilver, coal, iridium, and asbestos have been found at various places; but with the exception of quicksilver, none of these metals has received much attention. The copper prospects show large deposits of that metal. The finds of platinum have been frequent, and probably would rouse more interest if miners generally knew this metal was as valuable as gold and could be saved by similar methods.

The soil, with moderate irrigation, produces splendid crops of alfalfa and red clover, and fits the county for an industry badly needed—that of the dairy and creamery. With a splendid home market for butter, cheese, ham, bacon, and lard, it is strange that this industry has not been vigorously prosecuted, for certainly there are some splendid opportunities.

Stock-raising has been, and always will be, a leading business. Fine open ranges and an abundance of water are in every part. Though feeding is sometimes required in the winter, many of the stockmen avoid this by driving their stock to the Sacramento Valley and pasturing there.

Though covered with magnificent forests of pine, spruce, and sugar pine, no use has yet been made of the timber resources beyond the supplying of home demand. In present conditions not much development of the lumber industry can be looked for until the construction of a railroad into the county.

Communication by steam or electric railroad with Humboldt Bay and the Sacramento Valley is the greatest necessity required for the development of Trinity County and its resources.

STATISTICS OF TRINITY COUNTY, 1905-6.

General Statistics.

Area, 3,000 square miles, or 1,920,000 acres.

Number of farms	260
Number of acres assessed	600.000
Value of country real estate	$2,000,000
Of improvements thereon	$250,000
Of city and town lots	$30,000
Of improvements thereon	$85,000
Of personal property	$350,000
Total value of all property	$2,715,000
Expended on roads, last fiscal yr.	$6,132
Expended for bridges, last fiscal year	$11,356
Number of miles of public roads	250
Road levy per $100, 1906	40 cts.
Value of county buildings	$20,000
Irrigating ditches—miles, 200; cost	$20,000
Mining ditches—miles, 500; cost	$1,000,000
Electric power plants—7; assessed value	$32,060
Number of acres irrigated	4,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	1,000	500	$6,250
Barley	50	20	425
Oats	200	100	2,500
Corn	200	50	1,000
Total cereals	1,450	670	$10,175
Alfalfa hay	1,000	5,000	$10,000
Grain hay	1,000	2,000	5,000
Grass hay	3,000	6,000	12,000
Total hay	5,000	13,000	$27,000

Dairy Industry.

	Production.	Value.
Butter (pounds)	50,000	$12,500

STATISTICS OF TRINITY COUNTY, 1905-6—Continued.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	5,000	2,000	7,000
Apricot	30	10	40
Cherry	500	100	600
Fig	15	10	25
Nectarine	10	------	10
Olive	2	3	5
Peach	1,500	300	1,800
Pear	600	150	750
Plum	500	100	600
Prune	800	100	900
Quince	50	10	60
Almond	15	10	25
Chestnut	50	10	60
Pecan	2	------	2
Walnut	200	35	235
Hickory	------	3	3
Total acres grapes	20	------	20
Blackberries	30	------	30
Currants	2	------	2
Gooseberries } acres.	3	------	3
Raspberries	20	------	20
Strawberr'es	20	------	20
Total berries	75	------	75

Livestock Industry.

	Number.	Value.
Cattle—Beef	1,000	$30,000
Stock	20,000	300,000
Thoroughbred	50	5,000
Dairy Cows—Graded	400	16,000
Calves	2,000	10,000
Swine	2,500	12,500
Horses—		
Thoroughbred	3	750
Standard-bred	50	10,000
Common	2,500	125,000

Livestock Industry—Continued.

	Number.	Value.
Colts	300	$3,000
Mules	300	18,000
Sheep—Common	2,400	9,600
Lambs	1,000	1,000
Common Goats	245	525
Total stock all kinds	32,348	$523,375

Poultry and Eggs.

	Dozen.	Value.
Chickens	500	$2,500
Ducks	5	25
Geese	5	40
Turkeys	100	1,200
Total value		$3,765

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	1,000,000	--------
Cedar (acres)	5,000	--------
Pine (acres)	300,000	--------
Fir (acres)	500,000	--------
Sawmills (number)	20	$20,000
Fuel, wood (cords)	10,000	40,000
Lumber—Pine (feet)	2,000,000	40,000
Fir (feet)	2,000,000	40,000
Posts (pieces)	5,000	500
Mine timbers (feet)	300,000	7,000
Shakes (thousand)	20,000	200
Total value		$147,700

Power used for mills and manufactories in county: steam—number, 10 sawmills; electrical—number, 2; water—number, 10 sawmills; 25 quartz mills—2 electric power, 10 steam power, 13 water power.

TULARE COUNTY.

Tulare County, out of which three or four valley counties have been carved, is still one of the largest. It is about the size of Connecticut, and is almost square. It is remarkable for the height and beauty of its mountains, for its enormous groves of giant sequoia, for the fertility of its soils, for the abundance of watercourses, for the variety of products, for scenery that many declare to be superior to the Yosemite, for the highest mountain (Mount Whitney) in the United States on its eastern border, for the successful citrus territory, where are grown oranges that equal the finest produced, and for being the earliest section to be settled up and devoted to agricultural purposes. It is one of the greatest stock-raising counties. Cattle are raised for meat rather than for dairying, although the latter industry is keeping pace. The glory of Tulare is its deciduous fruit orchards, all along the channels of the Kaweah and Tule rivers. The soil is a deep alluvial loam, rich in nitrates and potash, and free from alkali.

Late frosts are rare. The spring is warm and early, which gives the fruit a perfect richness and sweetness.

While irrigation is general, at least to the extent of giving the trees one good drenching a year, there are many ranches where the underflow is only 6 to 12 feet from the surface, rising even higher in spring, and therefore no artificial watering is needed.

The principal town and the county seat is Visalia. It is the oldest city in the valley, having been founded in 1852 by the brothers Vice, for whom it was named. It is a modern, well-improved, prosperous city, with every prospect of continuous active growth. In the old days it was the starting point of the overland stage, and to-day it is said of Visalia that it represents more per capita wealth than any other city of like population. Visalia is midway between San Francisco and Los Angeles, but it was not until 1897 that it was connected with the main lines of the railroad. Electric power is supplied from a mountain watercourse.

Tulare City is the second in point of size; it is about 10 miles south of Visalia. The main line of the Southern Pacific, and the Tulare-Visalia line of the Santa Fé, pass through the city. In the surrounding country, cattle, hogs, and horses are raised, and there are flourishing orchards and broad wheat and alfalfa fields. It has substantial brick buildings, on broad, beautiful streets.

The famed citrus belt of Tulare lies about 12 miles east of Visalia, and includes a series of settlements, or districts, chief of which are Lindsay, Exeter, and Porterville. This land is practically frostless. The soil is known to contain in exact proportions the elements needed for the growth of citrus trees. Freedom from fog gives immunity from insect pests, which need moisture in the air to prosper. The long, warm summer brings the fruit to maturity earlier than is the case farther south, and as a result Tulare fruit reaches the Eastern market in November and the first weeks of December, in time for the Christmas trade.

Most of the district has a plentiful supply of water in the form of an underflow—a natural reservoir at a depth of from 50 to 75 feet. It is raised by pumping. Formerly the pumps were operated by gasoline, but electricity is now available at a reasonable price. Farm houses are lighted by electricity, and the cities of Visalia and Tulare and the towns of Exeter, Lindsay, and Porterville are supplied from the same plant.

The Porterville oranges have repeatedly carried off first prizes in the citrus fairs of the State.

In the Alta district, in the northwestern part, a considerable acreage is devoted to raisins, which do well in this county, although their cultivation has not been attempted on so extensive a scale as elsewhere.

Situated midway between the cities of Los Angeles and San Francisco, the dairyman is enabled to take advantage of varying market conditions to secure the highest prices. There has been a marked increase in the dairy interests. Another noticeable gain was made in horses and mules. There is a growing demand for draft-horses and large-boned, big-muscled mules, and these animals command good prices.

Soil and climate are generally adapted to diverse products. A crop of grain hay may be cut in May, and a harvest of potatoes, squashes, Indian or Egyptian corn taken from the same field in October. Alfalfa is one of the best honey plants. It supplies poultry with green feed the entire year. Its succulent shoots promote the rapid growth of young pigs and calves. The problem of meeting bills does not confront the diversified farmer. He has always something to sell. There is no waste. The hog gets what the reaper overlooks. The chicken in turn finds what the pig misses. A vast saving in labor is effected. With the aid of his family, daily tasks, trivial in themselves, accumulate in results that materially swell the income. Nor is there either drudgery or monotony on a farm of this kind. Varied interests and changing occupations give zest to life and rob labor of its burdens.

Alfalfa hay has a broad market for shipment. Squashes, onions, and beans command good prices. Honey has an unlimited market, it being shipped East in carload lots. Poultry and eggs are higher than in the East, and their production cheaper. Berries of all kinds thrive, and meet with a ready demand in the local market.

STATISTICS OF TULARE COUNTY, 1905-6.

General Statistics.

Area, 4,863 square miles, or 3,112,320 acres

Number of farms	5,000
Number of acres assessed	1,389,083
Value of country real estate	$9,360,565
Of improvements thereon	$2,028,405
Of city and town lots	$875,149
Of improvements thereon	$1,382,920
Of personal property	$2,474,416
Total value of all property	$19,555,406
Expended on roads and bridges, last fiscal year	$57,953
Number of miles of public road	1,837
Road levy per $100, 1906	40 cts.
Value of county buildings	$144,000
Irrigating ditches—miles, 658; cost	$900,000
Railroads, steam—miles, 202; assessed value	$3,289,516
Electric power plants—1; assessed value	$64,000
Electric power lines—miles, 163; assessed value	$41,750
Number of acres irrigated	151,378

Wines, Brandies, Etc.

Number of wineries, 5; number of breweries, 2.

	Gallons.	Value.
Wine—Angelica	120,200	$48,080
Claret	5,150	1,380
Muscatel	50,000	15,000
Port	261,950	91,750
Riesling	200	50
Sherry	260,100	78,650
Totals	697,600	$234,910
Brandy	50,000	$39,000
Vinegar	300	75

Dairy Industry.

	Production.	Value.
Creameries, 4.		
Butter (pounds)	2,699,340	$702,385
Cheese (pounds)	82,400	8,240
Cream (gallon)	37,000	14,600

STATISTICS OF TULARE COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	128,982	64,712	$1,389,440
Barley	32,641	14,331	289,220
Oats	2,902	1,484	29,683
Corn	9,614	6,373	127,460
Total cereals	174,139	86,900	$1,835,803
Alfalfa hay	29,927	81,579	$356,480
Grain hay	35,945	44,122	278,143
Grass hay	2,720	2,960	14,450
Total hay	68,592	128,661	$649,073

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		24,256	11,380	35,636
Apricot		61,426	6,740	68,166
Cherry		90	485	575
Fig		9,363	14,769	24,132
Lemon		39,824	2,563	42,387
Nectarine		6,890	840	7,730
Olive		5,201	2,076	7,277
Orange		460,280	590,022	1,050,302
Peach		433,891	433,499	867,390
Pear		17,656	5,862	23,518
Plum		13,354	13,761	27,115
Prune		272,896	5,403	278,301
Quince		102	242	344
Other kinds		740	1,060	1,800
Almond		3,605	624	4,229
Chestnut		------	170	170
Pecan		------	20	20
Walnut		674	367	1,041
Grape-fruit		3,710	1,150	4,860
Limes		10	200	210
Total fruit trees		1,353,970	1,091,233	2,445,203
Raisin grapes	acres.	7,816	3,395	11,211
Table grapes		527	766	1,293
Wine grapes		939	201	1,140
Total acres grapes		9,282	4,362	13,644
Blackberries	acres.	36	2	38
Gooseberries		2	--	2
Loganberries		10	4	14
Raspberries		4	--	4
Strawberries		11	--	11
Total acres berries		63	6	69

Fruit, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples	1,338,760	$19,355
Apricots	423,460	9,917
Blackberries	45,600	1,400
Beans	20,000	460
Beets	11,864,000	26,689
Cabbage	28,000	340
Corn	6,000	120
Cherries	1,500	50
Grapes	23,413,000	176,970
Grape-fruit	11,260	22,620
Limes (boxes)	25	100
Lemons (boxes)	72,154	$120,175
Loganberries	22,050	1,170
Nectarines	36,385	740
Onions	9,550	237
Oranges (boxes)	592,422	822,205
Olives	30,000	460
Pears	140,210	2,665
Peaches	15,875,411	158,754
Peas	80,000	1,200
Plums	1,162,360	10,100
Irish potatoes	2,129,965	21,344
Sweet potatoes	136,500	1,675
Prunes	7,899,000	69,350
Quinces	750	15
Raspberries	6,125	490
Strawberries	29,800	1,590
Tomatoes	93,000	930
Total value		$1,471,121

Dried—	Pounds.	Value.
Almonds	23,760	$2,[illegible]14
Apricots	470,500	62,460
Beans	49,200	1,518
Figs	548,200	13,130
Nectarines	34,500	2,120
Peaches	2,769,650	141,405
Peas	305,500	3,055
Plums	2,550	215
Prunes	9,611,500	223,734
Raisins	6,093,300	262,360
Walnuts	8,970	835
Totals	20,517,630	$713,546

Livestock Industry.

	Number.	Value.
Cattle—Beef	16,912	$475,904
Stock	60,501	968,440
Dairy Cows—Graded	12,504	425,654
Herefords	178	6,310
Holsteins	281	10,180
Jersey	243	3,490
Polled Angus	75	4,320
Shorthorns	712	22,500
Calves	25,782	113,903
Swine	36,332	209,024
Horses—		
Thoroughbred	12	13,500
Standard-bred	94	32,800
Common	12,812	905,125
Colts	2,257	37,985
Mules	2,688	268,800
Sheep—		
Imported or fine	1,930	13,800
Common	44,314	160,456
Lambs	19,666	52,898
Angora Goats	1,010	3,855
Common Goats	704	1,155
Wool (pounds)	405,170	51,728

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 2,504.		
Beeswax	1,250	$313
Honey	94,364	4,756
Alfalfa seed	180,830	18,083
Sugar beets (tons)	10,000	45,000

STATISTICS OF TULARE COUNTY, 1905-6—Continued.

Poultry and Eggs.

	Dozen.	Value.
Chickens	13,974	$58,470
Ducks	221	1,253
Geese	96	1,020
Turkeys	920	10,101
Eggs	746,452	129,467
Total value		$200,311

Forest Products.

		Amount.	Value.
Area of timber lands	acres	191,320	$3,826,400
Cedar		2,750	------
Pine		2,580	------
Redwood		13,450	------
Sawmills (number)		5	21,300
Fuel, wood (cords)		15,083	49,909
Lumber—Cedar (feet)		501,000	4,125
Pine (feet)		815,000	15,300
Redwood (feet)		2,075,000	41,500
Posts (pieces)		17,950	1,110
Sash and door factories (number)		65	------
Shakes (thousand)		20	325
Shingles (thousand)		------	50
Total value			$3,960,019

Power used for mills and manufactories in county: Steam—1,419 horse power; electrical—1,492 horse power; water—205 horse power; gasoline—8,955 horse power.

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Flouring mills (barrels)	2	9	21,000	$100,000
Furniture	1	5	------	10,000
Hides		8	3,750	7,537
Tallow (barrels)		----	41	492
Olive oil (gals.)		----	750	1,500
Pickled olives (gallons)		----	2,610	1,626
Visalia soda wks.		----	------	5,000
Visalia ice wks.		----	------	6,000

Productions Shipped Out of State.

	Amount.
Apricots, dried	21,550 lbs.
Figs, dried	54,700 lbs.
Grape-fruit	7,745 boxes
Grapes, fresh	152,500 lbs.
Lemons	30,115 boxes
Limes	43,000 boxes
Oranges	447,486 boxes
Peaches, dried	584,460 lbs.
Plums, dried	2,000 lbs.
Prunes, dried	445,000 lbs.
Raisins	850,000 lbs.
Wine, sweet	187,300 gals.

TUOLUMNE COUNTY.

Tuolumne County is in Central California, and is known as the Southern Mines. It is 150 miles nearly due east from San Francisco, and varies in width from 8 to 12 miles. The eastern portion extends into the western slope of the Sierra Nevada range. The entire surface is of a rugged character, with many small and fertile valleys and meadows, and sloping hills heavily covered with timber.

The county seat is Sonora, on the line of the railroad, and in about the center of the county.

The Sierra Railway connects at Oakdale with the line of the Southern Pacific, extending thence 53 miles in an easterly direction to Tuolumne, at which point junction is made with the Hetch-Hetchy & Yosemite Valley Railroad, which reaches into the high Sierras, tapping the vast timber belt, and affording transportation for lumber and mining material. The railroad passes through all the large towns of the county, and makes stage connections for outlying places.

Tuolumne County has made some wonderful strides during the last few years. While the railroad has worked a hardship to some of our towns, by shutting off staging and teaming, it has been the means of bringing in many people who never would have come if compelled to travel by stage. The population has increased, the assessment roll is larger, mining machinery can be placed at the mine for less cost, and every point can be reached within twelve hours' ride from San Francisco.

The scenery is unsurpassed. The streams afford pleasure to the sportsman equal to any place in the State.

During recent years the mining industry has been steadily on the improve. While mining is the greatest factor, the timber industry is fast coming to the front. The town of Tuolumne was laid out by the West Side Flume and Lumber Company in 1899. Since then it has installed a large sawmill plant. It has a box factory, a fine hotel, a large general store with offices overhead, and its lumber yards cover a large area. It has a narrow-gauge railroad which extends into the heavily timbered mountains. Logs are placed on flat cars, and hauled to the sawmill. This town is but a quarter of a mile west of the old town of Carters, and both are surrounded by producing mines.

Some of the greatest producing mines in the State are located in Tuolumne County.

The timber belt is great in dimensions, comprising 60 per cent sugar pine, 20 per cent yellow pine, and the balance cedar and fir.

The famous Mother Lode traverses the entire western portion of the county. The foot wall of the Mother Lode is serpentine, with eruptive dikes accompanying, while mineralized slate forms the hanging wall. All east of the Mother Lode is what is known as the East Belt, upon which are situated many fine producing mines, together with prospects held under possessory title. The East Belt has made quite a record, and is the principal mining section of the Southern Mines. The following list shows some of the metals found in Tuolumne County: Gold, silver, copper, arsenic, antimony, galena, zinc, iron, amphibolite, obsidian, asbestos, manganese, corundum, barite, and marble.

The main rivers are the Stanislaus and Tuolumne, tributaries of the San Joaquin. The Tuolumne has its source entirely within the limits of the county, and may be termed the river of a thousand lakelets, although a number of these strictly come under the head of lakes. The main or principal branch of the river flows through the Hetch-Hetchy Valley. This branch, with its many tributaries, commands about three fourths of the watershed of the county. The Stanislaus River, to the north, with one of its branches, forms the boundary line of this county and Calaveras.

The water supply is ample for all requirements, being used for mining and irrigation. It is furnished by a system of dams, reservoirs, and canals.

Four miles east of Sonora is Phœnix Lake, which is the lower distributing point, covering Sonora district and the Mother Lode. At Phœnix Lake is an electric power plant, which supplies power and lights to all the principal mines upon the Mother Lode. The towns of the county are furnished with electric lights from power generated by a plant situate upon the south fork of the Stanislaus River.

In many places the soil is admirably adapted to fruit-growing, and in the foothills some of the finest apples in the State are grown. Semitropical fruits of every variety and vines are cultivated, and yield an abundance of highly flavored fruit. The almond and walnut are cultivated with encouraging results. Lemon and orange trees do well in the southern portion.

Large quantities of grapes are shipped each year, while the second class is made into wine of good quality.

The sunny, sheltered hillsides of Tuolumne County offer inducements for the culture of fruits. With the present system of water ditches, land can easily be irrigated.

Most of the stock-raisers produce sufficient hay for their own use, and considerable is raised upon small farms, also. Little, if any, is shipped out of the county. Stock-raising is controlled mostly by feed—by those who have ranges in the mountains for summer, and pastures in the foothills for winter. In the mountains in certain sections there are meadows upon which grows the finest kind of bunch grass, while upon the hillsides wild oats and timothy afford a splendid feed.

The principal towns are: Sonora (county seat), situate about the center of the county. It has an elevation of about 1,825 feet, and is considered an exceptionally good business town. There is a courthouse, absolutely fireproof, and even age can not impair it. Columbia is 4 miles to the north of Sonora. It is one of California's famous mining camps of early days. Tuolumne and Carters lie 10 miles east of the county seat, and are situate in the center of the wonderful East Belt mining district, and have an exceptionally bright future, being the terminus of the Sierra Railway, and the junction of the Hetch-Hetchy & Yosemite Valley Railroad; also the headquarters of the West Side Flume and Lumber Company.

SOME RECENT TUOLUMNE ENTERPRISES.

An irrigation system—series of dams and ditches, etc.—is in course of construction, to be completed in 1908, at an approximate cost of

$2,000,000. It will develop a flow of 3,500 inches of water in the dry season, and will furnish water to irrigate 45,000 acres for fruit-raising.

There is an electric power plant of 27,000 horse-power capacity in course of construction at Sublett's Bar, to be completed in 1908.

An irrigation system south of Tuolumne River, in the vicinity of Groveland, has developed a flow of 1,700 inches of water, and at present can irrigate about 18,000 acres. When completely developed the flow will be 3,000 inches.

Two new marble quarries have been opened. In the Bruce Quarry machinery has been installed, and they are ready to commence operations; will employ 18 men; power, steam; contemplate changing to electricity. The Baxter Quarry has machinery on the ground ready to install; will employ 10 men; power will be electricity. All three quarries of this county are within a radius of 2½ miles of the town of Columbia. The marble is very similar to that from the famous Carrara ledge; it can hardly be distinguished by experts.

An ice plant was completed at Sonora in November, 1906; capacity, 18 tons in twenty-four hours; power, steam; 4 employés.

No one yet has engaged in the poultry business, excepting on a small scale. We do not supply one half of the local demand; about seventy-five per cent of our eggs are imported. Present price: Chickens, $9 per dozen; eggs, 45 cents per dozen.

The Sonora Abstract and Trust Company is preparing the first official map of Tuolumne County. The map will show all present owners of lands and mines; also all roads, trails, rivers, ditches, reservoirs (both proposed and in use), topography, and forest reserves. It will be lithographed in two colors. Price per copy will be $10.

STATISTICS OF TUOLUMNE COUNTY, 1905-6.

General Statistics.

Area, 1,518,000 acres.

Number of farms	359
Number of acres assessed	421,782
Value of country real estate	$3,703,260
Of improvements thereon	$1,718,515
Of city and town lots	$264,105
Of improvements thereon	$524,505
Of personal property	$831,895
Of railroads	$389,920
Total value of all property	$7,432,200
Expended on roads, last fiscal yr.	$27,507
Expended for bridges, last fiscal year	$10,285
Number of miles of public roads	426
Road levy per $100, 1906	31 cts.
Value of county buildings	$123,800
Irrigating ditches—miles, 206; cost	$1,042,500
Railroads, steam—miles, 74.74; assessed value	$444,920
Electric power plants, 2; assessed value	$114,500

Poultry and Eggs.

	Dozen.	Value.
Chickens	3,140	$21,980
Ducks	55	385
Geese	18	270
Turkeys	275	6,875
Eggs	116,000	29,000
Total value		$58,510

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	196	73	$3,139
Barley	42	26	838
Oats	228	114	3,990
Corn	12	5	138
Total cereals	478	218	$8,105
Alfalfa hay	415	1,215	$19,440
Grain hay	8,700	11,682	151,866
Grass hay	265	187	1,683
Total hay	9,380	13,084	$172,989

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	15,495	10,719	26,214
Apricot	276	141	417
Cherry	318	152	470
Fig	769	78	847
Lemon	5	------	5
Nectarine	21	------	21
Olive	39	308	347
Orange	302	92	394
Peach	7,638	2,219	9,857
Pear	2,187	182	2,369
Plum	2,518	316	2.834
Prune	146	172	318
Quince	253	57	310
Almond	183	79	262

STATISTICS OF TUOLUMNE COUNTY, 1905-6—Continued.

Fruit Trees and Vines—Continued.

		Bearing.	Non-Bearing.	Total.
Chestnut		97	27	124
Walnut		765	571	1,336
Hickory		14	------	14
Total fruit trees		31,026	15,113	46,139
Table grapes	acres.	26	------	26
Wine grapes		238	27	265
Total acres grapes		264	27	291
Blackberries	acres.	18	------	18
Currants		2	------	2
Loganberries		2	------	2
Raspberries		4	------	4
Strawberries		12	------	12
Total acres berries		38	------	38

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	1,318,400	$29,664
Apricots	14,250	285
Asparagus	1.200	96
Blackberries	45,600	2,736
Beans	31,500	708
Beets	18,000	360
Cabbage	92,500	1,850
Celery	6,500	200
Cauliflower	1,450	45
Corn	125,400	1,865
Currants	3,400	275
Cherries	12,500	1,000
Figs	84,050	2,521
Gooseberries	600	42
Grapes	924,000	6,328
Loganberries	3,400	306
Onions	105,500	2,100
Oranges (boxes)	275	350
Pears	185,000	2,775
Peaches	328,000	6,560
Peas	8,000	320
Plums	60,000	900
Irish potatoes	825,000	18,565
Sweet potatoes	9,500	285
Prunes	2,600	55
Quinces	16,000	320
Raspberries	4,550	455
Strawberries	26,000	2,600
Tomatoes	122,000	2,745
Total value		$86,311

Dried—	Pounds.	Value.
Figs	3,200	$96
Onions	18,000	360
Pears	4,300	172
Peaches	12,000	1,200
Plums	6,000	360
Walnuts	28,000	2,970
Totals	71,500	$5,158

Wines, Brandies, Etc.

	Gallons.	Value.
Wine—Claret	15,700	$3,925
Port	185	93
Riesling	1,380	345
Sherry	340	170
Totals	17,605	$4,533
Beer (barrels)	704	$8,448
Brandy	700	1,750
Cider	54,200	10,840
Vinegar	2,280	570

Livestock Industry.

	Number.	Value.
Cattle—Beef	2,908	$87,240
Stock	13,617	224,680
Thoroughbred	5	800
Dairy Cows—Graded	1,070	37,450
Herefords	4	300
Holsteins	6	510
Jersey	12	1,125
Shorthorns	5	450
Calves	5,470	49,230
Swine	3,685	26,716
Horses—		
Thoroughbred	41	8,200
Common	3,612	198,660
Colts	363	5,445
Mules	154	12,320
Sheep—Common	1,470	5,880
Lambs	82	164
Common Goats	1,205	2,710
Total stock all kinds	33,709	$661,880
Wool (pounds)	1,400	$200

Forest Products.

		Amount.	Value.
Area of timber lands	acres.	275,000	------
Cedar		27,500	----
Pine		247,500	------
Sawmills (number)		7	$168,500
Charcoal (sacks)		7,250	5,075
Fuel, wood (cords)		10,800	54,000
Laths (thousand)		5,600	7,000
Lumber—Cedar (feet)		812,000	8,932
Pine (feet)		48,500,000	1,212,500
Posts (pieces)		9,500	760
Sash and door factories (number)		1	125,000
Shakes (thousand)		1,250	12,500
Shingles (thousand)		450	1,800
Total value			$1,596,067

Power for mills and manufactories in county: steam—number, 7.

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 618		
Beeswax	600	$150
Honey	9,700	970

STATISTICS OF TUOLUMNE COUNTY, 1905-6—Continued.

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Wood boxes	2	46	7,510,000	$125,000
Brick		--	300,000	2,700
Cigars	2	6	246,000	12,300
Confectionery (pounds)	2	2	2,680	$1,700
Foundries, iron works (tons)	3	10	174	14,790
Lime (barrels)	1	14	75,020	140,000

Manufactories—Continued.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Machinery	3	--	------	$16,500
Malt (tons)	1	--	28	1,400
Pickles (gals.)		--	1,200	540
Planing mills	1	124	------	280,000
Marble (tons)	1	12	3,120	37,000

The exports of lumber for the year were 23,000,000 feet.

VENTURA COUNTY.

Ventura County, one of the smallest of the group of seven southern counties, lies between Santa Barbara County on the north and west, and Los Angeles County on the south and east, on the shores of the Santa Barbara channel. The county is triangular in shape, one face of the triangle, full 50 miles, fronting the ocean.

Of its area of 1,852 square miles, less than one fourth is under cultivation. Back from the coast in all directions rise rugged mountain ranges whose hearts are pierced in every direction with cañons and valleys of varying width. The entire northern section of the county is mountainous, but between the ranges here and there are to be found little valleys whose soil is the most productive in the world.

The mountain watersheds supply innumerable streams which, flowing in different directions, form the two principal rivers of the county, from which is obtained a vast quantity of water for irrigation. These two rivers, the Santa Clara and the San Buenaventura, rise in these northern mountains, their sources being separated but a few miles. The Piru River, the Sespe, and the Santa Paula, each of considerable length from its winding through the mountain gorges and cañons, flow into and form the Santa Clara River, which enters the county on the southeastern border, and flows in a generally western direction straight across to the sea. This is a stretch of nearly 40 miles, and the stream, with its feeders north and south, becomes the life blood, as it were, of a magnificent valley covering the southern portion of the county from east to west. Beginning on the east with a width of 2 or 3 miles, the valley gradually widens until its western breadth along the seashore is about 20 miles. The valley is broken by detached mountain ridges, whose living streams not only aid in producing the inexhaustible water supply and enhance the fertility of the soil, but afford the finest scenery and most desirable health resorts.

The San Buenaventura River rises in the mountains in the northern part of the county, flows south, and enters the Pacific within 6 miles of the mouth of the Santa Clara.

The lower part of the Santa Clara Valley is a vast plain, 20 miles or more in width, extending back from the ocean in a great crescent, whose greatest distance is 10 miles from the shore. This plain for countless ages has been receiving the alluvial deposits brought down by the streams from the hills and mountains. It is the garden spot of the county, one of the most fertile tracts of land in the world, producing annually hundreds of thousands of dollars' worth of produce. Every variety of plant life does well in this section, but so well adapted is the soil to beans and beets that these are the staples.

Other products of the county—products in which it ranks with the leading counties in the State—are apricots, walnuts, lemons, and oranges, the yield of each of which is enormous. Not alone does the county boast the largest lima bean ranches, but also the most extensive walnut grove, and the largest single lemon ranch.

Its mountain slopes are covered with verdure, and in its mountain valleys are many apiaries. In a good year a vast amount of honey is produced, netting big returns to the apiarist.

The narrow stretch of coast from southern Santa Barbara County, through Ventura County and including the northern portion of Los Angeles County, is the only section in the world producing lima beans, and Ventura County is the greatest bean-producing section in the world. This season 700,000 80-pound sacks of lima beans and 30,000 sacks of small beans were produced, bringing to the farmers more than $2,000,000.

The sugar-beet thrives in this great valley, and the percentage of sugar is greater here than in any other section in the world. The culture of sugar beets supports the Oxnard sugar factory, the second largest in the world, with a capacity of 2,000 tons per day.

Many herds of cattle and sheep are to be found in the mountain sections, and stock-raising is an important industry.

The county was the pioneer oil producer in this State, and its production of petroleum is still large.

The mountains are rich in mineral wealth, the production during the past year amounting to $335,000, divided as follows:

	Quantity.	Value.
Asphalt	3,000 tons	$30,000
Clay	30 tons	45
Gold	----	1,200
Natural gas	3,831 M cu. ft.	5,000
Petroleum	375,522 bbls.	236,578
Rubble	142,150 tons	60,490
Sandstone	2,300 cu. ft.	1,380
Total value		$334,693

STATISTICS OF VENTURA COUNTY, 1905-6.

General Statistics.

Area, 1,852.66 square miles, or 1,185,704.95 acres.	
Number of acres assessed	575,143
Value of country real estate	$5,423,927 00
Of improvements thereon	$706,095 00
Of city and town lots	$712,151 00
Of improvements thereon	$654,010 00
Of personal property	$1,933,762 00
Total value of all property	$9,429,945 00
Expended on roads, last fiscal year	$45,794 84
Expended for bridges, last fiscal year	$3,378 31
Number of miles of public roads	586
Road levy per $100, 1906	40 cts.
Value of county buildings	$112,000 00
Irrigating ditches—miles, 54½; cost	$92,600 00
Railr'ds, steam—miles, 198.32; assessed value	$1,761,303 00
Electric power plants—3; assessed value	$75,584 00
Number of acres irrigated	115,482

Poultry and Eggs.

	Dozen.	Value.
Eggs	158,400	$31,680

Number of Fruit Trees and Vines.

		Bearing.	Non-Bearing.	Total.
Apple		9,000	1,600	10,600
Apricot		65,000	24,230	89,230
Cherry		1,500	------	1,500
Fig		2,500	1,000	3,500
Lemon		57,000	48,000	105,000
Nectarine		550	------	550
Olive		31,740	------	31,740
Orange		85,000	21,240	106,240
Peach		5,970	300	6,270
Pear		600	------	600
Plum		650	------	650
Prune		21,680	------	21,680
Quince		150	------	150
Other kinds		1,500	------	1,500
Almond		12,870	------	12,870
Walnut		92,650	65,000	157,650
Total fruit trees		388,360	161,370	549,730
Table grapes—acres		173	15	188
Blackberries	acres.	12	----	12
Loganberries		16	----	16
Strawberries		15	----	15
Total acres berries		43	----	43

STATISTICS OF VENTURA COUNTY, 1905-6—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	12,840	17,500	$402,500
Barley	33,270	25,000	720,000
Oats	6,500	2,250	60,750
Corn	2,800	750	18,750
Total cereals	55,410	45,500	$1,202,000
Alfalfa hay	------	1,000	$10,000
Grain hay	22,570	30,000	360,000
Total hay	22,570	31,000	$370,000

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	400,000	$4,000
Beets	364,000,000	950,000
Cabbage	4,000,000	30,000
Figs	4,400	88
Grape-fruit	28,800	960
Lemons (boxes)	119,200	350,000
Loganberries	75,000	4,200
Oranges (boxes)	167,040	309,024
Olives	2,000,000	30,000
Irish potatoes	375,000	7,500
Sweet potatoes	8,400	252
Strawberries	15,000	1,500

Dried—	Pounds.	Value.
Almonds	2,000	$150
Apricots	840,000	121,800
Beans, Lima	56,000,000	1,960,000
Beans, others	2,805,000	84,000
Onions	225,000	2,700
Prunes	300,000	--- --
Walnuts	2,300,000	230,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	3,000	$90,000
Stock	11,236	202,240
Thoroughbred	200	8,000
Dairy Cows—Red Polled	100	4,000
Calves	3,000	21,000
Swine	-----	8,700
Horses—Standard-bred	20	3,550
Common	5,380	215,200
Colts	1,030	20,600
Mules	983	58,900
Sheep—Common	25,000	100,000
Angora Goats	1,500	6,000
Common Goats	1,510	2,265
Wool (pounds)	200,000	$25,000

Wines, Brandies, Etc.

Number of wineries, 10; number of distilleries, 2.

	Gallons.	Value.
Claret wine	50,000	$15,000
Brandy	1,800	1,440

Dairy Industry.

	No.	Production.	Value.
Creameries	3	72,000	$21,600
Butter (pounds)	--	144,000	36,000

Forest Products.

	Amount.	Value.
Area of timber lands—		
Pine (acres)	50,000	------
Sawmills—No., 1	------	$3,000
Charcoal (sacks)	7,500	3,100
Lumber—Pine (feet)	60,000,000	120,000
Total value		$126,100

Miscellaneous Products.

	Pounds.	Value.
Bees (hives)—No., 12,000	------	$48,000
Beeswax	2,000	500
Honey	100,000	10,000
Sugar beets (tons)	182,000	950,000

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	1	1	------	------
Brick	3	15	800,000	$6,400
Cigars	1	2	50,000	2,000
Confectionery (pounds)	5	12	10,560	2,112
Hides (number)	--	----	6,000	3,250
Tallow (barrels)	--	----	9,600	4,608
Olive oil (gals.)	3	10	5,000	10,000
Planing mills	4	20	------	------
Sugar, Beet (tons)	1	620	36,400	3,094,000

Productions Shipped Out of State.

	Amount.
Apples, dried	714,000 lbs.
Lemons (350 cars)	119,200 boxes
Oranges	125,280 boxes
Prunes, dried	100,000 lbs.
Walnuts	2,300,000 lbs.
Beans, dried	47,040,000 lbs.
Honey	600,000 lbs.
Olive oil	1,250 gals.
Olives, pickled	16,250 gals.
Sugar, Beet	20,000 tons

YOLO COUNTY.

Yolo County is acknowledged by those at all acquainted with its wonderful fertility to be the gem of the great Sacramento Valley. Approaching it from the north or from the south, one is impressed with the increasing richness of the soil.

About four fifths of its area is level, but the western portion breaks into hills, with cañons and valleys of considerable extent, chief among which is Capay Valley, noted as one of the earliest fruit sections of the State. The hills are nearly all used for grazing, except the numerous homesteads. Along the eastern side of the county, near the Sacramento River, is what is known as the "tule basin," which contains about 40,000 acres. These lands are overflowed during high water, but as the water recedes furnish rich pasture for immense herds of stock. The county has very little waste land.

The two principal streams are Putah Creek and Cache Creek, the former being the boundary line, for a portion of the way, between Solano and Yolo counties. Cache Creek is the outlet of Clear Lake. Its elevation is 1,300 feet above sea-level, and with Cache Creek as its only outlet, it will be seen that nature has furnished a magnificent natural reservoir. It is estimated that 50,000 horsepower could be generated by its waters, and that there would be enough left to irrigate every acre of land on each side of the creek, after it reaches the valley.

During high water Cache Creek has brought down from the hills and mountains immense quantities of the very cream of the soil, and for ages has been depositing this upon the land. The result is that there is a rich sedimentary deposit of from 20 to 30 feet in depth, entirely without hardpan, which is as rich as the valley of the Nile. This is particularly true of a large area around Woodland. It is ideal fruit land. You may find growing on this soil wheat, barley, oats, corn, alfalfa, all the vegetables of a temperate and sub-tropical climate, apples, apricots, nectarines, plums, pears, peaches, prunes, oranges, lemons, limes, figs, pomegranates, grapes (table, wine, and raisin), olives, almonds, walnuts, berries, and melons. Some of these lands are better adapted to particular crops than others, yet there are eighty-acre tracts of this sedimentary soil in the valley on which everything that has been named is now produced. The foothills in the western part, from Winters to Capay, and north, as well as those bordering Capay Valley, are mostly very fertile, and a great many have planted orchards and vineyards, the warm soil and exemption from frost making it a very desirable location.

The products are varied. Until within a few years, the cultivated area was devoted almost entirely to the production of wheat and to stock-raising. Yolo still holds the banner as the largest producer of wheat and barley, according to acreage, but in the meantime she is coming to the front as a fruit-producer.

The grape industry is a very important item. Yolo has the honor of producing the first raisins of commerce in America, and the late R. B. Blowers was the pioneer grower. The Seedless Sultana grape, which is grown here quite extensively, makes a very plump and "meaty" raisin, and for years the Woodland Sultanas have been acknowledged by the trade to be the best in the State. The shipment of table grapes to the New York market is quite an industry.

This county is noted for producing some of the fastest horses in California, and any day, on the streets and roads, can be seen fine specimens of driving horses. Woodland has been a center from which thousands of horses and mules have been shipped during the past few years, and they have gone to all parts of the country, notably to Hawaii, the Philippines, South Africa, and the Southern States.

There are thousands of acres of alfalfa, and the area is rapidly increasing. As each acre will yield from six to eight tons of hay, it can readily be seen how important the dairy interest may become. For stock of any kind there can be no better feed than alfalfa, either green or cured for hay.

The county seat is Woodland. Its streets are wide and clean, and lined with shade trees, while here and there can still be seen some of the majestic old oaks which suggested the name of the city.

Winters is located on Putah Creek, in the southwestern part of the county, and is noted as the earliest fruit section in the State.

Davisville, also located on Putah Creek, is in a very fertile section. There are probably more almonds grown here than in any other district in the State.

Yolo is on Cache Creek. It is also in a very fine fruit section, and boasts of having the largest almond orchard in the world. It has an olive-oil and pickling plant. The olives used for oil are first dried, and then run through a mill, which separates the seed from the pulp, the latter being then pressed to extract the oil. It is claimed that this process gives an oil of superior flavor, and is the only mill in existence which uses this process. The olives, after being dried, can be stored away and will keep in that condition for an indefinite time, thus giving the mill the entire year in which to work up the product.

Esparto is near the mouth of Capay Valley, on Cache Creek. It is surrounded by a fine body of land, largely devoted to fruit, vines, and alfalfa. It is quite a shipping point for wheat and barley.

The Woodland Chamber of Commerce, the Winters Board of Trade, and the Guinda Board of Trade are active public organizations.

The Legislature of 1905 made an appropriation of $150,000 for the purchase and equipment of a University Farm and to provide instruction in agriculture in connection therewith. This farm has been located upon a tract of about 780 acres of first-class valley land contiguous to the town of Davisville. The Legislature of 1907 appropriated $132,000 for additional buildings, equipment, etc. Courses of instruction are in preparation. (See page 53.)

STATISTICS OF YOLO COUNTY, 1905-6.

General Statistics.

Area, 1,017 square miles, or 650,880 acres.

Number of farms	1.710
Number of acres assessed	597,313
Value of country real estate	$10,387,963
Of improvements thereon	$1,023,795
Of city and town lots	$808,875
Of improvements thereon	$1,428,415
Of personal property	$2,011,115
Total value of all property	$15,660,163
Expended on roads, last fiscal year	$2,535
Expended for bridges, last fiscal year	$56,105
Number of miles of public roads	700
Road levy per $100, 1906	40 cts.
Value of county buildings	$60,000
Irrigating ditches—miles, 300; cost	$100,000
Railroads, steam—miles, 87.80; assessed value	$1,427,644
Electric power lines, 1—miles, 71½; assessed value	$40,425
Number of acres irrigated	7,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	80,000	42,660	$1,066,500
Barley	150.000	112,500	2,137,500
Oats	1,200	50	1,250
Corn	------	51	1,224
Total cereals		155,261	$3,206,474
Alfalfa hay	15,200	75,000	$375,000
Grain hay	18,000	14,250	128,250
Total hay	33,200	89,250	$503,250

Number of Fruit Trees and Vines.

	Bearing.
Apple	1,050
Apricot	185,000
Cherry	6,250
Fig	4,200
Lemon	1,500
Nectarine	320
Olive	19,885
Orange	9,200
Peach	149.000
Pear	55,600
Plum	1,200
Prune	120,000
Quince	325
Almond	122.300
Chestnut	1
Pecan	100
Walnut	3,000
Banana	1
Other kinds—	
Trees	2,500
Vines	50,000
Total fruit trees	678,932
Raisin and table grapes (acres)	1,800
Wine grapes (acres)	1,000
Total acres grapes	2,800

Fruit Trees and Vines—Continued.

		Bearing.
Blackberries	acres.	6
Gooseberries		1
Strawberries		3
Total acres berries		10

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	19,000	$350
Apricots	376,500	9,412
Asparagus	18.375	735
Blackberries	20,000	600
Beans	50,000	1,500
Beets	35,500	1,240
Cabbage	216,250	3.243
Celery	43,000	860
Cauliflower	46,000	920
Corn	123,500	617
Gooseberries	7,000	245
Grapes	16,756,900	167.569
Lemons (boxes)	36	112
Olives, pickled (gals.)	3,500	2,100
Olive oil (gals.)	950	2,375
Oranges (boxes)	. 2,250	1,125
Olives	240,000	7,200
Pears	1,867,000	37,340
Peaches	3,256,950	56,996
Peas	43,300	1,515
Persimmons	500	20
Plums	864,600	25,938
Irish potatoes	200,000	1,500
Sweet potatoes	10,000	150
Prunes	1,200,000	12,000
Strawberries	5,000	250
Tomatoes	572,500	5,735
Total value		$341,647

Dried—	Pounds.	Value.
Almonds	465,857	$69.878
Apricots	92,627	14,357
Beans	12,700	317
Figs	1.522,295	38,057
Onions	215,000	4,300
Pears	26,835	2,415
Peaches	674,667	67,466
Plums	7,290	164
Prunes	2,222,186	49,990
Raisins	832,154	33,286
Walnuts	350	35
Totals	6,071,961	$280,274

Canned—	Cases.	Value.
Apples	100	$270
Apricots	3.300	9,900
Cherries	200	900
Grapes	480	1,080
Pears	200	640
Peaches	11,000	3,300
Plums	600	1.320
Tomatoes	11,000	1,705
Totals	26,880	$19,115

Forest Products.

	Amount.	Value.
Fuel, wood (cords)	2,000	$11,000

STATISTICS OF YOLO COUNTY, 1905-6—Continued.

Wines, Brandies, Etc.

Number of wineries, 1; number of breweries, 1.

	Gallons.	Value.
Wine—Claret	5,000	$2,000
Muscatel	58,460	35,076
Sherry	34,785	20,871
Totals	98,245	$57,946
Beer (barrels)	2,100	$12,600

Fish Industry.

	Pounds.	Value.
Salmon	375,000	$37,500
Other kinds	450,000	31,500
Totals	825,000	$69,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	721	$18,025
Stock	9,190	125,740
Thoroughbred	500	25,000
Dairy Cows—Graded	5,910	155,800
Calves	2,630	26,105
Swine	11,125	33,445
Horses—		
Thoroughbred	50	4,945
Standard-bred	508	25,410
Common	4,630	138,905
Colts	609	12,185
Mules	2,801	168,080
Sheep—		
Imported or fine	1,500	7,540
Common	43,560	108,915
Lambs	1,775	1,775
Angora Goats	2,550	7,000
Total stock all kinds	88,109	$858,870
Wool (pounds)	350,000	$49,000
Mohair (pounds)	10,200	2,500

Poultry and Eggs.

	Dozen.	Value.
Chickens	5,584	$25,128
Ducks	92	414
Geese	75	675
Turkeys	664	1,394
Eggs	342,520	68,500
Total value		$96,111

Dairy Industry.

	Production.	Value
Creameries, 2.		
Skimming stations, 3.		
Butter (pounds)	779.660	$148,135
Cheese (pounds)	182,500	27,375
Cream (gallons)	34,715	52,072

Miscellaneous Products.

	Pounds.	Value.
Bees (hives) No., 1390	------	$5,170
Honey	72,000	5,760
Hops	1,903,380	264,775
Alfalfa seed	26,000	3,900
Sugar beets (tons)	733	4,010

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Cigars	2	6	312,000	$14,060
Confectionery (pounds)	1	5	34,000	8,500
Flouring mills (barrels)	1	20	52,615	236,765
Machinery	1	6	------	6,000
Meat prod'cts—				
Fresh meat (pounds)		----	1,294,572	103,565
Hides (pounds)		----	231,760	23,176
Lard (pounds)		----	55,200	60,720
Meat packed		75	------	22,500
Tallow (barrels)		----	1,127	18,032
Stock shipped out (cars)		----	200	213,700
Pickles (gals.)		----	2,400	960
Sandstone (cu. ft.)		----	75	------

Productions Shipped Out of State.

	Amount
Almonds	465,857 lbs.
Apricots, fresh	376,500 lbs.
Apricots, dried	82,627 lbs.
Grapes, dried	1,510,295 lbs.
Peaches, fresh	3,202,950 lbs.
Peaches, dried	634,667 lbs.
Pears, fresh	1,855,000 lbs.
Pears, dried	24,835 lbs.
Plums, fresh	864,600 lbs.
Plums, dried	7,291 lbs.
Prunes, fresh	1,200,000 lbs.
Prunes, dried	2,222,186 lbs.
Raisins	798,742 lbs.

YUBA COUNTY.

Yuba County comprises about 105,000 acres of valley land, 100,000 acres of foothill land, and 195,000 acres of mountainous land. It extends from the Feather and Bear rivers to high in the Sierras, and is centrally located in the Sacramento Valley. In the mountains lumbering, mining, and stock-raising are the leading industries. The mining industry is receiving more attention than at any other time in the past. In the valley, at the edge of the foothills, dredge mining has become quite an industry; at present there are ten dredges at work on the Yuba River.

Yuba is a great county for agricultural pursuits. When the soil and climatic conditions are considered, the land will produce almost any kind of a crop. At present it is devoted chiefly to grain and stock raising, but there are many orchards and vineyards which are thriving. Poultry-raising has also been found to be a very profitable industry.

Marysville, the county seat, is the principal town, and is a wholesale center of some note, having excellent transportation facilities in all directions by rail and stage. It has one of the largest and best equipped woolen mills on the coast, also a large and well-equipped flouring mill, and six machine shops for the manufacture of centrifugal pumps of all sizes. There is at present in course of construction a large machine shop and foundry for the manufacture of dredge and all kinds of mining machinery.

The Western Pacific Railroad is building into and through the City of Marysville, as is also the Northern Electric Railroad. The latter road is about completed between Marysville and the towns of Oroville and Chico, and the company is now constructing its roadbed from Marysville toward Sacramento. A survey for an electric railroad has been completed from Marysville to Grass Valley, Nevada City, and Auburn, and the road will be built as soon as the necessary rights of way have been secued.

STATISTICS OF YUBA COUNTY, 1905-6.

General Statistics.

Area, 625 square miles, or 400,000 acres.

Number of farms	900
Number of acres assessed	380,508
Value of country real estate	$2,492,920
Of improvements thereon	$470,280
Of city and town lots	$420,940
Of improvements thereon	$936,485
Of personal property	$1,288,935
Total value of all property	$5,609,560
Expended on roads, last fiscal yr.	$15,000
Expended for bridges, last fiscal year	$20,000
Number of miles of public roads	427
Road levy per $100, 1906	40 cts.
Value of county buildings	$81,000
Irrigating ditches; cost	$146,000
Railroads, steam; assessed value	$524,904
Electric power plants—1; assessed value	$164,000
Electric power lines—assessed value	$54,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	13,780	2,480	$59,520
Barley	5,605	1,401	28,020
Oats	4,530	1,369	34,125
Corn	10	6	150
Total cereals	23,925	5,256	$121,815
Alfalfa hay	655	1,637	$13,096
Grain hay	8,400	16,800	151,200
Total hay	9,055	18,437	$164,296

Poultry and Eggs.*

	Dozen.	Value.
Chickens	2,628	$10,554
Turkeys	150	3,420
Eggs	130,000	26,000
Total value		$39,974

STATISTICS OF YUBA COUNTY, 1905-6—Continued.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	400	1,090	8,490
Apricot	15,000	4,100	19,100
Cherry	10,000	3,000	13,000
Fig	4,000	2,000	6,000
Lemon	3,700	2,100	5,800
Olive	8,000	1,800	9,800
Orange	33,800	29,600	63,400
Peach	61,300	27,000	88,300
Pear	17,600	3,100	20,700
Prune	21,300	5,600	26,900
Almond	5,000	700	5,700
Walnut	2,100	560	2,660
Total fruit trees	189,200	80,650	269,850
Raisin grapes (acres)	165	15	180
Table grapes (acres)	70	20	90
Wine grapes (acres)	350	45	395
Total acres grapes	585	80	665

Fruit, Vegetables, Etc.

Green—	Total Production, Pounds.	Value.
Apples	50,000	$5,000
Grapes	5,000,000	55,000
Pears	350,000	8,750
Peaches	800,000	14,000
Prunes	400,000	2,000
Tomatoes	80,000	360
Total value		$85,110

Dried—	Pounds.	Value.
Almonds	50,000	$6,250
Apricots	300,000	9,000
Pears	80,000	8,000
Peaches	100,000	8,000
Prunes	400,000	14,000
Raisins	100,000	2,500
Totals	1,030,000	$47,750

Canned—	Cases.	Value.
Pears	1,100	$3,300
Peaches	14,000	42,000
Tomatoes	1,200	1,800
Totals	16,300	$47,100

Dairy Industry.

	Production.	Value.
Butter (pounds)	400,000	$100,000
Cream (gallons)	1,500	2,000

Forest Products.

	Amount.	Value.
Area of timber lands (acres)	17,369	$57,540
Sawmills (number)	2	5,500
Lumber—Pine (feet)	1,800,000	37,800
Total value		$100,840

Power used for mills and manufactories in county: Steam—number, 2 (sawmills); electrical—number, 5 (1 flour mill, 1 woolen mill, 2 planing mills, 1 ice plant); water—number 1.

Livestock Industry.

	Number.	Value.
Cattle—Stock	12,251	$122,515
Thoroughbred	1,112	33,355
Calves	570	2,850
Swine	2,542	5,085
Horses—		
Thoroughbred	20	4,000
Common	3,718	70,360
Colts	670	6,700
Mules	819	16,375
Jacks and Jennies	10	1,260
Sheep—Common	32,947	65,895
Lambs	------	240
Common goats	1,430	2,860
Total stock all kinds	56,089	$331,495

Miscellaneous Products.

	Pounds.	Value.
Hops	------	$37,560

Manufactories.

	No.	No. of Employés.	Quantity Produced.	Value of Product.
Bookbinderies	2	2	------	$6,656
Carriages and wagons	2	5	21	3,400
Cigars	3	6	175,000	12,000
Confectionery (pounds)	2	5	------	30,000
Flouring mills	1	15	------	------
Foundries and iron works	1	12	------	8,000
Furniture	1	8	------	1,200
Leather goods	3	8	------	15,000
Machinery (hydraulic)	1	3	150	6,000
Malt (tons)	1	4	60	13,000
Meat products—				
Hides (po'nds)		----	60,000	4,800
Lard (pounds)		----	50,000	5,000
Meat packed (pounds)		----	50,000	5,000
Tallow (lbs.)		----	30,000	1,050
Planing mills	3	----	------	43,500
Woolen mills (yards)	1	137	404,556	300,000
Horse collars (dozen)	1	1	60	2,000
Ice (tons)	1	6	300	12,000
Soda waters	1	----	------	7,500

One brewery makes 2,000 barrels of beer, worth $13,000.

Productions Shipped Out

Almonds	[illegible]
Apples, fresh	[illegible]
Grapes, fresh	[illegible]
Peaches, dried	[illegible]
Peaches, canned	[illegible]
Pears, fresh	[illegible]
Pears, dried	[illegible]
Pears, canned	[illegible]
Prunes, dried	[illegible]
Quinces	[illegible]
Beans, dried	[illegible]
Tomatoes, fr[illegible]	[illegible]
Tomatoes, [illegible]	[illegible]
Flour	[illegible] bls.
Cucumb[illegible]	[illegible] boxes.

REPORT

OF THE

CALIFORNIA
STATE AGRICULTURAL
SOCIETY

FOR THE YEAR 1907

SACRAMENTO:
W. W. SHANNON, : : : : SUPERINTENDENT STATE PNIRTING.
1908.

STATE BOARD OF AGRICULTURE, 1907.

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REPORT

OF THE

STATE AGRICULTURAL SOCIETY.

To His Excellency JAMES N. GILLETT,
Governor of the State of California.

SIR: We take pleasure in submitting herewith the fifty-fourth Annual Report of the California State Agricultural Society. Besides a summary of the receipts and expenditures of the Society for the past year, this report contains statistical data from fifty counties of the State, including some partial figures from San Francisco, and a number of specially prepared articles by able writers on different subdivisions of the State, besides articles on leading subjects of public interest from an industrial standpoint. These articles, together with the descriptive matter relating to the different counties and the facts and figures that are supplied by the county statisticians, afford a compilation that ought to be of interest as the best exponent of California's industrial conditions available. Yet, it is not all that it should be. The Act of 1897, amended in 1905, which provides that the Supervisors of the different counties shall, on or before the first day of November of each year, supply the State Agricultural Society with certain statistics, etc., is a move in the right direction, but thus far it has not fully met the objects desired. In the first place November is not a good time of the year to obtain reliable data. At this season the fruit canners, the wine makers, the raisin packers, the fruit driers and the vegetable growers are not through with the season's work, and the best they can do is to give a guess at their total annual business. Indeed, manufacturers in all lines have no account of stock at that time, and have to roughly estimate their output or ask the statistician to wait until they make up an accounting of their business at the end of the calendar year. In the second place, while the law is mandatory there is no penalty attached for noncompliance with its provisions, and some Boards of Supervisors persist in ignoring it, and however reliable the data sent in by those who try to comply with the statute on the subject, the report compiled by this Society must necessarily lack that value which attaches to anything that is complete. In the third place, the reports of many of the local statisticians show on their face a lack of thoroughness, while still others show an evidence of guesswork. In one instance a well-paid statistician of one of the leading counties of the State that prides itself on the quantity and quality of its olive oil, made no return of this industry whatever, and yet the oil of that county is practically all made in one district not many miles from the home of the statistician, and nearly any grower in that district could have told him, practically to a gallon, the annual output of the county.

The carelessness of statisticians can only be remedied by the Supervisors paying fair compensation and demanding good work. Crude as are some of the reports, however, they are on the whole an improvement on the reports of a year ago, as they in turn were an improvement on the reports of the preceding year. We notice, with few exceptions, that where the same statistician is continued in the work there is the most improvement. While two counties which sent in reports last year failed to report this year, four counties appear in the list this year that heretofore have not reported. Even under the present imperfect law, therefore, we must conclude that some improvement is manifest, but we hope we may be permitted to suggest that the question of reliable statistics is of such far-reaching importance to our industrial and commercial interests as to justify the consideration of any amendments that give promise of perfecting the service. If the present general system is retained it can be improved by changing the date when the report must be made from the first of November to the first of January, and by attaching a penalty clause for non-compliance with its provisions on the part of Supervisors. These changes would be simple and easy. If made, however, then the time when the report of this Society must be filed with the Governor ought to be changed accordingly, say from the first of February to the first of March. But the thought suggests itself that perhaps an entirely new system can be devised for collecting county statistics which will be more thorough and much more reliable, and at the same time but little if any more expensive. The Secretary of this Society has made inquiry by personal visits to and correspondence with other state agricultural societies as to their methods of collecting crop reports and other industrial statistics in their respective states, and is impressed that the Kansas system is preferable to that of any state in the Union. It is accepted as authority by the United States Government, and has given the agricultural society of that state a national reputation for the wealth of facts and figures contained in its reports. We have not the Kansas statute before us, but we know in substance that the county assessors are made the statisticians, that they are required either in person or by deputy to make a house to house canvass, and that besides assessing the property holders and the agents or representatives of non-resident holders, they are required to obtain from them full and complete answers in every line of inquiry on which the state board of agriculture may desire information. The blank questions are prepared by the board of agriculture and turned over to the assessors, and the law makes it their duty to see that the questions are answered direct and in full by every property holder or his representative, and it imposes a penalty on those who refuse to answer or who answer falsely. These blanks when filled out are returned to the secretary of the state agricultural society, and from them he compiles his state tables of statistics and those tables are about as nearly correct as anything human can be, giving the number of acres cultivated to any crop, the bushels of grain raised of any kind, the cattle or horses or sheep or hogs owned of any breed, and the articles manufactured and the value thereof of any character.

Our assessors are already required to obtain certain statistical data, a duty which is perfunctorily performed, and whether it would cost any more to have them do the work thoroughly than is now paid by the counties to special statisticians is a question, but regardless of whether one system or another costs a few dollars more or less, California ought to have the best. What is worth doing at all is worth doing as well as it can be done. The importance of this subject, not so much from the standpoint of this Society as from a public standpoint, is our excuse for thus dwelling on it so fully.

While the Society should be, and aims to be, useful in the line of collecting and disseminating valuable information and otherwise stimulating industrial endeavor and improvement at all times and in all seasons, its great function is the holding of Annual State Fairs for the purpose of showing the best efforts of the stock breeder, the farmer, the miner, the artisan and the artist; in other words, for the purpose of illustrating by object lesson the best efforts of the most progressive people in all lines of endeavor, as a mark of our advancement and as a lesson to the inquirer and a stimulus to all to try and reach the standard set by the objects in the show.

Many conditions tended for a time to detract from interest in these Fairs that the breeders, producers, manufacturers and the people generally ought to take, not least of which was a tendency to devote an undue amount of consideration to the racing features and the sporting that attended them. The pool box and the bar were sources of much revenue to the Society, and a fear of the consequences of losing this revenue was no doubt the cause of pools and the bar being tolerated longer than they otherwise would have been. But while these flourished, the exhibitors in industrial lines grew gradually less, and the attendance and corresponding gate receipts decreased. The Fair fell into disrepute and the people at large lost interest.

This was the situation when at a meeting of the Board of Directors in August, 1906, after full consideration of the situation, a motion was passed to abolish all book making and pool selling from the grounds of the Society, to cut out all privileges for strong drink, and to refuse return tickets at the gates to such patrons as might be disposed to patronize these features on the outside. This was a radical move, and many expressed the opinion that it would result in the death of the Fair. We admit that the struggle against the antagonisms thus created, coupled with the fact that the State had not yet recovered from the shock caused by the San Francisco disaster, and the further fact that the Society had no means to put into the work of exploitation, required the most strenuous efforts on the part of the management to keep the State Fair of 1906 from falling below the level of its immediate predecessors. This was accomplished, however. The Fair was held, its livestock department showed a slight improvement over the Fair of the year before, the Pavilion exhibits were more and better, the attendance was better, and the receipts from the Fair were enough to cover the cost of the Fair, leaving nothing, however, for current expenses or future work. This situation was represented to the State Legislature which convened the following January, and evidently impressed with the representations of the Society that it was desperately in earnest in its desire to abolish the abuses of which the people had complained, and realizing its need of assistance to carry on the good work, it appropriated $5,000 to be used exclusively for advertising and exploiting the succeeding State Fair. This money was used as shown by bills which met the approval of the State Board of Examiners, and are on file presumably with the State Controller, and the wisdom of the appropriation is shown by the results. The State was worked for exhibits in all departments, from San Diego to Siskiyou, and from the ocean to the mountains, and while an adverse feeling and lack of confidence was encountered almost everywhere, yet we succeeded in assembling one of the best displays of the State's resources that was ever made in California. The number of exhibits were only limited by our capacity to accommodate them. The Pavilion was filled from wall to wall, on main floor and gallery, with displays of industrial and artistic merit and educational value. The machinery department overflowed until it covered all the ground space we could secure outside without appropriating the sidewalks and streets, blooded cattle filled the stalls and many had to be shown in corrals, the horse barns were filled, while sheep, goats and swine were exhibited in goodly numbers. An operating exhibit of milking machines was made at the Park, while a new poultry house contained one of the best displays of chickens, turkeys, ducks, geese and pigeons that had been seen at a State Fair for some years. A good racing program was carried out, and other attractions were presented for the entertainment of the people. It was a good Fair, taking the past as a standard, and was brought about by tact, work and means to work with. The attendance, however, was not equal to the merits of the show, and consequently the receipts of the Fair were little more than the cost of the Fair, leaving only about $500 to apply on our back debts. In other words, the current expenses of the Society dating from the close of the Fair of 1906 to August 1, 1907, about the time we began to get ready for the 1907 Fair, had accumulated to approximately $2,000, while on October 1st, after paying all premiums, purses, and other expenses of the Fair, our indebtedness was reduced to about $1,500. It will be seen, therefore, that the Society is not financially strong; indeed, it is financially weak.

The Directors and management are ambitious and would like to build the State Agricultural Society into a strong instrumentality for the benefit of the State and make of its Fairs a great annual conclave where all the people will assemble and bring with them their products and their handiwork, and enjoy a season of rest and study and good fellowship; where they can learn from one another the best that is doing in their respective lines, and thus by contact and comparison raise the standard of endeavor and thereby the intellectual and industrial standard of the State. But it will be difficult, if not impossible, to do this without means to work with. They should have a better equipment and more financial assistance from the State, by way of helping to put the Society fully on its feet. With an appropriation for a few years that would enable them to increase their premiums and make a thorough canvass of the State for the purpose of securing exhibits and arousing interest among the people, they could hold a series of Fairs that would be more nearly commensurate with the richness and resources of California. After a few such Fairs the confidence that is now lacking regarding their merit and efficiency would be restored, and with popular confidence once regained the attendance would swell to such proportions as would make them thereafter largely, if not entirely, self-supporting. Other states have gone through an era of depression such as we are trying to emerge from, and the turning point came with them when the State went to the rescue. After a few years of state liberality they were in a position where they did not longer have to lean on its strong arm. California has the resources, and we believe we are working on the right lines for their best exploitation, and with proper encouragement we shall hope to see the State Agricultural Society become a powerful instrumentality for the advancement of all industrial interests and the upbuilding of the State.

Very respectfully,

B. F. RUSH, *President.*

ATTEST:

J. A. FILCHER, *Secretary.*

FINANCIAL STATEMENT.

FEBRUARY 1, 1907, TO JANUARY 31, 1908.

SUMMARY.

RECEIPTS.

1907.			
Feb. 1—	Cash balance	$579 11	
	Park and Pavilion receipts	40,511 65	
	Races	8,784 00	
	James Whitaker, special treasurer	2,660 00	
	Premiums	15,054 15	
	Rent	1,873 30	
	Fixed events	2,825 00	
	Profit and loss	25 20	
			$72.312 41

DISBURSEMENTS.

	Expense	$25.525 88	
	Races	14,914 00	
	Salaries	5,430 00	
	Payrolls	9,822 84	
	Advertising	1,590 95	
	James Whitaker, special treasurer	625 00	
	Premiums	11,153 95	
	Entrance due	2,285 00	
1908.			
Jan. 31—	Cash balance	964 79	
			$72,312 41

THE SACRAMENTO VALLEY.

By O. H. MILLER, Secretary Sacramento Valley Development Association.

The Sacramento Valley is pre-eminently an agricultural section. Dame Nature, in her wonderful distribution of blessings, lingered long over this valley and left here a combination of conditions which make it one of the great producing sections of the country. I call this a "producing section" because the things that come from the soil are real wealth which never before existed.

The almost wonderful producing ability of the lands of the Sacramento Valley are dependent upon three things—climate, soil and water. The climate is healthful and invigorating, and is Nature's free gift to all comers. It is a climate that makes the seeds and sprouts spring up early n the year and send forth buds and leaves, and later an abundance of luscious fruit. The soil is as fertile and productive as any, and may still be had at prices and upon terms within the reach of any and all persons. There is an unfailing supply of water, which has its origin in the snowcapped mountains surrounding the valley, and which finds its way from the lofty peaks down through the canyons until it reaches the broad plains, where it is frequently used for irrigation, and later drained into the Sacramento River, a large, beautiful and navigable waterway extending the length of the valley.

The floor area of the Sacramento Valley is approximately 3,000,000 acres, which is larger than the entire state of Illinois, the greater portion of which is subject to cultivation. On either side of the valley rise foothills, which later blend into splendid mountain ranges. In the valleys which extend up into these foothills and mountains are to be found some most charming locations, where all manner of trees and vines thrive and give their owners a handsome profit upon their investment. Farther back into the mountains may be found mines of precious metals and stones, as well as structural and industrial materials of many kinds. It was in these mountains that the first gold was discovered in California, and now this section produces the greater portion of the $30,000,000 worth of minerals annually taken from the ground in this State.

These mountains abound in mineral and medicinal springs of valuable healing powers, and they are also the "campers paradise." The Sierra Nevada Mountains, which bound the Sacramento Valley on the north and east, are frequently referred to as the "Switzerland of America," so beautiful and impressive are the scenic effects.

But to speak further of the valley.

Some four years ago the United States Department of Agriculture decided to establish at some point in this country, a National Plant Introduction Garden, where could be taken all of the new discoveries made by the Government explorers in their travels through all portions of the world. The needs of such a station required that the location be where all manner of plant life would flourish to the best advantage, a place where the water, soil and climatic conditions were as near ideal a they could be found. After a diligent survey of the entire United State a location was at last selected near Chico, Butte County, in the Sacramento Valley, as being the most suitable of any place in the country fo such an institution, which is destined in time to become one of the mos important adjuncts of the United States Department of Agricultur and is proof enough that this section leads as an agricultural region.

Soon after the establishment of the Federal Plant Introductio Garden, the State of California provided for a University College Far to be maintained in conjunction with the State University. Out of total of sixty-seven sites offered for this farm one was chosen at Davisville, Yolo County, also in the Sacramento Valley.

While this is naturally an agricultural section of superior quality, i also possesses many other advantages which must appeal to the perso who is looking for a place to locate. The transportation facilities, whic consist of river, steam railroads and electric railways, enable the producer to place his crop in the markets at the minimum of time an expense. They also make it possible for one to live on a farm and a the same time enjoy all of the opportunities for society that exist in th cities, for, with electric cars and their rapid and frequent service, on may travel either to or from his home whenever he desires.

And then there are the markets: With nearly a million population i San Francisco, Oakland, Alameda, Berkeley and the other cities aroun the bay, beside Sacramento, Portland, Seattle, Reno, Salt Lake, Lo Angeles and the many smaller places, there is a continuous and eve growing demand for all manner of farm products. It would be a difficult matter to find any section of the West as well equipped as regard markets for farm products as is the Sacramento Valley.

There is ample opportunity in the valley for the man or woman i any walk of life who is seeking a new location. Here may be foun almost any condition that may be desired. So fertile and productive i the soil that any industrious family may not only make for themselve a good living on twenty acres, but also lay aside money. Irrigation while not necessary except in intensified farming and where crops ar rotated, is doing a great deal towards enabling the farmer to reap bette returns from his land. Many large holdings have been subdivided an are now being placed on the market in small tracts. Many of thes places are under irrigation, and the water is furnished at prices ranging from 75 cents to $5 per acre per year—an inconsiderate amoun where needed to secure the best returns. The prices of land are lov considering its marvelous earning power, and it is sold on terms whic make it possible for any ordinary family to own a home in this favore portion of the earth.

THE SAN JOAQUIN VALLEY.

By ARTHUR E. MIOT, Secretary Tulare County Board of Trade.

Spread before you a map of California. At the juncture of the Sacamento and San Joaquin rivers draw a line east and west from the ierra Nevada Mountains to the Coast Range, and follow southward etween the two mountain ranges for a distance of almost 250 miles to here the Tehachapi range intersects, and you have the great San Joauin Valley.

This vast area is subdivided into the counties of San Joaquin, Stanisaus, Merced, Maderá, Fresno, Tulare, Kings, and Kern.

To gain a comprehensive idea of this wonderful section, consideration ust be given to its topographical formation as well as to its geographial location. When nature flanked the eastern portion of the valley with he towering peaks and yawning canyons of the Sierras it did a marvelus thing. In the lower altitudes the mountain sides form a water shed hat starts the rivers and streams on their journey to the foothills and lains, while the peaks and canyons of the upper range form a resting lace and receptacle for the snows of the higher altitudes, thus providing mighty reservoir to feed the streams during the long dry summers that ollow the winter rains.

Geologists tell us that in the beginning of time the rivers and streams ssuing from the mountains confined themselves to no particular chanel, but for centuries roamed here and there over the face of the land, epositing their burden of silt and decomposed granite, thus forming he deep alluvial soil that predominates in the valley.

This theory seems to be borne out by the fact that all through the valey there are to be found small areas of black and red adobe soil similar o the soils of the foothill region that lies above the wash of the streams. The eastern portion of the plains, adjacent to the foothill region, is a ontinuous strip of red and black adobe and dry bog soil. At the delta f the San Joaquin River are many acres of peat land.

These distinctive soils, with their various formations, mixtures and radations, give a multiplicity of soils which are adapted to the proluction of practically all the agricultural, horticultural and viticultural roducts that are of commercial value. The topographical formation f the valley not only gives us our soils, but is largely responsible for limatic conditions.

Here altitude has a greater influence on climate than latitude. With he crest of the Sierras capped with perpetual snow, and the trough of he valley basking in almost perpetual sunshine, we have every climate from the subtropics to rigorous Maine. These conditions, combined with varied and fertile soils, make the San Joaquin Valley a region of wonlrous productiveness.

Here, as in all western America, the prospector and the stockman blazed the way of civilization, followed by the grain rancher; but the reign of each was short, for the man who takes from the land and gives little or nothing in return must give way to the scientific and intensive tiller of the soil.

Twenty years ago the San Joaquin Valley did not produce enough fruit for home consumption, and truck gardening and dairying were, as a rule, unknown and unpracticed. Now, according to the latest statistics taken, there are in the eight counties 5,254,228 fruit trees and 145,097 acres of vines. The value of the product, exclusive of home consumption, was $16,521,146. The dairy products amounted to $6,637,782. The value of the livestock industry was $22,860,000, and the cereal output amounted to $28,000,000, giving a grand total of $74,018,928 for the four leading agricultural pursuits, which gives us, in round numbers, a producing capacity of $500 per capita, exclusive of manufacturing and all other industries, and this is only the beginning of things that are to be.

Irrigation has, of course, been the principal factor in all this development, and we can dimly grasp the future possibilities of the great San Joaquin Valley when we read from the Government report: "There are more acres of irrigable land in the San Joaquin Valley than are now watered in Egypt from the Nile, where agriculture alone supports over five million people, maintains a costly government, and pays the interest on a national debt half as large as that of the United States."

In recent years there has been a concerted effort by some to substitute the name "Central California" for "San Joaquin Valley," based upon the assumption that the word "valley" conveys to the outside world the impression of a small and circumscribed territory. Perhaps the assumption carries with it some degree of truth, but I have never known this interpretation to be given to the Valley of the Nile, the Arkansas Valley, or the Mississippi Valley. However, be this as it may, so long as the mountains stand, and the San Joaquin River flows onward to the sea, we will have the Great San Joaquin Valley, and the day is not far distant when the world will fully realize its true value and wonderful opportunities.

SOUTHERN CALIFORNIA OPPORTUNITIES.

By FRANK WIGGINS.

Mr. Griffith of Whittier, Los Angeles County, reports returns of $5,000 from five acres of lemons.

Charles Frieburg, of Toluca, reports returns of $1,175 from two acres of peaches. This land will sell for from $200 to $500 an acre.

Two hundred and thirty members of the Tropico (Los Angeles County) Berry Growers' Association report returns of $211,663 for the crop of 1907, raised from 1,200 acres. Some reports show $500 net per acre to the grower.

A. Lobingier, of San Gabriel, Los Angeles County, took $2,700 in one season from one acre of strawberries, and $5,000 from three acres.

Mrs. A. S. Green, of Los Angeles County, netted $300 per acre from two crops of sweet potatoes grown on five acres.

D. G. Alpin, of Imperial Valley, took a profit of $703 last season from one acre of grapes.

S. C. Gridley, of Nordhoff, Ventura County, sold the first crop from one third of an acre of egg plant for $300.

J. G. Cortelyou, of Imperial Valley, received $10,000 last year from 200 acres of alfalfa.

Mrs. J. L. Coles, of Los Angeles, netted $904.52 from two acres on which she kept 700 white rock chickens.

John Kortz, of Ventura County, received $15,000 from 150 acres of peaches, the buyer assuming all risks in gathering the fruit.

Mr. Gammell of Coachella, Riverside County, bought four breeding hogs for $50. In twenty months the $50 had increased to $1,400.

W. P. Mansfield, of Brawley, Imperial County, nets $40 an acre from alfalfa.

The cantaloupe growers of Brawley netted from $300 to $458 an acre.

J. F. Roth, of Brawley, netted $100 an acre from potatoes, $125 from tomatoes, and $75 from beans.

John Benn, of Ventura County, from 80 acres lima beans sold a crop last year for $6,400, and afterwards sold the ranch for $32,000.

Orange orchards pay from $75 to $100 an acre after the fourth year; $200 to $400 after the seventh year, and sometimes $500 or more after twelve or fifteen years.

Orange County reports returns to the grower of from $1,600 to $1,800 per acre in the cultivation of chili peppers. This vegetable is coming into more general use and the demand increasing yearly.

The apple orchards in Julian, San Diego County, Yucaipe, San Bernardino County, and Antelope Valley, Los Angeles County, bring returns of from $200 to $500 per acre, with increasing demands yearly.

We make a specialty here in southern California of homemaking opportunities which provide a profit while the homemaking process is still under way.

It seems to me that the foregoing list is the best and most practical answer that could be given any one who should wish to know whether the opportunities are all gone.

It will be observed that the instances quoted cover cases where new ground is broken, as in the Imperial Valley, and also where a considerable outlay of money is required—where the orchards and farms are already in full bearing.

The instances cited might be multiplied indefinitely, and they are all recent. While they cover leading branches of horticulture and agriculture, to go into other branches would only swell the list.

Intensified farming, diversified farming—these are at their best in southern California. The homeseeker may take his choice of oranges, lemons, alfalfa, walnuts, almonds, cattle, hogs, poultry, strawberries, peaches and apricots, grapes, melons, tomatoes, potatoes, celery and what not, the whole gamut of truck farming, each according to his experience and inclination, and as he has funds. He may buy a full bearing orange grove or walnut orchard; he may set out the young trees and wait several years for an income; or he may take other land and make a crop and get an income the first year. Why, there is a little bank in Brawley, in the Imperial Valley, with a capital of only $25,000, with deposits of $250,000, all received from the cantaloupe crop of 1907!

So much has been said from time to time in a general way about the homemaking opportunities in southern California that I wish particularly to show that the opportunities are constantly being developed and increased. The extension of irrigation, both by means of artesian wells and by water brought from a distance, is adding constantly to the area of cultivated land in southern California. Especially is this true in the districts between the mountains and the sea in Los Angeles County. For instance, large areas formerly given over to pasturage and the cultivation of grain have, with the development of an ample supply of artesian water, been cut up into five-acre and ten-acre tracts and devoted to intensive and diversified farming.

It is expected when the great Owens River project is consummated there will be a large excess supply of water over the quantity needed for domestic use, which can be used for the irrigation of small farms within a radius of fifty miles or more from Los Angeles. This will, of course, add largely to the cultivated area.

The most notable instance of irrigation by water brought from a distance is seen in the Imperial Valley, which was formerly a part of San Diego County, and a great portion of which lies below the level of the sea, about sixty miles west of the Colorado River.

Nearly eight years ago work was begun on a canal system which should bring the waters of the Colorado into the valley. This system is completed and has been in operation for several years. So enormous and so favorable have been the results that the new county of Imperial, a small empire in itself, has been organized out of the desert. Water was not delivered into the valley until June, 1901, yet to-day the population is from 12,000 to 15,000 and is growing rapidly. In 1907 the valley shipped products valued from $2,500,000 to $3,000,000. About 250,000 acres are at present under cultivation, and a railroad has been built through the center of the valley. The flourishing towns of Brawley, Imperial, El Centro, Heber, Calexico, Silsbee and Holtville have sprung up. All this has been accomplished in seven years in a desolate spot where not one useful thing was growing.

The long-talked-of railroad from San Diego to Yuma, Arizona, will soon be constructed, opening up a vast area rich in minerals, and gigantic in its possibilities with proper irrigation.

Then, too, the constant extension of the great electric railway network in the territory immediately tributary to Los Angeles not only opens up new areas for cultivation with proximity to a profitable market, but increases also opportunities in other lines of production, and in commercial and industrial activities. The past year has seen the extension of the Huntington electric line to Covina, and a new line to Glendora has just been completed. The picturesque Eagle Rock Valley has been made a suburb of Los Angeles. It is a question of only a short time when the Huntington system will be extended to Pomona, and then to Riverside. A few years more will doubtless see Los Angeles connected by a modern electric railway system with both Santa Barbara and San Diego.

Millions are to be spent in modernizing the Los Angeles-Pacific electric railway system which connects Los Angeles with the western seacoast towns.

All these improvements will, of course, tend to stimulate land cultivation and the quantity and diversity of the productions, and present, in proportion, opportunities to the homeseeker.

Manufacturing naturally centers in Los Angeles, and while this city has not yet become a great industrial center it has made long strides in that direction.

There are now in Los Angeles 1,700 manufacturing establishments, against less than half that number three years ago. Capital invested approximates nearly $35,000,000; the average number of employés is 20,000, with an annual payroll of $15,000,000. The output for 1907 is estimated at $50,000,000.

There are many excellent openings for additional manufacturing establishments, and the market is growing constantly.

The building of the Salt Lake road has opened a vast territory tributary to Los Angeles and southern California, with a corresponding increase in industrial and commercial possibilities.

The rapid increase in population (25,000 yearly in Los Angeles city alone) of itself creates a large number of industrial and commercial openings, especially stimulating the building trades. As the population increases and the surrounding country becomes more and more settled, a larger and better home market is created.

There are also industries peculiar to southern California, by reason of its location and climate, which can be developed nowhere else. These invite the attention both of home capital and newcomers, and produce large results.

Opportunities for homemaking in southern California are greater than ever before. The development of agriculture, horticulture, manufactures and commerce has created new openings, and planted the busy life of the great southwestern empire upon a solid foundation which yearly grows more substantial.

THE COUNTIES NORTH OF THE BAY.

By FRANCIS HOPE.

The counties north of the Bay of San Francisco offer attractive inducements to the homeseeker, settler and tourist. They comprise Marin, Napa, Sonoma, Mendocino, and Lake, while north again of these are Humboldt and Del Norte. In all this vast territory irrigation is not necessary, everything growing naturally and spontaneously, there being sufficient natural rainfall to insure good crops. A drought or failure of crops has yet to be recorded. There are no arid lands to reclaim, no desert to subdue; but it is a land of balmy air and a soil teeming with luscious fruit, rich grain and verdant forests. It is a land of gardens surrounded by parks, and has been well named "The Garden Spot."

To reach these counties you have to cross the bay. In doing so one of the first things you notice is Mount Tamalpais, in Marin County, which rises to a height of 2,300 feet direct from the Pacific Ocean. Up its sides runs a scenic railroad, which boasts in being "the crookedest in the world." At its feet nestle the pretty valleys of Mill and Ross, which have become popular for suburban homes and are connected with the city by rapid transit. Marin County is a place of cozy retreats and delightful homes. San Rafael, its county seat, has long been known as an aristocratic home of cultured people and is the second richest town per capita in the State. The great industry of the county is dairying, it being the second dairy county of the State, but of late years more attention has been paid to fruit growing and poultry culture.

Immediately north of Marin lies Sonoma County, which by its delighted people is called "Imperial Sonoma," because of the variety and vastness of its resources. It is an independent empire within itself, where everything needful for its own use can be raised, from a turnip to the spineless cactus. It also holds many world records on special products. Here is the chosen home of Luther Burbank, the great horticulturist, who has lived at Santa Rosa, the principal city of the county, for 32 years, and produced here his marvelous creations. Santa Rosa has also given to the world the two fastest trotting horses, Lou Dillon and Sonoma Girl. The "City of Roses," again, is the center of the hop growing industry of California, and over 60 per cent of the hops of the State are grown in this vicinity. In the southern part of the county we find the largest chicken center in the world—Petaluma. This town receives an income of $1,500,000 from the sale of eggs, often sending 1,500 cases to the city in one day. The "White Leghorn City" is now becoming a prominent factory town, and is showing great activity. During the last two years it holds a record of a new factory a month. Its population has risen from 3,000 to 7,000, and at the moment of writing has over 100 new houses in course of construction. In the northern part of the county, in the great vineyard country, is found the Italian-Swiss Colony, whose wines are famous the world over. Near it is the pretty little town of Cloverdale, with its annual citrus fair, where oranges among the earliest are raised. In the east is the largest petrified forest, and in the west, at Sebastopol, is the great blackberry and Gravenstein apple section. In fact, in whatever direction you go in Sonoma County, you find something unique and wonderful. Through the center flows the beautiful Russian River, whose banks are covered with campers during the summer months, and whose bottoms are as fertile as the Valley of the Nile. Driving along a road, a gentleman on one day saw farmers engaged in the following operations: planting potatoes, cocking hay, pruning hops, planting corn, digging potatoes, filling a crib with ripe corn, and gathering strawberries. Query, What time of the year was it?

Napa County has been called the county of stone bridges because all its bridges are built of the light lava rock quarried from the nearby mountains, which gives an appearance of permanency and great beauty. It might also be called the county of quality, for though the area is small the products are unsurpassed. This is especially true of its wines, which are noted for their bouquet and flavor, and are especially sought after by wine men to blend with wines coming from other parts of the State. From $2 to $5 a ton extra is paid for Napa Valley grapes. Napa prunes and other fruits maintain the same high reputation. Another big industry is the raising of early cherries; a man near Napa last year made over $1,100 an acre from his cherry orchard.

In passing through the Napa Valley one is struck with the prodigality of nature and the luxuriant way everything grows; it is a regular riot of trailing vines and flowering shrubs. Another interesting point is the great variety and range of the products, for growing side by side with the hardy redwoods and pines are to be seen the pomegranate, lemon, orange, date palm and other semi-tropical fruits, a sight not to be seen in many places. The landscape is of great beauty, and even in summer stands forth fresh and green in all its wealth of undimmed foliage. The houses veil themselves with vines, roses cluster about the porches and the wisteria climbs adventurously to the eaves. The whole scene is homelike, peaceful, and restful. The roads are continually winding, and the view shut in by groves and hills so that the eye is delighted with a continuous succession of small landscapes of captivating loveliness. The electric line has now been completed to St. Helena, bringing this romantic vale within easy access of San Francisco.

In going over into Lake County one has to take the stage, for as yet no railroad enters the district, though there are good prospects of one being built in the immediate future. Lake County is called "The Switzerland of America" because of the beauty of its scenery. In the center stands Clear Lake, a body of fresh water 25 miles long and 8 miles wide. At the center of the lake stands Uncle Sam mountain, so-called because it presents that profile against the sky. By the Indians it is called Konocti, the word meaning "horse-upside-down," because of the peculiar white patch on its side, which looks like an inverted horse and is to the Indians a mystic sign. Immediately north of Clear Lake is a chain of three beautiful lakes, two of which are called Blue Lakes from their intense color, the other being called Laurel Dell. The great industry around this portion of the county is the raising of green beans, said to be the earliest and finest in the State. Three canneries are in operation, but last year they received five times as many orders as they could fill. San Francisco takes the whole output. The farmers make from $100 to $150 an acre growing these beans in the rich sediment soils of Scott's Valley. In the Big Valley district, and southern part of the lake, the Bartlett pear is grown to perfection and profit. Lake County abounds in a multiplicity of hot and cold mineral springs, famous for their healing properties. Beautiful resorts and fine hotels have been erected in connection with these springs, which attract over 50,000 tourists annually. The altitude of the lake is 1,200 feet, making the climate especially good for all bronchial troubles—asthma disappearing as soon as people get there. The hills are filled with deer and other game, and the lake is stocked with fine fish, affording abundant sport to the angler and pleasure seeker.

There are many opportunities in the county for the profitable investment of capital in the development of natural gas, quicksilver mines, fruit canning, apple drying, and bottling mineral waters. Lakeport, the county seat, is a town of 1,330 inhabitants, and is destined to become much larger on the advent of the railroad.

Mendocino County is 85 miles north of San Francisco. It is twice the size of the state of Delaware, and has over 100 miles of coast line. The lands are generally fertile and productive; the climate delightful and healthful. Outdoor labor goes on all the year round. The coast is dotted with fine homes, dairy ranches, and bustling saw mills of great capacity. In the Ukiah and adjacent valleys all kinds of deciduous fruits are raised, and every kind of general farming is carried on. The wine grape is successfully grown in the foothills and mesas. Ukiah is the county seat, with a population of 3,500, a thriving town, and a large distributing center. North of Ukiah is the busy town of Willits, known as the "Gateway to the Redwoods," for north of it is the largest forest of redwood in the world, 200 miles long and 50 miles wide, the largest trees being found in Humboldt County. The railroad is now under construction from Willits to Eureka, which will give Humboldt County a through line to San Francisco, and will make Willits an important railroad center, as another line will soon be in operation from there to Fort Bragg, on the coast.

The vast territory of Humboldt and Del Norte counties extends again north for 150 miles along the coast and nearly 50 miles inland. Besides the unparalleled belt of redwood timber it is a region rich in minerals. Untold deposits of copper offer an attractive field for both capital and labor. Humboldt is also the banner county of the State for dairying, the value of dairy products being close on $4,000,000 last year. The county has also the record for the largest production per acre of oats and corn. Stock raising is carried on under the most favorable conditions and the natural grass pastures are covered with herds of cattle, sheep and hogs. Fruit of all kinds does well, and strawberries and raspberries are in abundance. With the fine and equable climate, healthful conditions, and undeveloped resources, this territory presents an inviting opportunity to the capitalist and to the man of small means.

SAN FRANCISCO.

Her Present Situation and Future Prospects.

BY ARTHUR R. BRIGGS.

The year 1906 is a memorable one in the history of California and of San Francisco. What occurred April 18th and the three days immediately following is not only ineffaceably impressed on the minds and grafted into the experience of those who were witnesses of the destruction wrought, but is a part of the history of catastrophes over the entire country and throughout the world. It was but natural that many erroneous statements were made soon after the fire, and that early predictions as to the rehabilitation of the city and the ultimate effect of the catastrophe were made without any proper basis of calculation. These opinions and utterances came largely from irresponsible sources, made with assumed knowledge and with earnestness that carried weight not merited. Even at this late date, twenty months after the fire, in the face of unmistakable evidence of vigorous growth and almost unparalleled industrial and commercial activity, misstatements in respect to conditions in San Francisco are being published. From the first there was no reason to doubt that the rebuilding of the city would be quickly accomplished. By reason of distance from the base of supplies, lack of established facilities for procuring men and material, and the unsettled financial condition, it took a little time to adjust the needs to the new situation. But the great forces that recognize no obstacle, that press forward the wheels of progress, are behind San Francisco—as they are behind all great commercial centers. The State as a whole, the Pacific Coast and the commerce that naturally centers here, gave expression to a demand for the speedy rebuilding of the stricken city. The people declared with one voice, we will rebuild and in a few years make a city greater in extent, more beautiful, and more durable than the one which was destroyed.

Within a few months the wheels of commerce, domestic and foreign, were set in motion with surprising activity. All branches of trade were adjusted to the new order of things, and, despite temporary disadvantages, have been conducted as though no fire had occurred. With the finances of the city on a sound basis, the commercial and savings banks unquestionably in strong condition; with the insurance situation fairly well settled, from which nearly $200,000,000 was released and put in use for rehabilitation; with mercantile and manufacturing interests again established, and with a foreign commerce going on as though no interruption had occurred; with the water, light, and sewer systems restored, and the facilities for transportation throughout the city renewed, there followed naturally the demand for permanent rebuilding and improvement.

The city for a time after the fire presented a unique appearance, with its temporary structures situated in the midst of an extensive area of magnificent ruins. The year 1906 closed with a good record of high class business structures, already constructed or under process of construction, scattered here and there on the principal streets on sites that have for years been conspicuous. The record for the nine months after April last is told in the statement that building permits during that period, for permanent structures alone, aggregated $35,000,000. This has been augmented each week at the rate of about $1,500,000. Scores of the most prominent business buildings that withstood the fire are now restored and occupied or are nearing completion. The buildings already constructed stand as monuments to the energy of the men who are devoting their money and their zeal to the rebuilding of the city.

A visitor from the city of Baltimore, who is entitled, by his position, to speak on the subject, recently said: "In looking over San Francisco I find no reason for thinking the work of reconstruction is not progressing in a most creditable manner. Where a large district is to be rebuilt, the work of reconstruction can not, to the casual observer, make much impression in a few months. Much preparation had to be made before building began. Most of these preliminaries have now been completed."

What has been already done is but a forecast of what may reasonably be expected for the future. This prediction finds substantial support in a late compilation made by Labor Commissioner W. V. Stafford, showing the increase in the number of men in San Francisco engaged in the building trades on January 1, 1907, over the number likewise engaged on January 1, 1906. Summarized it is as follows:

January 1, 1906—All building trades, skilled workmen....	14,466
January 1, 1907—All building trades, skilled workmen.....	28,459
A gain of........................	13,993, or 99.14%

Of this number the largest gain was in carpenters, or against 3,067 January 1, 1906, there were 9,802 January 1, 1907, a gain of 6,735, or 219.57 per cent. To this should be added a gain of about 2,000 in special lines of carpenter work, including millmen, etc., identified or affiliated with the union. This record is for unionized labor, the non-union men not being shown in the Commissioner's report. There is also a marked gain in the number of skilled laborers in other branches. On January 1, 1906, the record shows an aggregate of 402 union bricklayers in the city; January 1, 1907, the number was increased to 1,806, a gain of 1,404, or 349.25 per cent. This exhibit of increase in the number of skilled laborers employed in building trades is an indication of what is going on in the way of reconstruction. Rebuilding, when considered as a whole, seems a gigantic undertaking, but when reduced to units, each one doing for himself that which is suited to his means and his needs, the situation is simplified and the future presents a different outlook.

As indicating the activity and volume of business in the city, brief reference to figures again may be interesting. The bank clearings for the year 1906 aggregated $1,998,400,770. The total clearing for October last is reported as the largest in any single month in the history of the city.

In forecasting the future of San Francisco, two principal factors should be considered, viz: confidence and financial ability. Of the first there is no lack, demonstration of which is found in the progress already made and in the plans projected. Where the money for rebuilding is to come from may very properly be considered. Assuming that the fire destroyed $500,000,000 of property, the sum necessary to replace it must be provided before reconstruction is fully accomplished. What, then, is the source from which this vast sum is to come?

First, is the sum realized from insurance, aggregating in round numbers	$200,000,000 00
Next, the foreign capital that will come here to rebuild buildings, owned abroad, without reference to the money that is coming and will come for new investments (estimated)	25,000,000 00
Total	$225,000,000 00

This leaves an apparent loss to be made good of $275,000,000. Has the State an earning capacity sufficient to supply the deficit fast enough to meet the requirements in the speedy rebuilding of San Francisco? Let the following exhibit of the average annual earning capacity of the State answer the question, viz:

Minerals (including petroleum)	$48,000,000
Fruits and vegetables	50,650,000
Dairy products	22,250,000
Hay	31,800,000
Livestock	34,000,000
Cereals	39,650,000
Poultry and eggs	12,250,000
Wine and brandy	8,000,000
Beet sugar	6,600,000
Potatoes, beans, etc.	9,500,000
Hops	1,800,000
Hides and wool	5,800,000
Lumber	72,000,000
Sundry products not enumerated	15,000,000
	$357,300,000

From this exhibit, which does not count the manufacturing industries and the many unclassified sources, the yearly earnings are nearly, if not quite, equal to the deficit or net loss to the State from the fire of April 18, 1906. It is therefore reasonable to believe that the money for rebuilding will not be wanting. Money seeks centers of profitable investment, and San Francisco presents rare opportunities. Nor should the fact be lost sight of that the population of the State is continually on the increase, and that larger population means increased earning capacity. The movement of people in search of homes and investment is from the east westward. The development of the State at large promises to be more rapid in every branch of industry in the years to come than has been experienced in the past, and with development comes constantly increasing growth of the principal city to keep pace with the demands of trade and commerce.

As has been truly said, for individual enterprise, ability and strength, the men of San Francisco stand in the front rank: collectively they lack cohesion in matters of public interest, but in the rebuilding of the city they stand as a unit.

Since the above was written there appeared in a publication by the Atchison, Topeka & Santa Fe Railway from the pen of the same writer the following, which is added as a further, and in some particulars a fuller statement with respect to San Francisco. It is by permission appended:

The scene presented from the tower of the Ferry Building, or from any of the prominent view points in San Francisco at the present time, is calculated to change a pessimist into an optimist, in respect to what has been accomplished in rebuilding San Francisco during the twenty months ended December 31, 1907. It would also make of the natural optimist an enthusiast as to the present condition and the near future of the city. If similar growth had come under normal conditions it would be the wonder of the world. Why should it be less wonderful when the development has been made in the face of a combination of obstacles the like of which had not hitherto been known?

During this period about 12,000 buildings have been erected or improved. These comprise in construction, Class A, Class B, Class C, and frame buildings, 8,436 in all, and structures remodeled 3,354, which, as a whole, represent an expenditure of $95,000,000 to $100,000,000.

This may not express as clearly the growth as the further statement that the fire of April, 1906, destroyed 28,200 buildings, three tenths of which in number, and greatly superior in description and capacity, have already been replaced by more modern ones, and that the value of the new structures is more than twice that of those they replace.

This has been accomplished in spite of municipal corruption, grasping and selfish methods on the part of labor, impaired confidence at home and abroad, and natural obstacles incident to great distance from the base of building supplies. The present furnishes a substantial basis for the future, and the future is fraught with hope and confidence. The State was never more prosperous than now. Agricultural industries are thriving, mercantile, manufacturing and all commercial interests are good. Confidence is being restored. With the efforts being put forth by the transcontinental railways, by the California State Board of Trade and by other commercial organizations throughout the city and State to make known the resources of the State, the outlook is for large, continuous growth.

VITICULTURE AND THE UNIVERSITY FARM.

BY FREDERIC T. BIOLETTI, PROFESSOR OF VITICULTURE,
UNIVERSITY OF CALIFORNIA.

The University Farm is destined to be of great value to all the agricultural industries of the State, and to none more than to those of grape growing and wine making. This is not the occasion for pointing out what large crops of fine grapes we raise, or what excellent wines we make from these grapes. If our vineyard products were universally or even generally as satisfactory as they could be made, the utility of the farm to the grape growers would be much curtailed. It is in correcting defects and supplying deficiencies that the most good is to be accomplished here, and the principal object of this paper is to point out some of these defects and deficiencies and to suggest ways in which the University Farm can be of use in removing them.

To obtain the best results in grape growing we must have: First, suitable soil and climate; and second, the best agricultural practice. That we have the former is evidenced by the large crops of fine grapes which our best vineyards produce. That we have the latter is open to question.

This is clearly shown by a comparison of the statistics of grape growing in California and France. The latest figures available for California are the following:

Vineyards in California, 1907		280,000 acres.
Dry wine produced, 1906	26,000,000 gallons.	175,000 tons.
Sweet wine produced, 1906	11,500,000 gallons.	115,000 tons.
Raisins produced, 1906	75,000,000 pounds.	150,000 tons.
Table grapes produced, 1906	200 carloads.	60,000 tons.
Total grape production		500,000 tons.

If we allow that one sixth of the total acreage consists of young nonbearing vines, we have about 234,000 acres of bearing vines produced at the average rate of 2.14 per acre. While the statistics on which this calculation is based are by no means exact, it is unlikely that they vary much from the truth. This shows that we are not getting the results to be expected from our rich soils and favorable climate.

According to the official figures of the French government, the vineyards of the Gironde, where the fine Medocs and Sauternes are grown, produced an average crop of 2.2 tons per acre in 1904; the Cote-d'Or, the region of fine Burgundies, 2.4 tons, and the Yonne, the department of fine Chablis wines, 3.6 tons. If we compare our crop with that of the rich soils of the south of France, the contrast is even less flattering to us. The vineyards of Herault produced in the same year at the rate of 4.7 tons per acre.

The total crop of France for the year 1904 was 65,000,000 hectoliters, and the area of vineyards 1,641,000 hectares, which indicates an average crop of about 2.7 tons per acre, or about 25 per cent more than ours.

Comparison of Average Crops in France and California.

California, 1906	2.14 tons per acre.
France, 1904	2.70 tons per acre.
Medoc, 1904	2.20 tons per acre.
Burgundy, 1904	2.40 tons per acre.
Herault, 1904	4.70 tons per acre.

When we consider the large crops obtained by our best vineyardists, the favorable nature of our soil and climate and our immunity from most serious vine diseases, it is evident that there is something wrong with our methods.

Grape growing in California is to a great extent in the hands of newcomers who know nothing about the nature and needs of the vine, or of grape growers from Europe who do not understand our conditions. The former need instruction in all the elements of their business and the latter need to unlearn a great part of what they had been taught in Europe.

There are hardly any of the operations of grape growing and wine making in which there is not pressing need for instruction and experimentation.

The spread of phylloxera calls for enlightenment and demonstration as to the best methods of preparing the ground for new vineyards, as to the best methods of grafting, planting and pruning resistant vineyards, as to the adaptation of the various stocks to the multifarious conditions of soil and climate, and their suitability to our principal wine, table and raisin varieties.

A properly planted and managed resistant vineyard should commence to bear the second year, and should be in full bearing by the fourth. Most of our resistant vineyards are one or two years longer than this in coming into bearing and never produce a full crop because a full stand is not obtained. In many there are vacancies, amounting to 5 per cent or 10 per cent of the total number of vines and, of the vines which grow, a large percentage are defective and unprofitable. We find growers planting Rupestris St. George on shallow and wet soils where it is sure to fail, or Lenoir on poor soil where the phylloxera will finally destroy the roots. We even find innumerable cases of non-resistant vines being planted where there is not one chance in ten that they will bear two crops before the phylloxera destroys them. On the other hand we find—though rarely—cases of growers planting resistant vines at an extra expense of $40 to $50 per acre in locations where with proper precautions the phylloxera could be kept out indefinitely or for years.

All the most serious of these errors would be avoided by anyone who takes a suitable course in vine growing such as it will be possible to give at the University Farm. The courses given at Berkeley are useful in this respect, but they lack the advantages of practical demonstration in the field, and moreover they are available to but a very limited number of grape growers.

In wine making the need for adequate instruction and demonstration is even more urgent than in grape growing. The amount of spoiled or inferior wine made in California is still very large and due to the ignorance of most of the wine makers of the basic principles of their art.

The mechanical parts of the handling of grapes and wine are fairly well done in California, because we have good mechanics and their methods do not depend to any great extent on peculiar local conditions.

The management of yeast and temperature, the proper utilization of the raw material, and the intelligent aging of wine, are on the other hand very imperfectly carried out in a large number of cases. Our conditions of grape composition and climate differ so much from those of most other wine-making countries that an accurate knowledge of the theory of wine making is necessary for the best results. A European who knows only the best practice of his particular region, or a man who knows little of either theory or practice, cannot make the best possible wine from our grapes.

With a properly equipped wine cellar at the University Farm, it would be possible to give adequate instruction in the theory and practice of fermentation, in the control of yeast, temperature and must composition, and in the methods of clearing and aging wine, which cannot but result in vast improvement of our products.

The character and situation of the University Farm make it possible to have all the equipment necessary for instruction and demonstration in all departments of viticulture and ethology.

For this purpose will be needed a vineyard of various varieties, large enough to exemplify all the methods of cultivation, grafting, pruning, fertilization, and treatment of diseases which are applicable to California. Equally necessary and useful are a packing house to demonstrate the best methods of handling, packing, cooling and shipping table grapes, a grape-drying outfit to demonstrate the various methods of drying, curing and packing raisins, currants and Sultanas, and a cellar where students can become familiar with all the operations of wine making—analysis of grapes and wine, methods of handling and fermenting the must, racking, filtering, pasteurizing and bottling wine, and utilizing the residues and waste products.

With such an outfit as this in the hands of competent instructors, it will be possible to turn out young men who will be able to avoid the numerous errors of practice and judgment which are responsible for our crops being 25 per cent less than those of France, and 50 per cent to 100 per cent less than they ought to be.

The farm, however, can do more than this for viticulture. It will make it possible to prosecute comprehensive and far-reaching investigations of great importance to the future of the industry, which for several reasons the University has been unable until now to carry out in a completely satisfactory manner—especially investigations requiring continuous work and observation for a term of years.

An experiment vineyard should be started at once, with the object of determining the best resistant stocks for our principal varieties of grapes. Careful reports should be made on the quantity and quality of the grapes and the vigor of the vines on each stock. This will supply data of increasing value every year for the guidance of all new plantations.

A vineyard of pedigreed vines should be established, where by continuous selection and regrafting the bearing of our fine quality grapes can gradually be improved until they can be grown with profit, and used to replace the heavy bearing vines of poor quality which are now too much planted.

A plot should be set apart for the testing of new varieties, more especially of table grapes. Scores of good varieties have been introduced and abandoned because they were not given a complete test with various methods of cultivation and pruning. Scores of fine varieties from Asia Minor, Algeria, Persia, and China are worthy of testing, and may supply us with valuable table and raisin grapes superior to those we have, or filling gaps of season and market that now exist. Such tests properly carried out are too expensive and require too much time for the private individual, but will be none the less profitable to the State.

The problems of pruning and fertilizing are among the most important, and at the same time the most puzzling, that confront the grower. They usually require years for their proper elucidation. Only practical and scientific experimenters, who for an uninterrupted series of years can give the careful attention and accurate observations necessary, are capable of throwing light on these difficult questions.

A packing house should be built, designed to test and improve the methods of gathering, packing, cooling, and shipping table grapes. Improvements in methods of drying, substitutes for sulphur in the bleaching of Sultanas and for the expensive wooden trays in preparing Muscats, should be investigated.

A winery and cellar also will be needed where new methods of wine making, handling and aging can be tested on an industrial scale.

The above are simply some of the more pressing lines of investigation which the establishment of the University Farm make possible. New problems arise every day, and the solution of one difficulty, the making of one improvement, reveals the existence of other difficulties and clears the way for other improvements. Continuous, uninterrupted, and gradually enlarging work is needed, and will certainly be carried out if aided by the support and encouragement of those whom it is intended principally to benefit—the grape growers and the wine makers of the State.

This support and encouragement must be of two kinds, each equally essential.

First: The work must be made possible by regular legislative appropriations. These appropriations should be sufficient, reasonable, and continuous. Large sums appropriated by one legislature in a burst of enthusiasm, and cut off by the next in a fit of economy, are in great part wasted. A moderate appropriation, gradually increased by each succeeding legislature, will accomplish very much more than twice the amount granted irregularly, as these sums too often are. The amount needed will at first be comparatively small. No one knows better than the men who are competent to carry out such work how difficult it is to spend economically, getting full value in return, large sums suddenly appropriated for scientific or practical investigations. Time is necessary to train observers, plan, commence, and carry out experiments. Work of this kind commenced and finished in two years is liable in great part to be incomplete or unreliable, owing to defective observations or hasty conclusions. On the other hand, if the work is gradually planned, organized and built up year after year, the amount that can finally be expended with profit to the industry is limited only by the extent and importance of that industry.

Second: However well supported financially, the work will fall short of the best results unless it receives the fullest encouragement from those engaged in the industries. Their co-operation is essential to success. Unless they attend the short courses given, send their sons and daughters to the regular courses, and visit the farm and experiment fields freely, little good will be done. Bulletins and reports on pruning, vine diseases, and fermentation, are of much use only to those who through proper study are able to appreciate and apply the principles enunciated. It is to the lack of adequate viticultural education that we must ascribe our backwardness in applying modern methods of grape growing and wine making which are in common use in less-favored and in generally less-progressive countries.

This lack it should be the important duty of the University Farm to fill, and not only bring us abreast of the viticultural progress of the world, but at the head.

TABLE GRAPES.

By MRS. MINNA E. SHERMAN, of Fresno.

The grape and the vine has endeared itself to the human heart as far back as man has left memorials in writing. The vine, the grape, and the vintage have stood for the joy of the world. "The vine languishes, all the merry hearts do sigh." When the trees said to the vine, "Come thou, reign over us," and the vine said unto them, "Should I leave my wine, which cheereth God and man, and go to be promoted over the trees?"

Life in a vineyard is full of inspiration. When we think of Emerson following the plow and thinking his great thoughts, we know a vineyard full of sunshine and beauty would have put those thoughts into verse, into poetry, and made him a great poet. Our singers are to come from the vineyards, and our thinkers from the shadows of the starlight nights on the great plains, to make California as famous in literature as she is now in her fruit.

Wine is ever dear to man, but to woman the grapes stand first. The beauty and brilliancy of the spheres of imprisoned dew and sunshine, covered with their misty blue veil of bloom, are entrancingly beautiful. Women, therefore, make the best packers of grapes. I doubt if a beautiful pack is possible without their aid. I have never seen a good pack, by color, that a woman did not superintend.

The early spring is beautiful in a vineyard country. "When the winter is past and the rain is over, the fig putteth forth her green figs, and the vine with tender grapes gives a good smell." The view from a high building of a vineyard, with its orderly rows of vines, suggests a great garden. The vineyardist that lays out a vineyard with the rows crooked receives a word of reproval from every passerby, from the Chinese vegetable peddler up to the tourist—all alike feel it to be a personal reflection on the credit of the community.

I would that more people realized the badness of the pruning. The properly pruned vineyard is rare enough to make one pause and think that the profits must indeed be great, if they can be so wantonly sacrificed by lack of knowledge of the grapevine's true character of growth.

New land is frequently taken for a vineyard and the vines do well. Still, if the land is in a country where irrigation is new, it is better to get the water well into the land before beginning to plant vines. If a field is summer fallowed one summer, and in the fall is plowed deep and left ridged to take in air and rain, then, at the spring plowing time, is run into deep furrows and well soaked with water, plowed, harrowed, and sown to corn, the corn is watered twice during its growth and kept well cultivated. The air is worked into the soil, and the water held in it by the constant cultivation. During the summer fallow time, if straw or manure is well spread on the land, and it rots after it is plowed under, it greatly helps the soil in holding moisture.

On land prepared in this careful way, a 98 per cent to a perfect stand of vines can be expected. The third year will give a crop under this treatment, and the vines will be as large as five-year-old vines treated in the ordinary way. If this seems too slow, the quicker way is to put on a large number of heavy teams and plow deeply, following the plows with a subsoil plow, breaking land without turning the raw soil on top. Plant the young vines, and irrigate in a single furrow close to the vine. In August, after the last irrigation for the season, spread on a heavy coat of manure to retain the moisture. This mulch will grow green with the first rains, and make a mass of green manure to plow under. The covering of the land from the sun helps it as well, for after all clean culture in our vineyards is the best; yet, while the vines are young the sun burns out the land badly.

The worst possible practice is the common mistake made by Eastern men. They reason that in the East a clover field plowed under helps the growing of other crops. Why not plow up an alfalfa field for the new vineyard? Why not? Because the practice is not good. The close, unaired condition of the soil and the rotting alfalfa roots, in a dry climate, do not help the land. It must be gotten into good tilth first, or else the vines make a poor struggling growth while the ground is coming back to good condition. It means, at least, two years' extra work before the vineyard is profitable. Planting out of cuttings directly, in the vineyard, has again become the fad. This is the second time it has come to the front among new growers since I had the craze. It is tried, and then dropped, and then tried again. Now it is simply the old idea of making a short cut, and Nature will not have it. The Italians are old grape growers and have this as a proverb: ''Do nothing hastily but catching fleas.''

If you desire to keep the friendship of your new neighbor, caution him against planting cuttings for a vineyard. I haven't any idea he will take your advice, but he will understand that advice is a good deal like quinine, more blessed to give than to take. The idea that cuttings make stronger vines than rootings is not borne out when the cuttings receive the same care as the roots. Sometimes a man gives the cuttings nursery care at a great expense for labor, and makes a great success. Let the same careful man plant roots, and see what a vineyard he will have at the end of the first year! The ordinary care given to young vines will not as a rule result in more than an 80 per cent stand. Now, if a cutting vineyard only receives this sort of care, it will be about a 30 to 50 per cent stand, and have to be filled out with rootings from the nursery. I know three vineyards planted with cuttings that have been a success; in every instance the cuttings received extra care and it was after a wet winter. One vineyard the young owner planted while too wet to put a team on, and the little space around each vine was cultivated by hand until late in the spring. After all, in July and August this vineyard had to be irrigated twice and some of the vines watered by a cart. In speaking of planting cuttings, I must ask you to bear in mind that I was referring alone to Fresno and its surroundings, as we all come here that are not University professors to give only the actual conclusions we have arrived at by our own experiences. That is the only value our work can possibly have to any one.

In the vineyard the vines are planted at various distances apart, 8 by 8, 8 by 10, 8 by 12, 8 by 14, 10 by 12, 12 by 14, all have their advocates among the men that are planting table grapes. The men planting vines on their own roots near vineyards having phylloxera plant 8 by 12 or 14, intending to plant a resistant root later in the wide way of the vineyard rows. If the phylloxera never comes they are safe. If it does, they think this will be a successful way of holding up the vineyard in its production. The men really fighting phylloxera do not regard this as a good plan, but take up the vines of the infected spot completely and put the land into alfalfa for a term of years.

The use of fertilizers is neglected in many California vineyards. Indeed, I know men that say that it is time to sell out when the vineyard needs fertilizing, and allow the next fellow to try it. The size and firmness of the berry in table grapes, its standing up quality, depends upon a well-fed soil: two years of good barnyard manure, spread on the earth in the early fall, or if preferred it can be put into a deep plow furrow after the first rains. The plow is run across the land set deep, and back again in the same furrow, until at least ten inches deep, then throw in the manure and cover with a couple of furrows. If this is done early enough there is little annoyance from the manure dragging out.

The third year ground bone is dropped into the furrows and covered at the first plowing. At the last cultivation nitrate of soda is put into the furrow and covered. If the pruning of the vines has been balanced, the grapes will set in large bunches and the wood growth will not be too great. Balanced fertilizers against balanced pruning, to produce health and vigor, and large crops.

The varieties of table grapes shipped from California in large lots are Thompson Seedless, or the Sultanina, the Sultana, the Malaga, Tokay, and Emperor. Small quantities of Cornichons, Muscats, Black Prince, and Rose de Peru are sometimes shipped out.

The Sultanina are fine grapes when well grown. The bunches are large and showy, and the grape well flavored and sweet. As there is little culling or clipping on the bunches, it is a cheap grape to pack, and shows up well in bunch packing.

The Malaga is a fine variety when it is good. It needs pedigreeing badly, as it varies more in quality than any other grape we have at present. At first we all thought it was in the soil, and condemned as Malaga lands the stronger lands. They seemed to fail to produce the sweet amber-colored berry. They now find that the amber Malaga is a larger grape on the good soils, and that it does not vary more than a week in the time of ripening on the different soils. The green, watery Malaga does not ripen until Muscat time, and is always to the taste deficient in sugar

The Sultanina and Sultana are more expensive to produce than the Malaga, owing to the fact that they require trellising to make full crops. The six-foot stakes are set a foot in the ground, and half a foot from the top is placed the upper wire; two feet below it the second wire is run. Long canes are tied to the wires, and the vine bears its fruit on the laterals springing from these canes. The Malaga is pruned half high, and after a time becomes strong enough to support itself. The stakes are then removed and used again to stake other vines.

The Muscat is not a shipping grape in most seasons, yet a few are always in demand in local or nearby markets. When raisins are normal in price, these grapes do not reach farther than San Francisco and Los

Angeles. The Muscat grape is not staked, but pruned to head close to the ground. To-day the general tendency is not to prune or to head the Muscat as low as in former years, hoping to increase the length of the life of the vine.

Tokays and Emperors are both high staked vines. This adds considerably to the expense of the vineyard. Stakes have been high priced these last few years. Now that the Government is selling timber, the small mill is likely to be able to make stakes once more, and we may look for a reduction from the ruinous prices now prevailing. The cement stake promises well, and after a few years' trial we will be able to tell if the unpreventable accidents in vineyard work will be too many to make it profitable. Poplar, willow, and mulberry stakes are used by peeling them and at once standing the ends in a solution of bluestone; after twenty-four hours they are ready to use. How long these treated stakes will last has not yet been proven.

Table grapes are usually well irrigated in the winter time, as they are often ruined by mildew when summer irrigation is attempted. Indeed, I regard it as folly to irrigate an old Emperor vineyard in the spring after the foliage has started. The years of deficient rainfall, the vineyards should be irrigated in the winter and cultivated to hold the moisture.

The Tokay grape has brought more money into the State than any other table variety shipped out, for its acreage is very great. Like the Emperor, it grows well on heavy, shallow soil. It is a handsome grape and a good carrier. I really think that both Tokays and Emperors taste better in New York than they do in California. The Tokay colors highest when the heat is not too great; where the climate is cooler than one in which the temperature clings lovingly around a hundred degrees for day after day. The season in Fresno has been favorable to the Tokays this year, and the packing houses have sent out well-colored fruit to the East.

The Tokay color could be readily improved in the hotter portion of the State by a little selection. I have worked the Emperors most successfully by pedigreeing them. This is done by using only cuttings from marked vines that had produced for two seasons a reasonable amount of high-class grapes, large berries, high colored and large bunches, were only considered. The vines were large, and it was easy to get more cuttings than I cared to use that were first class in every respect. The output of merchantable grapes was increased from three and a half and four tons to the acre, to eight, nine, and ten tons, and the culls were reduced to a minimum.

The vines must be kept clean; usually keeping a vineyard clean, that is, keeping down the weeds, is all that is thought necessary. The vines themselves should have the fungous growth taken off and dead knots removed, then spray the whole vine heavily with Bordeaux mixture just before the buds swell. Clean up all the trash around the vineyards, leave no place to hold mildew spores, or thrips, or hoppers. All these can be controlled by keeping down their breeding places. If the vines need sulfuring, then it should begin while the leaves are still small, and again later at the blossoming time. The sulfuring machine is a success. It blows the sulfur where it is needed and wastes none; and therefore reduces the amount needed greatly. Red spider and purple mites sometimes show up late in August; spraying with cold water controls these. Usually they are simply let alone and the next season the vines are given more water in the winter time, as dryness is thought to be the cause of the rapid multiplication of these pests.

The Emperor grapes have been our success, and the high prices received for this crop have induced planting all over the county. Many are unsuccessful—some from poor quality of the vines they planted, some from summer irrigation, and some from bad pruning. The pruning is often a merely go-as-you-please process, and never two years alike. I often wonder that the vines bear at all. Then I look at my own vineyards and think, "It is a good preacher who follows his own advice." I cannot get the pruning done rightly except I stay right there and have a few careful white men at work. By all mistakes in the years as they pass, we learn what not to do with the vines.

The same experiments we all tried fifteen years ago are being repeated and will prove unsuccessful again. I talked half an hour to one grower who was about to plant Emperors. He was a man above the average in intelligence. Indeed he came to me for advice. After all, when he went away he said he would plant his Emperors sixty feet apart and trellis them. I gave up, as I had hammered in the thought that tonnage was not wanted in a shipping grape, but quality. The Red Emperor bears its large clusters of high-colored grapes on the crown of the vines. Large bunches of the dark fruit sold as Emperors are sometimes produced at a distance from the head of the vines. The more the vine has laterals, the more little dark grapes will it bear. As every seed produces taxes, the vine as well as the land, it is folly to produce a lot of worthless little grapes that the winery will buy cheap. With long trellised pruning the Emperors will produce immense tonnage of cheap fruit, worth say $7 or $8 a ton, or the same vines will produce, with proper pruning, a minimum crop of fruit worth $50 a ton. Neither the vine nor the soil is taxed to produce the crop.

The Emperor grape can not be recommended to careless growers. Year after year, a well-cared-for Emperor vineyard planted from selected vines is a small mint to coin money. The grapes are as beautiful in their soft, harmonious, jewel-like coloring almost as a begonia. The Emperor is a good shipper, and stands considerable rain while on the vines without damage to its shipping qualities. It also holds up well in cold storage.

The market for table grapes grows constantly. I well remember when seven cars of Emperor grapes was all I could sell on the New York market, and then the seventh car slumped badly. The day of the ventilator cars made shipping risky business, and returns were considered good at $1,000 a car. Now we look for $2,000 or more a car for the best grapes. I expect to see the better quality of grapes, those we like to eat, go to the Eastern market under the improved ways of handling. The precooling of the fruit before it enters the refrigerator cars will greatly help the grape-shipping trade.

The love of the fruit-packing house grows on one. I was never as happy as when surrounded with girls and women in the packing house. The eye was feasted with the marvelous beauty of the grapes, almost as sweet as the pretty girl faces bending over them. That is past—to-day we have the Japanese. They are not pretty, neither is their work pretty. If they would try they could do better, but they simply will not try. I often watch them strutting around—proud of the Lord only knows what; yet not too proud to accept unearned money. The thoroughness they showed in the late war as soldiers makes us know that they could do their work well, if they were willing to learn. The bloom has gone from the packing house, and it has become drudgery. The shipping grape is like the Bartlett pear, easily damaged in handling. The grapes should never receive the slightest jar in handling; cut and held by the stem and laid lightly one bunch at a time in a large sweat box—this is the only way to preserve their bloom. The sweat boxes are well padded by a thick layer of hay under the papers, to give the grapes a soft bed to ride on. These boxes are hauled on wagons with springs, and the vineyard roads have the ruts and "thank-you-moms" smoothed over and tramped down to save jolts. Steady, slow horses are used to draw the wagons to the packing house. The sweat boxes are lifted by two men on and off the wagons. They are stacked log-cabin fashion to leave plenty of space for air; after twenty-four hours the stems are limber enough to pack.

In Emperor packing a girl or two spends her time in picking out the clusters from the large boxes before they are carried to the ordinary packers' tables. The cluster fruit is carried by the stem carefully and laid on paper in other sweat boxes at the packers' tables. Sometimes half the packers are at the cluster tables. The ribbons on a ten-car pack will cost $100 to $150. The ribbons should be tied into chous, and then the bunch tied on the stems of the grape. The ordinary packers will trail the ribbons over the grapes and injure the bloom. I sometimes find a girl who is an artist in tone work; and when I find one, she alone puts on the ribbons.

The ordinary packers must not be allowed to cut the grapes up into little bunches to make the top of the crates more even. This is the easiest way to top off a poorly filled crate, but it is inexcusable in a foreman to permit it; if the packers are trained to fill the corners first of the basket, then fit in a center bunch, the tops will come out smooth enough and the basket will be full weight. The fruit in each crate should be even in size and color. The packers seem to think that it is doing the owners a favor to fill the basket as rapidly as possible, without regard to doing it well. When one can bend this enthusiasm to careful work, it makes for goodness. The lack of skill in using the fingers, as well as the color blindness, makes one wish that every child could have a kindergarten training.

The early fruit packing, for it is seventeen years this week that I first began to pack fruit on the ranch—the early fruit packing was pioneering. We had none of the ideas now common. The grapes were clipped up into little pieces and faced into a form; they came out of it as evenly surfaced as cherries and without any bloom on them. It was not a pretty nor appetizing looking pack. The first year they went in like that to the market. The next year I rebelled against cutting up the large bunches, and to make the basket larger cut down a side, and put two together, tacking the cut sides to the bottom. Then I tied on a few pieces of baby ribbon left from the year's before Christmas packages. When the grapes reached the East I received a telegram to send more. It has been more—more. Like little Oliver Twist, the demand is still unsatisfied.

The early commission men argued against the shipping of the large bunches in this way, as the crates were lighter and took up too much room in the cars. I knew this was not reasonable, for I had lived in the East and knew the trade could charge well for that brilliantly colored fruit. The women in the East were willing to pay as much for it as for flowers; for the fruit not only decorated the dining table, but it became a part of the desert. In the season of the year that Emperors are in market $10 provides only a few flowers for a dinner party, hardly enough for more than a simple affair. These grapes, when arranged under an electric light, rival hothouse flowers in their effectiveness. These first large baskets were a surprise when they sold for $3.50 and up for a single crate. The old double crate we never used except in emergencies. The consumer was asked to buy a "pig in a poke," and as we had nothing to be ashamed of in our pack we felt proud to pass him the single crates, so he could see that his "pigs were in clover."

In a packing house a woman is better to oversee the women workers; while a man can best put up with the Japs, as he has more patience with masculine stupidity. If any women at all are employed; a sensible forewoman will hold things in order and suppress the little snippy fresh youths that come out as floor boys. They are usually smarties rather than vicious, but little gnats are often more annoying than bigger beasts. If a packing house is to hold conscientious women packers, it must be high toned in its personnel. The bloom must be kept on the workers as well as on the grapes. It is the bloom that makes the Eastern agent smile when the crates are opened up. It is the bloom on the workers that makes the work a joy.

Loving kindness is the best way of managing workers. A little kindness goes a long way with women and girls. That is the reason there should always be a capable woman at the head. A cup of tea at noon or a little hot soup is not much to give these faithful ones, and it makes them comfortable for the afternoon's work.

Loving the work in hand is the only way to be faithful to it. The romance of the grape surrounds the workers, and year after year the youths and maidens find their life partners in the packing house. The history of their lives begins in the packing house, and reality takes the place of the dreams of youth in which nothing is impossible of achievement. Surely, this building up of happy homes makes the watchful care of a good woman worth while. "Yes," as my forewoman used to say each season when we drove around to notify the girls to come to the packing house—"Yes," she would say, "as usual, we ran a matrimonial bureau at the ranch, and my best girls are all married off!" It is all life, however, and the grapes were well packed and none the worse for the little romances going on around them.

"Man comes into this world naked and bare,
He goes through the world with trouble and care;
When he dies, he goes the Lord knows where,
But if he does well here, he does well there."

AIMS AND OBJECTS OF THE STATE FARM.

By PROF. E. J. WICKSON.

In the course of an address on the subject of "Agricultural Education" at the State Farmers' Institute, which marked the opening of the University Farm at Davis for instructional purposes, Professor E. J. Wickson, Dean and Director of the Agricultural College and Experiment Station of the University of California made the following statement:

We expect to realize for the University of California the greatest institution for agricultural research and instruction in the world. Such a great ambition should be shown to be reasonable. The following conditions lie in the foundation of it:

First: The earnest desire and deep determination to realize it on the part of those to whom the development of the University is intrusted by law. The University has gone steadily forward since its foundation, but there came a quickening and a more rapid rate of growth a little more than a decade ago when the Regents of the University adopted this declaration:

> Agriculture is specially mentioned as one of the leading subjects to be taught at the State University, that the scientific knowledge essential to the success and prosperity of agriculture may be better known and more easily and quickly applied and with more immediate and more certain beneficial results * * * so that the University may send forth a tendril of thoughtful, helpful, and affectionate regard to every acre of soil within the State.

This was the initiative on the part of the Regents which brought University extension work in agriculture into active operation, and opened the way for a popularization of all lines of industrial educational effort in the institution. The impulse toward a greater University manifested itself in the induction of a new plan of administration and a new executive about seven years ago. One of the early acts of the new executive was to secure the expansion of the agricultural work of the University, and to promulgate a truer conception of its importance to the institution and to the State. The instructional staff was increased, and instruction was specialized in method and multiplied in subjects. There were 31 pupils taking full agricultural courses of instruction in the University in 1900; there are 124 to-day. There were 47 courses of instruction offered in 1900; there are 76 courses to-day. There were 11 instructors in 1900; there are 26 instructors to-day.

I have noted these points of progress in the agricultural work of the University because I wish to show that the attitude of the President of the University toward the agricultural work of the University is the logical expression of his thought, observation and experience. As he has been, so he may be trusted to be, and therefore these words which he recently spoke for himself and for the Board of Regents may be held to truly set forth what they desire and aim to accomplish: "The appointment of a head of our agricultural department has been regarded by the President and the Board of Regents as involving the most responsibility of any recent acts. We have believed the agricultural interests of California to be second to none of any state in the country, and these interests to be second to no interest within the State. * * * We propose to give him every support, and to go ahead for the building up of an agricultural department which shall be struck out on large enough lines to be fairly commensurate with the tremendous interests at stake."

Let there be no question, then, that it is the ambition of the administration of the University to make its facilities for agricultural research and instruction the greatest in the world. Whatever is fully true to California opportunities, certainly has a start in that direction.

Second: Another significant indication of the coming greatness of the agricultural work of the University of California is found not only in a desire, but in a clearly expressed determination of the California people toward that end. For a third of a century special legislative appropriations for agricultural work have been made in constantly increased amounts, and generous, stated appropriations for general University support have been largely secured through the stanch advocacy of our agricultural population. The college of agriculture from the beginning has lain close to the heart and purse of the California people. They will deny it nothing which is reasonable and promotive of real greatness and leadership.

Third: No state or country is superior to California in natural adaptation to greatness in agricultural education, because no state presents agriculture in so many phases. From the high mountain valleys with their alpine agriculture, through the higher foothill vales and slopes with north temperate zone products, down upon the lower foothills with their increasing suitability for agricultural efforts and below them the mesas where semi-tropical conditions prevail; out upon the great valley of California with its plains, river bottoms and reclaimed lands, and west of them the Coast Range slopes, mesas and small valleys, with innumerable conditions of moisture, heat, exposure, and productiveness—we have in California an epitome of a world's agriculture, except its strictly tropical phases, with opportunities for research and commands to teach to which none but the greatest agricultural institution can be true and adequate.

Fourth: There is no state or country with a population which needs such wide demonstration of agricultural science and such varied instruction in agricultural practice. Coming from all parts of the world, eager to adapt their agricultural experience to California conditions, they are most appreciative of accurate local knowledge and anxious for the fullest possible enrichment of it. They are ready to provide for it most generously by State appropriation and by princely private donations. California is unique in the enthusiasm, appreciation and generosity of its agricultural constituency.

Nor is there any state in which agriculture is held in such high interest and respect by the non-agricultural population, and none in which the agriculturist holds such high rank socially and financially. What the California farmer thinks of his enterprise and investments, and what his fellow citizens think of them, constitute agriculture a higher calling in this State than elsewhere. Upon such a foundation an institution which is true to its opportunities must be uniquely great and influential.

Fifth: Our duty is thus defined by our opportunity. It is to do more and better work; to push equipment of men and materials until every farming interest of California is adequately served, both in the ascertainment of new truth for the leaders and the demonstration of plain practice for beginners both young and old. This can only be done by the exaltation of agriculture as a technical science in the University; by the development of special schools of secondary grade as fast as it can be wisely done according to current demand for them; by the preparation of teachers to carry elementary science and agriculture into the common schools; by the free publication of helps to farmers and to teachers of farming, until our system shall provide just what every one needs to know to work intelligently and successfully. When this shall be done to the measure of California and to the standard of the California people, distinctive greatness will have been attained and pupils will be drawn from across the world because of it.

Sixth: Three things are necessary to realize the popular will in this regard: men, money, and time for them to work together for results. This is the undertaking of which we are now at the beginning, confident, strong and expectant.

POULTRY IN CALIFORNIA.

CONDITIONS AND OPPORTUNITIES.

By A. WARREN ROBINSON.

Poultry raising in California has attained large proportions. While it has of late years rapidly developed, it is yet in its infancy and has in store a remarkable future. Conspiring to bring to pass this very desirable result are numerous incomparable conditions which are, and forever will be, the heritage of our fortunate poultrymen.

Notable among these are our wonderful climate, perfectly adapted to the breeding of fowls of all varieties; the remarkable fertility of our soil, which produces economically feed stuffs in great variety; the never ceasing demand for poultry products, and the many and varied means of transporting fowls and eggs to remunerative markets.

So rapid of late years has been the growth of this profitable industry within our borders, that the early beginnings of the business are often forgotten. The ill-bred fowls, once so common, have been displaced in very many portions of the State with birds of the finest breeding, of all the standard varieties, bred, not for points alone, but for utility as well.

While the poultry products of the State are annually increasing, there is a wide-open field for the expansion of this profitable industry, there not being the least ground for fearing that the business will be overdone. To supply the enormous local demand for eggs and fowls, large quantities are imported from states east of the Rocky mountains, a goodly share, if not all of which, might well be produced within the borders of California.

The quantity of eggs received in San Francisco during the first eleven months of 1907 aggregated 11,597,030 dozen, the number for the entire year being nearly, if not quite, 12,000,000 dozen. The value of eggs produced in the State in 1899, according to the last census, was $3,864,697, and for poultry $2,492,067. This valuation has greatly increased since the year mentioned.

Taking a glance at the situation away from home, it may be said that the dairy products of the United States for one year amounted to $254,000,000. We are in the habit of looking at this branch of farming as one of large extent, but we find the poultry products for the same year to be $560,000,000, or more than twice as much, and still not enough, for during the same year 13,000,000 dozen of eggs were imported, and the total value of poultry and eggs imported was probably $20,000,000.

This $20,000,000 ought to have been jingling in the pockets of American farmers and poultrymen, rather than to have been sent to foreign countries. The thousands of dollars that are annually sent out of California for poultry products should be kept at home, and well might be, enriching the many worthy people now engaged in the business and others, who would be benefited financially, as well as physically by investing their time, talents, and money in this health-giving occupation.

Bearing in mind the scope of this industry; the large amount of capital invested; the very profitable returns for money and time expended, and the positive assurance of an unlimited, constantly increasing demand for all poultry products we can furnish for all the future, it is very evident that for those who keep fowls, whether on a small or on a large scale, greatest returns can be realized by judicious selection of stock, proper housing and feeding, and by bestowing upon the birds unceasing, careful attention. There are a hundred and one details connected with poultry raising, each and all of which must not be neglected if best results are to crown the labor of the poultryman.

Ten or more of the standard varieties of fowls are raised in this State, but the White Leghorn leads, numerically at least. Not that other fowls of the Mediterranean class are most excellent layers of fine, large white eggs, nor that the American birds fail to give excellent returns for care bestowed, or that the Asiatic fowls are by any means without their champions, but the hen first mentioned greatly outnumbers the others.

Within the borders of our favored State many enthusiastic poultrymen, and poultrywomen as well, have by careful breeding, with a never-ceasing ambition to bring their flocks up to the highest degree of excellence both as regards points and utility, achieved wonderful success.

This is evidenced by the superb displays of fowls of many breeds at our State and county fairs, which are surpassed by no other section of our land for fine displays of poultry.

Here one is impressed with the very evident indications that, owing to our wonderful climate so admirably adapted to poultry raising, and to the enthusiasm and intelligence of the many persons who have engaged in this fascinating and profitable business, California is destined ere many years to become the first and foremost state in the Union as regards, at least, the excellence of her fowls.

How best to feed fowls for the greatest egg production, the matter of economy always to be kept in mind, ever engages the attention of the practical poultryman. Upon this subject there is a great divergence of opinion, though it may be said that it resolves itself into the consideration of the moist-mash and the dry and hopper methods. Every person who keeps fowls wishes them to produce the largest number of eggs possible, and the output is influenced in great degree by the food provided. While there is much controversy regarding the subject, yet repeated and long-continued successful experiments have convinced very many persons that the dry method has very much in its favor. Not only has the excellence of this method of feeding been demonstrated in California, but not a few of the most successful poultrymen in states to the east are decidedly of the opinion that it is the better way.

Where a maximum egg production is the first and foremost consideration, as it is on the average farm, it will be conceded that the birds must be kept in perfect health and their physical condition maintained by a feeling of comfort. In addition to this, they must have the assurance of an abundance of egg-making material, and secure a regular supply of it before they will undertake egg production. If their instincts teach them anything, it is to delay undertaking the task of egg production until they are in good flesh and find themselves supplied with, not only sufficient flesh-forming food to maintain this condition, but a surplus in sight to justify the attempt to convert it into eggs. The half-starved hen never has been and never will be found laying.

I believe the most abundant egg production can be secured by keeping constantly before the birds a supply of wheat, oats, corn, and other grains in hoppers, in addition to a hopper of beef scrap and an abundance of skim milk. A liberal supply of green food is absolutely necessary to supplement grains and meals fed. No food of this kind will be found superior to alfalfa, which readily and luxuriantly grows in nearly every locality of this State. Its value for all kinds of stock can not be overestimated.

After repeated trials at the Maine experimental station the management is very enthusiastic regarding dry feeding. The great saving seems to be in the item of labor. The food the fowls consume costs about as much, but one man can tend 1,500 birds with comparative ease. So far the results seem to prove that the germs in the eggs are stronger, and consequently the eggs hatch better and the mortality is not so great among the young chicks. If experiments extending through a series of years prove this to be true, the days of mash feeding are ended.

To the housing of fowls in California much attention has been given. While the continuous house is in favor with not a few, the majority of poultry are kept in individual or colony houses. In our genial climate no very elaborate buildings are necessary. If the open-front house has proved the very best in the rigorous climate of the far eastern states, it certainly ought to be well adapted to the comfort and health of California flocks. Too little attention is paid to the ventilation of our houses for both young and old fowls.

A few borrowed thoughts may well conclude this paper. "In order to make this avocation a success, it may be said that there are personal traits of character which underlie success in any business, and these must naturally be possessed, or else acquired, before we can look for the best results from a man's labors. He must have application, patience, persistence, and in every sense of the word be a hustler. Be on the alert for every new idea in your business, but do not be greedy and attempt to swallow more than you can digest. Season your scientific knowledge with lots of common sense, and, above all, run your business on sound business principles. Study your market, the particular likes and dislikes of your customers.

"Do not begin too expensively. Remember that every dollar you put into business is an interest-bearing factor, and must be accounted for out of your profits. Expensive or fancy buildings are not a necessity, but convenience of labor and proper conditions are. Above all, look after the details, for no department of the farm needs so close attention to the many details, or will suffer so quickly for lack of attention, as this. Careful attention to these littles, a love for the work, and a never-failing will to succeed under any and every condition, will bring you success. Never depend upon luck, but always spell it with a 'p,' and never expect success till you have earned it."

FORESTRY.

By G. B. LULL, State Forester.

Forestry has been defined as the art of producing wood crops. This is not the most comprehensive definition which could be given it, yet it answers all practical purposes. As the agriculturist is engaged in the business of producing food crops, so the forester is engaged in the business of producing wood crops, and both are carrying on their art for the ultimate purpose of producing a revenue.

Forestry has been practiced in the United States since July 1, 1887, when the Division of Forestry was created in the Department of Agriculture. Like most other lines of activity, it came to meet a need long foreseen by wise men throughout the country. Thus, as early as 1799, the Federal Government recognized by legislation the need of preserving for future use timber suitable for the navy. In 1817 the former act was renewed, and 19,000 acres were reserved for live oak and cedar production on Commissioners, Cypress, and Six Islands, in Louisiana. In 1828 another appropriation of $10,000 was made, and some lands were purchased on Santa Rosa Sound, where during a few years an attempt at cultivation, transplanting, and pruning was made. In March, 1831, provision was made for the punishment of persons cutting or destroying any live oak, red cedar, or other trees growing on any lands of the United States, by a fine of not less than thrice the value of the timber cut, and a corresponding imprisonment.

It will be noted that no general conception of a need of a forest policy underlay those attempts to secure sufficient material for a special purpose—material of a kind which was not plentiful, and was then believed a continued necessity for the building of warships.

We can now smile at the concern expressed by early writers with regard to the threatened exhaustion of forest supplies. The extent of our forest domain was then entirely unknown, and in the absence of railway communication the location of supplies near the centers of civilization was of more moment. Logging then was carried on only along the coast and the eastern river courses. Small country mills sawed to order for home consumption, or sent material to the mouths of the rivers to be carried by vessels to home and foreign markets. The mills were run in a manner of country gristmills, often in connection with them. This petty method of doing business lasted until the middle of this century, as is evidenced by the census of 1840, which reports 31,560 mills, with an average product of about $400. But note the change: in 1870 the product per mill was valued at $6,500, and in 1890 it had become $19,000.

It would be difficult to set a date or mark an event from which the changes in the methods of the lumber industry, which is now such a stupendous factor in forest decimation, might be reckoned. It came as gradually or as fast as the railway systems expanded and made accessible the vast supplies of the West, while the supplies of the East were being exhausted.

Especially after the war, the settlements of the West grew as if by magic; the railroad mileage more than doubled in the decade from 1865 to 1875, and with it the lumber industry developed by rapid strides into its modern methods and volume. In 1865 the State of New York still furnished more lumber than any other state, now it supplies only insignificant amounts.

In 1868 the golden age of lumbering had arrived in Michigan. In 1871 rafts filled the Wisconsin; in 1875 Eau Claire had 30, Marathon 30, and Fond du Lac 20 saw mills, now all gone; and mills at La Crosse, which were cutting millions of feet annually, are now closed.

No wonder that those observing this rapid decimation of our forest supplies and the incredible wastefulness and additional destruction by fire, with no attention to the after growth, began to sound the note of alarm. Besides the writings in the daily press and other non-official publications, we find the reports of the Department of Agriculture more and more frequently calling attention to the subject.

In the report issued by the Patent Office as early as 1849, we find this significant language in a discussion of the influence of forests on waterflow and their rapid destruction:

> The waste of valuable timber in the United States, to say nothing of firewood, will hardly begin to be appreciated until our population reaches 50,000,000. Then the folly and shortsightedness of this age will meet with a degree of censure and reproach not pleasant to contemplate.

In 1865 the Rev. Frederick Starr discussed fully and forcibly the "American forests, their destruction and preservation," in which, with truly prophetic vision, he says:

> It is feared it will be long, perhaps a full century, before the results at which we ought to aim as a nation will be realized by our whole country, namely, that we should raise an adequate supply of wood and timber for all our wants. The evils which are anticipated will probably increase upon us for thirty years to come with tenfold the rapidity with which restoring or ameliorating measures shall be adopted.

And further:

> Like a cloud no bigger than a man's hand just rising from the sea, an awakening interest begins to come in sight on this subject, which as a question of political economy will place the interests of cotton, wool, coal, iron, meat, and even grain beneath its feet. Some of these, according to the demand, can be produced in a few days, others in a few months or in a few years, but timber in not less than one generation. The nation has slept because the gnawing want has not awakened her. She has had plenty and to spare, but within thirty years she will be conscious that not only individual want is present, but that it comes to each from permanent national famine of wood.

These and many other urgent writers had their influence in educating a large number to a conception and consideration of the importance of this subject, so that when, in 1893, the committee on forestry of the American Association for the Advancement of Science was formed and presented its memorial to Congress, there existed already an intelligent audience, and although a considerable amount of lethargy and lack of interest was exhibited Congress could be persuaded in 1876 to establish the agency in the United States Department of Agriculture out of which grew the Division of Forestry, already mentioned.

Then was presented the spectacle of a nation in need of foresters, possessed of a forestry division and ready for the practice of forestry art, which had no foresters of her own. The Eastern universities were quick to respond, however, and during the ensuing years Cornell, Yale, Harvard, and Michigan universities and many of less prominence, instituted forestry courses. On the graduation of the first American foresters the field of investigation was broadened continuously, as new recruits from the universities were added. Thus, the development of scientific forestry and the extension of forestry knowledge was extended in the United States as our Wolfville friend says: "Like the grace of heaven through a camp-meeting."

During this time, however, an anomalous condition existed in the government organization which greatly hampered the benefits of forestry practice. This was the administration of the forest reserves by the Department of the Interior, which numbered no trained foresters among its employés. Fortunately, this condition was rectified by Congress in February, 1904, when the forest reserves were transferred from the Department of the Interior to the Department of Agriculture, where they were rightly placed in the hands of the Forest Service, as the former Division of Forestry is now called.

The administration of the reserves themselves was quickly placed on a basis of local management instead of the oldtime, longarm management from Washington which had resulted in the growth of so much ill feeling among reserve users. Under the present methods of management the just opposition to the reserves has practically disappeared, although we occasionally hear outbursts from selfish interests, as was the case with the recent Denver convention. The area of the reserves (now called national forests) has been steadily increased as the examination of new areas warranted their extension, until now they cover a great portion of the mountain area in our Western States. In California alone their area exceeds 21,000,000 acres, occupying practically all the higher mountain slopes of the State.

With the firm establishment and successful development of Federal forestry, action for similar work began in many of the states. In California it began as early as 1885, when this State, preceding any other in this particular, passed an act establishing a State Board of Forestry. This board was not composed of trained foresters. It acted functionally as a Bureau of Education, issuing three reports, botanical in nature, before it was abolished in 1893.

The present State Board of Forestry was created in 1905, after a thorough examination of the forest resources of the State by the Federal Forest Service. The creating law provides that the State Forester shall be technically trained, and outlines the work along the lines of forest management, forest replacement, and forest protection.

The question has arisen, Why should California support a Board of Forestry when the Federal Government is administering 20,000,000 acres of her forest domain? If for no other reason, California can afford to support such a board simply to educate her people to the need of co-operating with the Federal officials in their efforts to safeguard their interests in navigation, irrigation, forest material, stock raising, etc.

But there are other more important functions for the State Board of Forestry.

Many thousands of acres of the best timber in the State are held by private parties, who are administering their holdings for private gain regardless of public good. The existence of the Board of Forestry places within the reach of these owners technical knowledge as to how they can manage their properties without seriously curtailing their profits and without being the cause of public calamities. The State is vitally interested in the way this natural resource is exploited, and if its owners do not prove themselves amenable to the demands of the public good laws should be enacted to compel them to do it.

Another direction for the activities of the Board of Forestry which should be of immense benefit to the State is opened by the thrifty growth here of eucalyptus. The great, unanswerable objection to the practice of forestry by individuals arises from the time element involved between the planting and the harvesting of forest crops. Fortunately for California, this objection does not apply to this remarkable genus. There is no need for the establishment of a eucalyptus plantation on every California farm, to supply wood, posts, poles, and all the thousand uses for which wood is required. I shall not go into detail here to tell you of the methods of propagation or the profits it is possible to secure, but I want to assure you that the Board of Forestry is in a position to help every planter who means business and will meet him halfway.

Then there is the fire problem, rendered so vast by the extreme drought of our summers. Fortunately, we have good laws to punish those who are careless with fires, and the existence of over 600 voluntary fire wardens in the State proves the public is vitally interested in their enforcement. Gradually, we are learning to think twice before starting fires, though old customs sometimes prevail. Thanks to the efforts of the fire wardens the Board of Forestry has justified its existence many times over by its activities under the laws relating to forest fires. And it will continue to do so until the belief in forestry will be so strong in the State that a popular demand will come for the establishment of a college of forestry at the University of California. This action should be taken, and I believe it will be in the not distant future.

CALIFORNIA'S RESOURCES.

The following is an extract from a paper by A. R. Briggs read at the State Farm dedication:

The rural settlement in California has only begun. It will double ere we know it. The attractions of soil, climate, and productions, with the natural trend in movement of people seeking homes, from the East westward, will bring into the State homeseekers and investors in great numbers each succeeding year.

A summary of average yearly product from the soil and mines in California is found in the tabulation made by the State Board of Trade in its report for the year ended March 1, 1907, as follows:

Cereals	$39.620.777	
Hay	31.795.515	
Potatoes, beans, hops, etc.	11,251.515	
Beet sugar	6.599.950	
Livestock	34.232.647	
Wool and hides	5.800.000	
Dairy Products	22.756.811	
Poultry and eggs	12.240.000	
Product of vines	10.847.890	
Orchard products	41.637.399	
Vegetables	6.198.000	
		$222.980.504
To this may be added minerals—		
Including petroleum		48.000.000
Lumber		72.000.000
Other forest products		15,000.000
Making a grand total of		$357.980.504

Representing interests of this magnitude, is it not time the producers of the State began to think about advancing and safeguarding them in every legitimate and intelligent way. The limit of farm settlement and of farm products in California has not yet been roughly estimated. While development will be more rapid in future than it has been in the past, the opportunity for extension and growth is so great that the most optimistic fail to comprehend it. Where such vast wealth is produced under present conditions, when the possibility is considered, it is folly to say that opportunities in any direction or in any branch of industry have been exhausted.

RESOURCES

OF THE

STATE OF CALIFORNIA.

(BY COUNTIES.)

ALAMEDA COUNTY.

Alameda County fronts the bay of San Francisco for a distance of 38 miles, with an average width of 25 miles, extending to and beyond the summit of the Contra Costa hills, comprising numerous beautiful valleys, besides the broad Alameda Valley, which last is bounded by the waters of the bay on the one side and the Contra Costa hills on the other, and is one of the richest and most fertile valleys in the State.

The principal stream is Alameda Creek. There are other creeks crossing the county and emptying into the bay, two of which furnish water for the city of Oakland. The country around Hayward is one of the great fruit-raising regions, many millions of pounds being shipped annually.

The soils immediately along the bay in Alameda Valley and the marshes formed by the overflow are heavy, but very fertile when reclaimed. Then comes a broad belt of rich, black adobe that is crossed by deposits of alluvium made by shifting channels of streams running down from the Coast Range. In the Niles region are lighter loams. About Livermore are uplands, bench and valley lands. Between the latter two classes the variation in potash, lime, and phosphoric acid accounts for difference in grape crop. Mission San José is characterized by gravelly, upland, adobe soil, and was evidently chosen by the padres of the old Spanish mission for its exemption from frost, caused by its slight elevation above the surrounding valleys. The Pleasanton section consists of agricultural and grazing lands. The soil is a very rich sediment, producing hay, grain, potatoes, hops, and beets in abundance. At Alvarado the surrounding country is a fine farming and fruit region, and gardening and dairying are largely carried on. The fertile, alluvial soil is finely adapted to fruit-growing.

The average rainfall of the county is about 30 inches.

Alameda County was among the first to begin the planting of orchards and vineyards. This county is divisible into three sections—the cherry district, the apricot district, and the vineyard district.

From Oakland to Hayward is the home of the cherry, and in an ordinary year this crop is good for a profit of a quarter of a million dollars.

The apricot section includes all the region east and south of Hayward, but the center is at Niles. The Alameda apricot is high colored and the flavor exquisite. One of the most popular varieties, the Alameda Hemskirk, was originated here. The other varieties preferred are the Blenheim and the Moorpark. A first-class apricot orchard is easily worth $500 per acre, and some could not be bought for $750 or $800. Apricot trees yield from twelve to twenty tons an acre, worth from $20 to $30 a ton. Thousands of carloads of apricots are shipped annually from this county.

While cherries and apricots are the king and the queen of fruits, there are others which do well, among them being the Bartlett pear. The plum is another fruit which thrives, and the smaller fruits and berries are profitably grown.

In Alameda County are the largest currant patches in the United States. The size of an average currant farm varies from twenty to forty acres. Local canneries pack a great number of cases of this fruit, and thousands of chests of currants are shipped away each year.

Almonds, chestnuts, English walnuts, pecans, beechnuts, and hazelnuts are extensively cultivated.

Alameda is par excellence a vegetable-producing county. It has led in this industry for a long time, and the area devoted to vegetables has been increasing at a rapid rate, since the profit in peas, potatoes, tomatoes, rhubarb, asparagus, and several other vegetables is large enough to tempt the owners of the best soil to go into the business.

There are 8,000 acres devoted to vegetables in the county, not including sugar beets, which would add 4,000 or 5,000 acres more.

Many acres in this county are planted to tomatoes, which prove to be a most profitable crop. It is not unusual to find 100 acres of tomatoes growing upon a single farm.

The potato crop is of increasing importance, since it has been found that there is good money in the big Burbank potatoes and other commercial varieties. The best soil will produce from 75 to 80 sacks to the acre, although record yields of 150 sacks have been produced.

The growing of peas for canning has assumed importance. The output of the San Leandro cannery, located in this county, has reached as high as 1,200 cases per day, and 3½ tons of peas have been grown upon a single acre.

One of the prosperous agricultural industries is the growing of rhubarb for the California and Eastern markets.

The hop industry is chiefly located near Pleasanton, and during the picking season employment is given to some 2,000 pickers. The Pleasanton hop yards are the largest under one wire in the world. Over sixteen million pounds of cable and of trellis wire are used for the network that spans the twenty-foot poles to sustain the weight of the full-grown vines.

California was the first State in the Union to manufacture beet-sugar on a commercial scale. In Alameda County it has been manufactured for the past thirty-three years. Within her borders is located not only the pioneer beet-sugar factory of this country, but also one of the largest factories in the world. The annual production of beet-sugar in California exceeds that of any other State. The product of the land used for this industry is annually worth $10,000,000. Beets in Alameda County average over 14 per cent sugar of 88 per cent purity, and they yield an average of 15½ tons to the acre. The planting season extends from the first of February to the middle of May. This provides a long period of activity for the factory, which begins operations in August, and has continuously maturing crops of beets to handle.

The average annual output of salt recovered from San Francisco Bay, in Alameda County, is 100,000 tons, including both coarse and fine salt.

Oakland is the county seat, located on the bay opposite San Francisco, and has for its immediate neighbors the cities of Berkeley and Alameda. These three cities are very prosperous and have a rapidly increasing population.

The University of California is located near the city of Berkeley, and has an average attendance of 3,500 students.

STATISTICS OF ALAMEDA COUNTY, 1906-7.

General Statistics.

Area, 840 square miles, or 537,600 acres.

Number of farms	2,482
Number of acres assessed	441,480
Value of country real estate	$16,726,050
Of improvements thereon	$7,698,753
Of city and town lots	$86,390,825
Of improvements thereon	$41,847,534
Of personal property	$24,154,429
Total value of all property	$176,817,591
Expended on roads, last fiscal year	$500,000
Expended for bridges, last fiscal year	$200,000
Number of miles of public roads	850
Road levy per $100, 1907	40c
Value of county buildings	$825,000
Irrigating ditches, miles, ——; cost	$450
Railr'ds, steam—miles, 134.74; assessed value	$3,071,382
Railr'ds, electric—miles, 158; assessed value	$5,198,900
Electric power plants—5; assessed value	$2,105,000
Electric power lines—miles, 60; assessed value	$100,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	4,250	3,250	$108,875
Barley	16,246	15,648	444,303
Oats	6,582	4,200	155,400
Corn	486	1,030	37,080
Buckwheat	40	40	3,200
Total cereals	27,604	24,168	$748,858
Alfalfa hay	1,785	3,267	$42,471
Grain hay	52,648	66,810	1,336,000
*Straw	22,542	......	11,271
Total hay	75,975	......	$1,389,742

*Bales, at 50c.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	36,425	7,627	43,052
Apricot	282,000	69,322	351,322
Cherry	102,927	25,472	124,399
Fig	2,000	......	2,000
Lemon	750	250	1,000
Olive	4,200	1,500	5,700
Orange	1,200	700	1,900
Peach	22,875	2,250	25,125
Pear	60,750	12,224	72,974
Plum	27,860	4,375	32,235
Prunes	156,000	36,700	191,275
Quince	3,825	225	4,050
Total fruit trees	700,812	156,645	855,032
Almond	48,622	4,300	52,922
Walnut	3,250	2,500	5,750
Total nut trees	51,872	6,800	58,672
Grapevines	5,267	1,500	6,767
Berries, acres	678	.....	678

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries, cream	15	779,074	$779,074
Skimming stations	85	4,000,000	800,000
Butter, pounds	..	3,000,000	900,000
Cheese, pounds	..	4,600	920

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Almonds	100,000	$40,000
Apples	38,354	57,531
Apricots	2,968,950	593,790
Asparagus, tons	1,130	180,800
Blackberries, crates	1,021	5,105
Beans	438,400	21,945
Beets, tons	78,536	392,680
Cabbage	1,428,000	14,280
Celery, tons	5,209	260,450
Cauliflower	30,000	1,500
Corn, table	2,280,000	300,000
Currants	439,200	21,960
Cherries	601,290	54,116
Figs	30,000	1,500
Gooseberries	44,600	13,380
Grapes, tons	10,454	376,910
Loganberries, chests	1,500	7,500
Onions	378,000	56,700
Oranges, boxes	1,100	5,500
Olives	11,400	570
Pears	2,751,000	41,265
Peaches	689,400	62,046
Peas	6,662,000	266,480
Pumpkins	100,000	15,000
Plums	436,700	43,670
Irish potatoes	12,850,700	385,521
Sweet potatoes	25,870	517
Prunes	2,558,900	127,945
Quinces	20,000	500
Raspberries, crates	1,236	7,280
Strawberries, crates	8,800	52,800
Tomatoes, tons	35,784	357,840
Cucumbers	55,870	13,967
Rhubarb	2,908,000	218,100
Squash	200,000	5,166
Walnuts	100,000	15,000
Totals		$4,019,314

Dried—	*Pounds.*	*Value.*
Almonds	42,870	$8,566
Apples	64,200	6,000
Beans, string	300,000	10,000
Garlic	400,000	20,000
Onions	825,000	8,260
Pears	200,000	16,520
Peaches	16,000	875
Peas	250,000	3.500
Plums	3,200	175
Prunes	375,000	20,000
Walnuts	46,200	6,930
Vegetables, in general	......	180,500
Carrot seed	......	41,000
Onion seed	......	27,750
Nursery trees	......	78,350
Totals		$428,426

Canned—	*Cases.*	*Value.*
Canned fruits and vegetables	500,000	$1,600,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	2,600,000	$650,000
Sweet wines	66,200	33,100
Champagne, cases	2,800	56,000
Beer, barrels	238,765	2,387,650
Brandy	200,000	100,000
Carbonated and soda waters	....	569,000

Manufactured Output.

Unsegregated output	$1,750,250
Number of employes	270

STATISTICS OF ALAMEDA COUNTY, 1906-7—Continued.

Manufactories.

	No. of Employes.	*Value of Product.*
Bookbinderies and job print and litho	599	$2,156,800
Paper boxes	80	175,000
Wood boxes	110	282,480
Brick	109	1,792,300
Brooms	105	88,626
Carriages and wagons	72	329,375
Cotton, silk, jute	675	2,466,395
Cigars	195	1,735,374
Clothing	694	3,757,764
Coffee, spices, etc.	158	462,000
Confectionery, fancy cakes, etc.	446	1,201,404
Fertilizers	50	820,000
Bags, tents, and awnings	100	499,000
Electrical supplies	20	150,000
Flouring mills and health foods	804	1,422,033
Drugs	10	250,000
Furniture	233	1,048,220
Jewelry	70	645,516
Leather goods, boots and shoes	446	1,581,541
Machinery output of foundries, includes products of iron and steel	3,500	17,820,048
Malt	5	55,500
Matches	25	183,500
Meat products—		
Hides	600	536,810
Lard		75,000
Meat packed		5,390,097
Tallow		50,000
Olive oil	25	50,000
Paints, oils, etc.	551	3,710,771
Pickles and pickled olives	14	107,000
Sewer pipe	300	1,000,000
Planing mills, sash and door factories	1,124	4,797,569
Potteries	500	2,270,000
Salt	17	120,000
Soap	72	275,000
Artificial stone and crushed rock	795	2,178,614
Granite and marble	46	500,000
Carbonic acid gas	7	50,400
Sugar (beet), store and office fixtures	52	467,000
Syrups and extracts	3	24,000
Tanneries	25	250,000
Creamery products	62	488,999
Tin and galvanized iron and tinware	64	503,866
Willow and wooden ware	34	50,350
Patent roofing	60	675,000
Trojan powder	30	300,000
Miscellan's rubber mfg.	21	60,000
Iron pyrites	12	36,000

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	4,800	$144,000
Stock	12,113	264,238
Dairy cows—Graded	9,689	350,000
Brown Swiss	3	....
Herefords	200	....
Holsteins	3	....
Jersey	26	....
Polled Angus	1	....
Red Polled	12	....
Shorthorns	45	....
Calves	6,200	49,600
Swine	4,962	48,499
Horses—		
Thoroughbred	241	236,300
Common	21,162	2,116,200
Colts	917	53,350
Mules	231	33,035
Sheep	7,632	35,927
Lambs	5,521	14,957
Angora goats	195	3,900
Common goats	211	5,177
Total stock, all kinds		$3,355,183
Wool from herd and mohair from hides		$72,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	18,530	$92,650
Ducks	581	4,792
Geese	296	2,531
Turkeys, pounds	46,652	10,182
Eggs	1,452,000	435,600
Total value		$545,755

Miscellaneous Products.

	Value.
Honey and hives	$2,390
Hops, alfalfa seed, clover seed, flax seed, garden seed, grass seed, nursery stock, flowers, plants, etc.	412,270
Sugar beets, 50,000 tons	250,000

Summary.

Total manufacturing	$68,435,352
Total agricultural	15,303,922
Total	$83,739,274

AMADOR COUNTY.

The County of Amador is between the Cosumnes River, which forms the greater part of its northern boundary, and the Mokelumne River, which forms the greater part of its southern boundary.

The counties bordering Amador are El Dorado on the north, Alpine on the east, Calaveras on the east and south, San Joaquin on the southwest, and Sacramento on the west.

The eastern boundary reaches the crest of the Sierra Nevada Mountains, where snow remains throughout the year; thence the county stretches to the southwest a distance of sixty miles, as the crow flies, to the westerly boundary of Sacramento County and of San Joaquin County.

The boundary rivers and the many interior creeks that drain the county flow in a general westerly direction and terminate, without the boundaries of the county finally, in the Sacramento River.

Intervening between these waterways are mountain ridges, foothills, and plains. Transverse to these waterways there are, stretched across the county in a northwesterly and southeasterly direction, the metallic and mineral veins, lodes, or ledges.

In the easterly or mountainous section, we have granite and marble ledges of exceptional quality and abundant in quantity; thence to the westward we have an extensive and well-developed ledge of talc, which is used in the construction of furnaces, etc.; the next ledge, vein, or lode is the famous ''Mother Lode'' of gold-bearing quartz, covering the greatest width of the county between any two points, a distance of eighteen miles. The ''Mother Lode'' has a varying width of about three miles easterly and westerly. There are, in Amador County, upon the ''Mother Lode,'' several thoroughly equipped mining properties that yield abundant returns upon the investment. The next is a belt of copper ore, rich in copper and mined throughout the entire length of the vein within the county; the next is a belt of limestone from which is made the highest quality of lime; the next is sandstone, excellent in quality and abundant in quantity—used in building; the next is of clay, furnishing limitless material for the manufacture of firebrick, pottery of all descriptions, etc., the next and last zone is that of coal, which is mined and used locally and shipped to manufacturing centers to be used for fuel.

The rainfall insures a sufficient supply of moisture for the production of one crop of cereals each year. Where alfalfa is sown, four and sometimes five crops are, by irrigation, grown annually.

The best of natural grasses for the fattening of stock grows in abundance, and in the foothills the season is from four to six weeks earlier than it is in any other section, thereby enabling stock men to have their stock ready for the market at a time when a cent to a cent and a half more per pound can be obtained.

About one third of the area of the county—the eastern portion—is covered with magnificent forests of sugar pine, yellow pine, fir, spruce, cedar, the different kinds of oak, and many other kinds of trees. One sawmill this year cut 2,042,000 feet of lumber. Better means of transportation and a greater investment of capital in sawmills are all that are wanted to multiply this output many times and for many years to come.

The development of the varied resources of the county is greatly handicapped as a result of insufficient and unsuitable means of transportation. There are but twenty miles of railroad in the county, and there are no navigable waterways. Most of the shipments of the produce from the interior of the county are made by means of teams.

Because of the abundance and the cheapness of fuel coal and wood, and of the sufficiency of the water supply, and the tremendous fall to be obtained, manufacturing within the limits of Amador County is becoming a most important project.

Among the leading manufactories of the county now operating may be mentioned the California Gas and Electric Company's electric power plant upon the Mokelumne River, at Electra. This plant has a capacity sufficient to generate 27,000 horsepower, and has a transmission line furnishing power and light for the cities of Stockton, Oakland, Alameda, San Francisco, San José, and others along the route of the transmission line.

The American River Electric Power Line traverses the county along the "Mother Lode."

Other manufactories are the Amador Roller Flour Mills, the Ione Fire Brick Works, the Carbondale potteries, the Ione Creamery, the Jackson Brewery, the Sutter Creek Brewery, the Jackson Soda Works (two), the Sutter Creek Foundry, the Sutter Creek Ice Plant, the Jackson Ice Plant, the Sutter Creek Sash and Door Factory, and the Amador County Steam Laundry at Sutter Creek.

The raising of mules, horses, and cattle is a thriving industry. Horticulture and viticulture are growing industries and are successfully carried on. There are thousands of acres in Amador County adapted to the production of grapes—particularly the wine varieties. The 12,000 acres of land in Shenandoah Valley have been practically demonstrated to be an exceptional viticultural belt. This land may be purchased for from $10 to $25 per acre. All kinds of vegetables grow luxuriantly.

The adaptability of the altitude, the soil, and the climate to the successful and proper development of vegetation and the sufficiency of rainfall and the facilities for irrigation, make it possible for every known product to be fostered in Amador County.

Thousands of tons of apples and potatoes that have never been excelled in flavor, keeping quality, or size, are raised annually in this county.

We have four clay mines or banks that ship about 22,000 tons of clay a year. They employ about 20 men and ten teams.

We also have one cheese factory that makes about 20,000 pounds of cheese per day, which is valued at about $3,500.

There are also two coal mines that give employment to about twenty men.

The metals and minerals to be found here, constitute gold, silver, copper, iron, galena, arsenic, asbestos, clay, amphibolite, obsidian, marble, granite, sandstone, slate, limestone, and coal.

For deep quartz mining; for the cultivation of the grape, the apple, the pear, the olive, the potato; for the raising of mules, horses, and cattle; for the manufacture of fire and building brick, pottery, flour, lime, cement, butter, beer, and mining machinery, for the quarrying of marble, granite, sandstone, and slate—Amador County furnishes the safest inducements to the investment of capital.

During the year ending June 30, 1907, 420 stamps, crushing five tons of ore each per day, dropped an average of 360 days. At an average of $5 per ton, the gross output for the year amounts to $3,780,000. Notwithstanding the great output of bullion during the years past, from the mines of Amador County, but little is known of the nature, or extent, or value of the gold-bearing quartz lodes.

Practical demonstrations seem unquestionably to have proven the fact that the quartz-gold ore mines yield more satisfactory returns as the depth from the croppings at the surface increases.

Of the 11,116 population in the county, fully one half depend directly or indirectly on mining as a means of gaining a livelihood. The mining industry alone affords ample opportunity for investment of capital sufficient to provide employment for a population ten times that now credited to the county.

STATISTICS OF AMADOR COUNTY, 1906-7.

General Statistics.

Area, 568 square miles.	
Number of farms	852
Number of acres assessed	270,855
Value of country real estate	$2,937,731
Of improvements thereon	$1,009,923
Of city and town lots	$287,045
Of improvements thereon	$764,593
Of personal property	$715,421
Total value of all property (including S. P. R. R., $176,080)	$5,890,793
Expended on roads, last fiscal year	$22,413
Expended for bridges, last fiscal year	$5,831
Number of miles of public roads	615
Road levy per $100, 1907	33c
Value of county buildings	$50,000
Irrigating ditches, miles, 151½; cost	$102,700
Railroads, steam—miles, 20; assessed value	$262,812
Electric power plants—21; assessed value	$223,500
Electric power lines — miles, 51½; assessed value	$29,050
Number of acres irrigated	6,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	3,850	1,390	$55,600
Barley	4,450	1,068	32,040
Oats	2,130	511	15,330
Corn	320	640	25,600
Total cereals	10,750	3,609	$128,570
Alfalfa hay	1,130	5,650	$67,800
Grain hay	4,025	8,050	120,750
Grass hay	1,126	1,126	11,260
Total hay	6,281	14,826	$199,810

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines	171,000	$37,470
Sweet wines	2,000	800
Beer (30 gal. to bbl.)	5,220	41,760
Brandy	750	1,500
Cider	100	40
Vinegar	3,700	925

Number of wineries, 5; distilleries, 2; breweries, 2.

Dairy Industry.

	No.	Production.	Value.
Creameries	1	....	......
Skimming stations	2	....	$7,600
Butter, pounds		156,000	58,250
Cheese, pounds		20,000	3,500

Livestock Industry.

	Number.	Value.
Cattle—Beef	861	$16,887
Stock	13,525	155,037
Dairy cows—Graded	27	570
Common	2,587	51,315
Thoroughbred—Shorthorns, bulls	41	504
Calves	1,528	7,669
Swine	1,590	5,055
Horses—Graded	24	5,000
Common	2,220	90,968
Colts	257	5,905
Jacks and jennies	3	160
Mules	197	10,135
Sheep	2,213	4,463
Lambs	49	38
Angora goats	155	310
Common goats	713	1,412
Total stock all kinds	25,990	$354,428
Wool, pounds	4,050	..
Mohair, pounds	30	$6

STATISTICS OF AMADOR COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	428,400	$8,568
Apricots	405,000	8,100
Blackberries	5,500	450
Beans	13,000	520
Beets	13,000	260
Cabbage	20,000	400
Celery	3,500	350
Cauliflower	2,000	200
Corn	70,000	2,800
Currants	400	40
Cherries	40,700	2,035
Figs	25,000	1,250
Gooseberries	200	20
Grapes	7,609,000	80,450
Loganberries	500	50
Nectarines	25,500	1,275
Onions	120,000	2,400
Oranges, boxes	50	150
Olives	25,000	1,500
Pears	323,000	6,460
Peaches	347,750	7,133
Peas	8,000	400
Persimmons	500	25
Plums	60,000	1,200
Irish potatoes	875,000	15,200
Sweet potatoes	1,000	20
Prunes	319,000	6,380
Quinces	17,500	395
Raspberries	750	188
Strawberries	3,500	575
Tomatoes	32,000	960
Total	....	$149,754

Dried—	*Pounds.*	*Value.*
Almonds	4,000	$500
Apples	14,000	1,570
Beans	1,000	30
Chestnuts	12,000	1,500
Currants	1,500	150
Figs	600	36
Grapes	200	20
Nectarines	2,000	200
Onions	110,000	2,200
Pears	31,200	2,700
Peaches	25,800	2,150
Plums	37,100	3,250
Prunes	126,600	7,340
Raisins	1,000	83
Walnuts	12,500	1,500
Totals	379,500	$23,229

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	3,251	$13,755
Ducks	23	138
Geese	23	380
Turkeys	120	3,130
Eggs	48,445	12,045
Total value		$29,448

Manufactured Output.

	Quantity.
Flour, barrels	2,000
Lime, barrels	600
Malt, tons	375
Hides, pounds	8,200
Lard, pounds	22,900
Tallow, barrels	93
Olive oil, gallons	150

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	11,068	1,353	12,421
Apricot	2,916	110	3,026
Cherry	2,959	120	3,079
Fig	2,835	55	2,890
Lemon	63	11	74
Nectarine	1,052	..	1,052
Olive	1,947	88	2,035
Orange	1,053	176	1,229
Peach	12,682	1,010	13,692
Pear	10,742	619	11,361
Plum	10,201	80	10,281
Prunes	13,132	575	13,707
Quince	692	...	692
Other kinds	80	...	80
Total fruit trees	71,422	4,197	75,619
Almond	5,431	650	6,081
Chestnut	2,118	4	2,122
Pecan	25	...	25
Walnut	1,155	190	1,345
Total nut trees	8,729	844	9,573
Grapevines	357,540	35,000	392,540
Berries, acres	35	......	35

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	70,400	....
Sawmills	3	....
Charcoal, sacks	10,000	....
Fuel, wood, cords	8,115	$56,392
Lumber, feet	200,000	4,000,000
Posts, pieces	9,200	....
Sash and door factories	1	1,500
Shakes, thousand	796,750	.....
Shingles, thousand	950	.....
Poles	128,500	8,500
Lagging	167,000	11,775
Logs	53,950	107,900
Total value		$536,057

Power used for mills and manufactories in county—Steam, 13; electrical, 7; water, 7.

Miscellaneous Products.

	Pounds.	*Value.*
Sorghum, cane	730,000	....
Tobacco	500	$50
Gold ore crushed, tons	756,000	3,780,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	1	25	......
Carriages and wagons	1	4	......
Flouring mills	1	3	$1,500
Foundries and iron works	2	24	60,000
Lime	1	5	......
Malt	2	9	22,500
Meat products—			
Hides	6	18	12,863
Lard	..	..	3,640
Meat packed	..	..	1,384
Tallow	..	..	1,384
Sandstone	1	..	......
Electrical supplies	1	2	5,000
Ice plants	2	6	58,400

BUTTE COUNTY.

Butte County has an area of 1,777 square miles, consisting of three sections—mountain, foothill, and plain. It is situated north of the center of the State, about 150 miles north of San Francisco; its winter climate is as warm as that claimed for southern California; there is an abundance of rain, the average being about twenty-five inches each season. The supply of water for power and irrigation purposes is unlimited.

Embraced within its boundaries there is perhaps more diversity of climate, scenery, and industrial pursuits than any other county in California. The valley section is devoted to the growing of deciduous fruits, dairy products, and cereals; the warm thermal belt along the foothills is devoted chiefly to the growing of oranges, olives, figs, and many of the deciduous fruits; in the higher hills and mountains forming the eastern portion of the county stock raising, lumbering, and mining are extensively engaged in; apple growing is also becoming an important industry in the higher altitudes. In the middle of summer, when the orange trees are crowding to maturity their crop of oranges to be harvested during the following November, one can in a day's drive arrive at an altitude in the high Sierras and enjoy snowballing; while, on the other hand, he can within a day's drive from the snowcapped mountains in the middle of winter reach the county seat in the valley and pick from the trees oranges for his Christmas dinner.

Butte County has two rivers—the Sacramento and the Feather, as well as Butte Creek, Honcut Creek, Chico Creek, Rock Creek, and Pine Creek. The Sacramento, which heads at Mount Shasta in the extreme northern portion of the State, takes its course directly southward, approximately on the north and south center line of the Sacramento Valley, and on its course southward forms the western boundary of Butte County. It is navigable from a point 100 miles north from Butte County during its entire length southward to the San Francisco Bay. Along its banks are some highly diversified and profitable farms, the products from which are mainly shipped to the markets by river steamers. Water for irrigation is taken from this river.

The second river in size, but perhaps the first in commercial value to Butte County, is the Feather. The main river and its three great tributaries drain an area of 4,000 square miles. In the higher altitudes it supplies water for a large acreage of grazing land, where thousands of cattle are raised annually. A little farther on in its descent towards the valley, it supplies water for three large irrigation ditches. Leaving the valley, it supplies water for three large irrigation ditches. leaving the river at different points, these ditches wind around through the foothills on the eastern boundary of the county, irrigating many acres of orange, olive, and deciduous fruit trees, and as the ditches emerge into the valley from the foothills they continue to nourish a beautiful green lawn of these fruits. The river itself after contributing these irrigation waters, comes tumbling into the Sacramento Valley at Oroville, where it spreads out into a quiet, slumbering stream and winds its way through the valley toward the southwesterly corner of the county. At a point about seven miles in this direction from Oroville it again contributes to the wealth of the county by supplying the large Butte County Canal with abundant water for the irrigation of 150,000 acres of fertile valley land, upon which is produced alfalfa, stock, berries, poultry, vegetables, and every deciduous and citrus fruit known to California. The total area now irrigable in Butte County from the Feather River is estimated at 200,000 acres.

On the Feather is located the plant of the Great Western Power Company. This is said to be the largest power plant in the world. The Colgate Power Plant sends one of its largest branches into Butte County, and many large gold dredges operating in the immediate vicinity of Oroville receive power from it. The De Sabla Power Plant, on Butte Creek, Butte County, also furnishes a large amount of power, which is used for the purpose of lighting the City of Chico, furnishing power for the Oroville gold dredges, and then extending on to the cities southward.

The Feather River is also navigable for small vessels from San Francisco Bay to the City of Marysville, a distance of twenty-five miles below Oroville; in the early days it was navigated as far as Oroville, but this valuable feature was neglected during the days of the gold excitement in California, and the river was permitted to spread out and grow shallow in many places. Measures are now on foot to make it navigable as far as Oroville again.

Butte County is well equipped for railroad transportation: The new Western Pacific Railway enters the eastern boundary of the county and follows the course of the Feather River down through the mountains, entering the plains at Oroville, and thence passes on to San Francisco. It is a transcontinental road, being a part of the 16,000-mile system known as the "Gould System." This road will be in operation within one year. Besides the Western Pacific, the California & Oregon Railroad, and part of the Southern Pacific traverse the county from north to south; the Butte County Railroad extends from Chico into the Sierra Nevada Mountains about thirty miles to Stirling City. Within the past year the Northern Electric Company, starting at the City of Chico, has been put in running order to the City of Oroville, thence south to Biggs and Gridley, and from these cities on to Marysville, until now it is completed to the City of Sacramento, thus connecting Butte County with the State Capital over three lines of railroad. These three lines of road also connect the county with tidewater, as well as a direct tidewater connection by steamer down the Sacramento River from Butte County.

More than 500 carloads of the finest oranges grown in the State go from this county each year, and reach the Eastern market from four to six weeks earlier than those grown in the southern parts of the State.

About fifty per cent of the olives raised in Butte County go to Los Angeles County, and are there made into pickles and oil. There is now located in Oroville, the Ehmann Olive Oil and Pickling Works, by far the largest olive oil plant in the United States; also the Ekman & Stow and Mount Ida Olive Processing plants. Olives and oil from these establishments are now being shipped to all parts of the civilized world, and are rated the best to be had.

The mountain districts of the county are filled with sugar and yellow pine and numerous varieties of hardwood, while the earth is seamed with some of the best quartz and placer mines found in the State.

Butte County has the only diamond mine in North America, and it is now being worked by men who have been trained in the diamond fields of Africa.

The important cities and towns of Butte County are Chico, Oroville, Gridley, Biggs, Stirling City, Honcut, Magalia, and Paradise.

Chico has a population of 12,000, electric street railway, electric interurban line, and near that city is located the U. S. Plant Introduction Garden. It has eleven churches, State normal school, a $50,000 high school, good grammar schools, and a 1,790-acre public park. The Diamond Match Company's large factory is located in Chico, employing 500 men.

Oroville, the county seat, has a population of 5,000, is well equipped in an educational way, has a most complete grammar-school system, and an accredited high school. Churches of all denominations are represented there.

STATISTICS OF BUTTE COUNTY, 1906-7.

General Statistics.

Area, 1,727 square miles, or acres.	1,100,800
Number of farms	1,953
Number of acres assessed	901,680
Value of country real estate	$13,973,931
Of improvements thereon	$2,817,301
Of city and town lots	$2,596,914
Of improvements thereon	$3,808,910
Of personal property	$5,433,928
Total value of all property	$28,630,934
Expended on roads, last fiscal year	$54,467
Expended for bridges, last fiscal year	$91,281
Number of miles of public roads	1,600
Road levy per $100, 1907	40c
Value of county buildings	$250,000
Irrigating ditches—miles, 442; cost	$1,326,000
Railroads, steam—miles, 151; assessed value	$1,344,319
Railroads, electric—miles, 42; assessed value	$146,279
Electric power plants—4; assessed value	$96,500
Electric power lines — miles, 117; assessed value	$32,250
Number of acres irrigated	12,500

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	48,028	26,602	$744,856
Barley	30,506	19,724	522,438
Oats	4,830	3,082	123,280
Corn	906	4,050	81,000
Total cereals	84,270	53,458	$1,471,574
Alfalfa hay	8,190	30,785	$246,280
Grain hay	26,559	69,738	728,666
Grass hay	1,027	1,854	11,124
Total hay	35,776	102,377	$986,070

Wines, Brandies, Etc.

	Gallons.	*Value.*
Sweet wines	7,250	$2,900
Brandy	120	96
Vinegar	25,000	5,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	43,939	9,941	53,880
Apricot	17,445	1,940	19,385
Cherry	7,436	1,154	8,590
Fig	11,630	1,155	12,785
Lemon	1,081	303	1,384
Nectarine	2,117	345	2,462
Olive	58,955	7,477	66,432
Orange	179,993	37,476	217,469
Peach	304,286	56,820	361,106
Pear	27,746	1,448	29,194
Plum	10,206	2,324	12,530
Prunes	240,209	21,889	262,098
Quince	3,276	35	3,311
Other kinds	4,785	......	4,785
To. fruit trees	913,104	142,307	1,055,411
Almond	81,805	21,130	102,935
Chestnut	405	45	450
Pecan	125	...	125
Walnut	3,764	303	4,067
Total nut trees	86,099	21,478	107,577
Grapevines	491,665	72,900	564,565
Berries, acres	253	27	280

Fish Industry.

	Pounds.	*Value.*
Salmon	251,580	$11,250

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	150,000	$45,000
Butter, pounds		269,825	67,456

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	62,527	$312,630
Ducks	202	1,212
Geese	75	1,500
Turkeys	1,863	85,890
Eggs	500,215	125,053
Total value		$526,285

STATISTICS OF BUTTE COUNTY, 1906-7—Continued.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	20,644	$557,388
Stock	17,236	346,520
Dairy cows—Graded	6,750	270,000
Guernsey	30	1,675
Herefords	127	3,925
Holsteins	164	5,250
Jersey	120	5,275
Polled Angus	40	4,000
Red Polled	37	1,260
Shorthorns	1,875	33,840
Calves	7,667	84,337
Swine	33,090	231,630
Horses—		
Thoroughbred	202	303,975
Standard-bred	172	60,200
Common	10,201	1,632,160
Colts	2,243	100,935
Jacks and jennies	45	18,000
Mules	3,061	459,150
Sheep	108,082	432,328
Lambs	25,625	51,250
Angora goats	1,908	7,632
Common goats	548	1,096
Total stock all kinds	239,867	$4,611,726
Wool, pounds	937,694	$130,654
Mohair, pounds	16,197	4,860

Forest Products.

	Amount.	*Value.*
Area timber lands, acres	350,000	....
Cedar, acres	35,000	....
Pine, acres	140,000	....
Fir, acres	175,000	....
Sawmills, number	14	....
Charcoal, sacks	300	$135
Fuel, wood, cords	105,297	1,052,970
Laths, thousand	375,000	1,500
Lumber, feet	63,148,000	1,762,960
Pickets, pieces	504,500	17,660
Piles	1,500	12,000
Posts, pieces	23,200	3,480
Railroad ties, pieces	249,460	199,560
Sash and door factories, number	2	50,000
Shakes, thousand	315,000	3,937
Shingles, thousand	1,000,000	4,000
Total value		$3,108,202

Power used for mills and manufactories in county—Steam, 12; electrical, 10; water, 2.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, number	1,357	$3,393
Beeswax	850	215
Honey	20,723	1,450
Hops	384,000	64,000
Sorghum, cane	10,000	50
Syrup, gallons	100	25
Sugar beets, tons	9,546	42,562
Melons, acres	125	31,250
Pumpkins, tons	5,000	5,000
Turnips, sacks	350	350
Carrots	350	350
Parsnips	400	400
Squash, tons	150	6,000
Various garden prod'cts	...	75,000

Manufactured Output.

	Quantity.
Brick	250,000
Cigars	200,000
Flour, barrels	25,000
Olive oil, gallons	59,820

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,972,141	$49,303
Apricots	19,385	1,550
Asparagus	17,740	1,419
Blackberries	249,275	14,956
Beans	107,460	4,298
Beets	22,245	444
Cabbage	217,875	4,357
Celery	22,420	896
Cauliflower	34,636	693
Corn	301,995	1,650
Currants	1,250	625
Cherries	163,835	8,200
Figs	1,198,445	11,984
Grapes	569,758	18,000
Grape fruit	53,870	21,548
Lemons, boxes	1,250	3,750
Loganberries	35,565	2,500
Nectarines	57,950	1,160
Onions	224,000	1,100
Oranges, boxes	490,432	735,648
Olives	7,987,500	159,720
Pears	945,155	33,180
Peaches	6,836,900	170,950
Peas	37,875	780
Persimmons	15,775	788
Plums	523,500	10,470
Irish potatoes	1,984,700	29,770
Sweet potatoes	272,280	5,445
Prunes	2,405,125	48,250
Quinces	57,486	840
Raspberries	25,890	2,589
Strawberries	50,603	5,100
Tomatoes	909,935	13,650
Total	....	$1,365,613
Dried—	*Pounds.*	*Value.*
Almonds	407,150	$61,072
Apples	2,350	135
Apricots	5,500	1,375
Beans	42,500	1,275
Chestnuts	3,570	525
Figs	881,700	22,045
Nectarines	2,000	200
Onions	244,000	97,600
Pears	174,000	20,880
Peaches	1,599,870	159,987
Plums	38,030	1,140
Prunes	9,332,945	476,000
Raisins	363,740	25,451
Walnuts	47,913	7,200
Totals	13,145,268	$874,885
Canned—	*Cases.*	*Value.*
Apples	15	$45
Blackberries	205	1,230
Beans	110	264
Pears	550	1,675
Peaches	62,575	250,300
Raspberries	150	900
Tomatoes	2,450	4,900
Loganberries	150	900
Totals	66,205	$260,214

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	2	75	$20,000
Brick	2	6	30,000
Cigars	2	4	10,000
Confectionery	6	9	25,000
Flouring mills	2	19	168,450
Foundries and iron works	8	255	240,000
Matches	1	5	....
Olive oil	4	50	239,280
Pickled olives	2	..	37,500
Planing mills	2	30	400,000
Green hides, 5,642	.	..	28,210

CALAVERAS COUNTY.

Calaveras County is a triangular-shaped county with an area of almost 1,000 square miles. It is about centrally located west of the Sierra Nevada Mountains and east of the Sacramento-San Joaquin Valley. From its mountain regions, in the eastern part, it slopes gradually westward through rolling foothills. Owing to this difference in altitude, there is a variety of rainfall and climate. Passing from the lower foothills to the higher altitudes, the rainfall increases.

The western part of the county is particularly adapted to farming. Wheat, oats, and barley are grown in considerable quantities, and alfalfa is raised with profit.

East of the farming section are the mining and timber regions. The mines of Calaveras County are world renowned, the famous Mother Lode crossing the county in a northwesterly and southeasterly direction. Here is the treasure vault of the world awaiting development.

The forests on the mountain sides furnish the supply of lumber and timber used in the mines. Here are thousands of acres of choice sugar pine, yellow pine, spruce, fir, and cedar, in addition to the ''Sequoia Gigantea,'' the largest trees in the world. Owing to its mining and lumbering the growing of fruits is neglected, but most any kind of fruit or nuts do splendidly.

Stock raising is important, the mountains supplying abundant pasture for summer range, and the foothills for winter.

With the extension of the railroads, affording a method of securing cheap fuel and transportation facilities for the mines, the wholesale manufacture and exportation of lumber, and the production of its choice fruits, Calaveras is destined to be always an important county.

SATISTICS OF CALAVERAS COUNTY, 1906-7.

General Statistics.

Area, 990 square miles, or 633,600 acres.	
Number of farms..........	2,015
Number of acres assessed...	484,651.6
Value of country real estate..	$3,124,100
Of improvements thereon....	$1,277,215
Of city and town lots.......	$190,115
Of improvements thereon....	$666,625
Of personal property........	$877,635
Total value of all property..	$6,162,555
Expended on roads, last fiscal year	$20,147.30
Expended for bridges, last year	$4,000
Number of miles of public roads	400
Road levy per $100, 1907....	35c
Value of county buildings...	$45,000
Irrigating ditches — miles, 800; cost	$755,000
Railroads, steam — miles, 20 11-100; assessed value..	$331,172
Electric power plants—1; assessed value	$50,000
Electric power lines—miles, 120; assessed value.......	$60,000
Number of acres irrigated...	13,700

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	14,200	3,000	17,200
Apricot	2,252	195	2,447
Cherry	812	121	933
Fig	2,078	52	2,130
Lemon	75	25	100
Nectarine	221	11	232
Olive	8,553	330	8,883
Orange	924	296	1,220
Peach	12,300	1,000	13,300
Pear	5,000	200	5,200
Plum	3,500	...	3,500
Prunes	7,200	300	7,500
Quince	500	25	525
Total fruit trees.	57,615	5,555	63,170
Almond	10,000	500	10,500
Chestnut	150	50	200
Pecan	.....	5	5
Walnut	2,000	750	2,750
Total nut trees..	12,150	1,305	13,455
Grapevines	10,000	800	10,800
Berries, acres ...	100	10	110

STATISTICS OF CALAVERAS COUNTY, 1906-7—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	500	450	$12,000
Barley	550	275	6,875
Oats	1,000	500	13,000
Corn	100	75	2,250
Total cereals	2,150	1,300	$34,125
Alfalfa hay	900	2,700	$27,000
Grain hay	10,000	12,500	175,000
Grass hay	10,000	10,000	85,000
Total hay	20,900	25,200	$287,000

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	750,000	$15,000
Apricots	30,000	1,500
Asparagus	15,000	500
Blackberries	70,000	4,000
Beans	100,000	5,000
Beets	55,000	225
Cabbage	225,000	2,500
Celery	4,000	400
Cauliflower	48,255	600
Corn	125,368	2,325
Currants	2,025	20
Cherries	21,100	1,000
Figs	170,000	2,150
Gooseberries	1,000	50
Grapes	4,000,000	50,000
Lemons, boxes	150	600
Loganberries	30,000	2,000
Nectarines	500	20
Onions	90,000	1,800
Oranges, boxes	500	2,000
Olives	100,000	4,000
Pears	175,000	3,000
Peaches	500,000	15,000
Peas	30,000	1,000
Persimmons	50	3
Plums	150,000	2,000
Irish potatoes	600,000	12,000
Sweet potatoes	10,000	200
Prunes	320,000	5,000
Quinces	25,000	525
Raspberries	25,000	650
Strawberries	75,000	1,500
Tomatoes	350,000	5,000
Total	....	$141,568

Dried—	*Pounds.*	*Value.*
Almonds	80,000	$9,000
Apples	2,000	400
Apricots	1,000	600
Beans	12,000	3,600
Chestnuts	5,000	500
Figs	2,500	250
Onions	200,000	3,000
Prunes	200,000	8,000
Walnuts	500,000	6,000
Totals	1,002,500	$31,350

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	......	....
Butter, pounds	..	75,000	$25,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	60,000	$30,000
Sweet wines	5,000	3,500
Beer, barrels	7,000	22,750
Brandy	1,000	2,000
Vinegar	3,000	1,000

Number of wineries, 15; distilleries, 4; breweries, 1

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	5,000	$125,000
Stock	25,000	375,000
Dairy cows—Graded	25	1,250
Thoroughbred—Shorthorns	10,000	50,000
Calves	4,500	36,000
Horses—Thoroughbred	65	6,500
Standard-bred	4,000	300,000
Common	500	15,000
Colts	100	1,000
Jacks and jennies	325	30,000
Mules	75,000	225,000
Sheep	20,000	30,000
Lambs	55	165
Angora goats	2,500	6,250
Total stock all kinds	147,070	$1,201,165
Wool, pounds	100,000	$20,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	4,000	$22,000
Ducks	30	180
Geese	25	375
Turkeys	340	8,500
Eggs	320,000	64,000
Total value		$95,055

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	160,000	$2,000,000
Sawmills, number	7	70,000
Charcoal, sacks	5,500	1,650
Fuel, wood, cords	15,000	60,000
Lumber, feet	5,000,000	150,000
Posts, pieces	10,000	1,000
Shakes, thousand	175	8,000
Total value		$2,290,650

Power used for mills and manufactories in county—Steam, 16; electrical, 10; water, 15.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 250	.....	$800
Honey	6,500	500

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Foundries and iron works	1	35	$70,000
Meat products—Hides, 19,000	..	..	15,000
Ice plants	4	6	6,000

COLUSA COUNTY.

In affection, the people of this county have named it "The County of Good Luck." By successive experiments, they have demonstrated that there is no product of the United States but may be grown within its borders. Every variety of vegetable, grain, or fruit, including almonds, prunes, apricots, raisins, and olives, which are not produced in the United States outside of the Pacific Coast, and all citrus fruits, are produced to perfection.

At the midwinter fair, held in San Francisco during the winter of 1894-95, in competition with all sections, Colusa took the first prize for navel oranges and for grape fruit or pomelos.

A large portion of the county is still farmed to wheat and barley, of which the yield is from 15 to 50 bushels per acre of barley, and from 10 to 40 bushels of wheat. But within the last few years several thousand acres of orchard and vineyard have been planted. The favorite fruits are prunes, Bartlett pears, apricots, peaches, apples, plums, and raisin grapes. The greater portion of this fruit is dried in the sun and shipped East.

While the growth of grain, fruit, and vegetables has been usually without irrigation, yet the Sacramento River is available and carries enough water to irrigate the entire valley, and there is a pronounced movement on now to utilize it. Pumping plants are being placed in great numbers by individuals. Irrigation companies have been formed. Several canals have been dug, and are in successful operation. A branch of the Central Irrigation Company's system has been completed into the county, and is supplying water to landowners.

With irrigation have come extensive alfalfa fields, and stock raising is becoming a profitable and growing industry. Without irrigation, from three to five crops of alfalfa are cut each season. With irrigation, the crops are from five to eight each year.

The county extends from the summit of the Coast Range on the west down across the valley to the Sacramento River on the east, some portions lying on the east side of the river. About one half is in the Sacramento Valley, one third is arable hills, one tenth interior valleys, and the balance mountainous.

Along the river, bordering the foothills and in many of the smaller valleys, the soil is a loose, rich, sandy loam, easily worked, retaining moisture and very fertile. The foothill soil is rich, mellow, easily worked and possessing every element of adaptation to the raising of all fruits known to temperate or semi-tropic countries. The main valley is deep, rich alluvium, and gave Colusa County the distinction for many years of the banner wheat county.

Dairying and poultry raising are carried on with profit, and there are several creameries and skimming stations. A mild, equable climate makes poultry raising safe and profitable.

In the Coast Range are deposits of gold, cinnabar, copper, chromic iron, and quicksilver. The Manzanita mine, near Sulphur Creek, has been taking out gold-bearing rock during the past season, which it will crush during the winter. The Wide Awake mine, near the same place, with a capacity of reducing thirty-five tons of ore per day, mined 11,000 pounds of quicksilver during the past run. Crude oil of high grade has been found, but never to date in paying quantity.

There are a number of salt springs in the foothills, from which a fine quality of salt is made. Natural gas is abundant, and only needs development.

In the foothills near Sites a superior quality of sandstone for building purposes is found. Two quarries are in operation, and the stone is shipped and used throughout the State. The Ferry Building, Hall of Justice, and Flood Building, of San Francisco, and many of the finest structures of the State were constructed of this stone.

Health resorts which combine the beneficence of climate with medicinal waters are located in the western mountains. Wilbur Springs, at Sulphur Creek, is famed especially for the cure of rheumatism and kindred ailments. Cooks Springs and Fouts Springs are bidding for popular favor, with every arrangement for pleasure and comfort of guests, and flowing springs of natural mineral waters that accomplish wonderful cures.

The Sacramento River traverses the county from north to south, is navigable each day of the year, gives each farmer on its banks his own landing so that he can ship his products from his own door by boat, and regulates freight rates on the railroad, which also crosses the county.

"The County of Good Luck", where the climate knows no extreme, sheltered against fog and storm, dry, mild, and equable. Flowers bloom each day of the year. Epidemics unknown. Statistics show that there is no more healthy locality in the United States than Colusa County.

STATISTICS OF COLUSA COUNTY, 1906-7.

General Statistics.

Area, 1,080 square miles, or 691,200 acres.	
Number of farms	844
Number of acres assessed	606,599
Value of country real estate	$9,154,105
Of improvements thereon	$571,925
Of city and town lots	$354,150
Of improvements thereon	$665,890
Of personal property	$1,605,283
Total value of all property	$12,351,353
Expended on roads, last fiscal year	$27,396
Expended for bridges, last fiscal year	$9,745
Number of miles of public roads	1,255
Road levy per $100, 1907	35c
Value of county buildings	$100,000
Irrigating ditches—miles, 15; cost	$2,900
Railroads, steam—miles, 56; assessed value	$791,554
Electric power plants—1; assessed value	$3,500
Electric power lines — miles, 16; assessed value	$1,280
Number of acres irrigated	843

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	....	....
Skimming stations	4	....	....
Butter, pounds	..	288,395	$82,635

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Asparagus	60,000	$3,000
Blackberries	5,000	250
Beets	4,000	100
Cabbage	50,000	750
Celery	20,000	500
Corn	25,000	300
Grapes	1,520,000	7,600
Loganberries	2,000	160
Oranges, boxes	2,000	5,000
Pears	48,000	2,400
Irish potatoes	1,240,000	18,600
Sweet potatoes	30,500	610
Total	....	$39,270

Dried—	*Pounds.*	*Value.*
Almonds	27,500	$41,125
Beans	420,000	12,600
Figs	40,000	2,000
Onions	200,000	3,000
Pears	3,600	450
Peaches	9,500	950
Peanuts	1,500	75
Plums	5,500	550
Prunes	2,488,000	87,080
Raisins	1,084,000	54,200
Walnuts	55,000	750
Totals	4,334,600	$165,780

STATISTICS OF COLUSA COUNTY, 1906-7—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Tons.	*Value.*
Wheat	9,917	$297,510
Barley	55,717	1,392,925
Oats	140	3,500
Corn	3,862	96,500
Totals cereals	69,636	$1,790,435
Alfalfa hay	5,760	$57,600
Grain hay	42,220	295,540
Total hay	47,980	$353,140

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	7,710	.....	7,710
Apricot	17,170	1,100	18,270
Cherry	1,150	200	1,350
Fig	4,140	2,000	6,140
Lemon	650	100	750
Olive	5,350	1,045	6,395
Orange	6,825	1,125	7,950
Peach	10,900	.....	10,900
Pear	5,125	.....	5,125
Prunes	78,000	5,100	83,100
Total fruit trees	137,020	10,670	147,690
Almond	23,320	5,120	28,440
Walnut	2,150	1,200	3,350
Total nut trees	25,470	6,320	31,790
Grapevines	326,800	364,000	690,800
Berries, acres	40	10	50

Mineral Waters.

	Gallons.	*Value.*
Cooks Springs mineral water	252,962	$80,948

Fish Industry.

	Pounds.	*Value.*
Black bass	20,533	$2,053

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,620	$9,720
Ducks	21	105
Geese	4	36
Turkeys	1,230	30,750
Eggs	117,120	29,280
Total value		$69,891

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	1,450	$47,850
Stock	16,240	324,800
Dairy cows—Graded	2,550	76,500
Calves	5,293	52,930
Swine	17,675	106,050
Horses—		
Thoroughbred	4	1,000
Common	3,240	243,000
Colts	1,020	30,600
Jacks and jennies	39	4,265
Mules	3,594	359,400
Sheep	64,000	192,000
Lambs	31,000	46,500
Angora goats	4,500	13,500
Total stock all kinds	150,605	$1,498,395
Wool, pounds	512,000	$76,800
Mohair, pounds	18,000	4,500

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	830	$5,810
Lumber, feet	500,000	17,500
Total value		$23,310

Power used for mills and manufactories in county—Steam, 2; sawmill, 1; flour mill, 1.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 740	......	$740
Broomcorn	420,000	15,750
Honey	16,320	2,080
Alfalfa seed	43,900	6,585
Dressed poultry	654,123	.....
Wild game	85,432	.....

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	1	2	$4,000
Flouring mills	1	6	85,000
Meat products—			
Hides, 2,840	..	..	8,520
Lard, 65,700 lbs.	..	..	9,855
Tallow, 36,000 lbs.	..	..	2,880
Sandstone	2	46	100,704

Manufactured Output.

	Quantity.
Cigars	80,000
Flour, barrels	15,000

CONTRA COSTA COUNTY.

Contra Costa is one of the central counties, its shore line being within 14 miles of San Francisco. It possesses unusually good traveling facilities, both by rail and by steamer. The county has 70 miles of water-front, nearly all of which is upon deep water, navigable by all vessels engaged in commerce. Over three fourths of its area is cultivated, the balance being used for grazing. The only mountain of any size is Mount Diablo, which is 3,896 feet in height and almost in the geographical center of the county.

About two thirds of the area is rolling and hilly. Lying between the hills are some of the most fertile and beautiful valleys in the State, which are drained and watered by many streams, the banks of which are bordered by oak, sycamore, laurel, willow, etc., while the hills are dotted with oaks, many of which are of large size.

The farming lands in the eastern section are between the foothills and the San Joaquin River. The soil is of a rich alluvial nature, and produces wheat, barley, alfalfa, fruit, and vines. To the northward and between the uplands and the San Joaquin River is a body of tule lands, a large portion of which has been reclaimed, and is some of the most productive land in the State, being a rich deposit of sediment and decomposed vegetation. Alfalfa, asparagus, potatoes, beans, etc., are produced on the largest scale on such lands, the asparagus being shipped East by the carload during the early spring.

The average rainfall is from 18 to 23 inches, which is ample for all purposes of agriculture, horticulture, etc.

In depth, the soil throughout the county shows a remarkable continuity of rich alluvial deposits underlaid by limestone or clay. There is an occasional change to a coarse sandy and gravelly heavy loam of black or brown tint. It has great power for enduring drought, and is easy to work, giving large returns. The soil in the uplands is in character similar to that of the lowlands, and being drier, is for some purposes even better.

Irrigation is not required to insure crops; the abundant rainfall, the absence of evaporating heat, and the moisture-laden breezes from the ocean furnish abundant humidity for all forms of vegetable life without recourse to artificial irrigation.

The many beautiful valleys and the rolling hills are strikingly similar in general characteristics to the gentle slopes of sunny France. Scattered in all directions are numerous small vineyards and orchards that produce rich results. Fruit growing has proved successful and remunerative.

Grain raising is very prominent in this county. A very large acreage is planted to wheat, oats, barley, and hay.

The raising of sugar beets is a growing industry.

Vegetables of all kinds are raised very profitably and on an extensive scale; one very large tract of land is used entirely for the production of asparagus for early Eastern shipment. Potatoes, beans, etc., are also a prolific and profitable crop, especially in the central portion.

Natural feed is abundant, both on the hillsides and at a higher elevation.

Stock raising is a leading industry, as the reclaimed lowlands for summer grazing and the rolling hills for winter, close together, create conditions whereby a failure is impossible. The stock farms have produced some of the most famous trotting and pacing horses. In addition to the raising of horses, much attention is given to blooded cattle, sheep, and hogs.

Large dairies are conducted, and in the western end the product mostly shipped to the cities is milk, while in the central and eastern parts butter is the main production. Low freight and express rates give unusual advantages.

Contra Costa County is well adapted to poultry raising. Feed can be obtained cheaper than in other sections where the industry is thriving. The central part of the county is only a few hours' drive from Oakland and suburbs. The demand for eggs is always greater than the supply.

The only important mining industry is the coal mines of Mount Diablo, although some little mining for precious metals has been done.

The terminus of the Santa Fé railroad is located at Point Richmond, and many substantial improvements in the way of wharves, etc., on a very extensive plan, have been constructed.

Port Costa, the shipping point for the bulk of the grain raised in California, has extensive warehouses.

At Pinole are located large stockyards; near Vallejo Junction is the largest smelting works in the State; at Vallona are extensive lumber yards, where ships from Oregon and Puget Sound discharge. At Crockett are flouring mills; also agricultural works.

STATISTICS OF CONTRA COSTA COUNTY, 1906-7.

General Statistics.

Area, 877 square miles, or 561,267 acres.

Number of farms	1,592
Number of acres assessed	472,853
Value of country real estate	$9,745,689
Of improvements thereon	$4,127,554
Of city and town lots	$2,662,995
Of improvements thereon	$1,632,475
Of personal property	$5,775,289
Total value of all property	$27,122,288
Expended on roads, last fiscal year	$57,642
Expended for bridges and oil, last fiscal year	$7,918.74
Number of miles of public roads	400
Road levy per $100, 1907	40c
Value of county buildings	$425,000
Railroads, steam—miles, 141.33; assessed value	$3,114,328
Railroads, electric—miles, 15; assessed value	$106,980
Electric power plants—1; assessed value	$5,400
Electric power lines — miles, 59; assessed value	$100,000
Number of acres irrigated	$1,200

Fish Industry.

	Pounds.	*Value.*
Salmon	1,330,000	$66,500

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	20,000	15,000	$450,000
Barley	40,000	40,000	1,000,000
Oats	19,000	19,000	570,000
Corn	2,000	2,500	62,500
Total cereals	81,000	76,500	$2,082,500
Alfalfa hay Grain hay Grass hay	120,000	240,000	$2,160,000

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	35	......	$190,000
Butter, pounds	..	295,000	72,750
Cheese, pounds	..	11,500	2,300

Poultry and Eggs.

	Dozen.	*Value.*
Chickens Ducks Geese	13,299	$106,392
Eggs	508,333	127,083
Total value		$233,475

STATISTICS OF CONTRA COSTA COUNTY, 1906-7—Continued.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	19,050	5,000	24,050
Apricot	76,000	9,000	85,000
Cherry	20,500	9,560	30,060
Fig	5,000	875	5,875
Lemon	860	200	1,060
Nectarine	2,000	500	2,500
Olive	11,200	4,000	15,200
Orange	3,340	500	3,840
Peach	38,915	5,000	43,915
Pear	112,000	9,000	121,000
Plum	19,000	2,000	21,000
Prunes	75,000	18,000	93,000
Quince	3,800	500	4,300
Total fruit trees	386,665	64,135	450,800
Almond	275,600	20,000	295,600
Pecan	600	......	600
Walnut	18,900	11,550	30,450
Total nut trees	295,100	31,550	326,650
Grapevines	3,197,075	116,000	3,313,075
Berries, acres	345	....	345

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	250,600	$10,024
Apricots	2,280,000	91,200
Asparagus	650,000	125,000
Blackberries	58,000	5,800
Beans	3,000	20,000
Beets	81,000	500
Cabbage	8,000	1,000
Celery	16,000,000	800,000
Corn	70,000	2,100
Currants	12,000	1,200
Cherries	410,000	31,600
Figs	40,000	6,700
Gooseberries	2,150	250
Grapes	36,000,000	360,000
Grape fruit	1,500	350
Limes, boxes	100	500
Lemons, boxes	500	2,000
Loganberries	1,900	950
Nectarines	10,000	200
Onions	500,000	10,000
Oranges, boxes	1,200	3,000
Olives	223,000	11,200
Pears	1,450,000	29,000
Peaches	1,375,500	21,265
Peas	18,000	1,800
Persimmons	3,000	300
Plums	112,056	11,205
Irish and sweet potatoes, acres	9,000	1,500,000
Prunes	980,000	29,400
Quinces	19,900	7,000
Raspberries	2,850	1,000
Strawberries	10,000	1,000
Tomatoes	250,000	2,500
Total	....	$3,088,044

Dried—	*Pounds.*	*Value.*
Almonds	5,512,000	$55,120
Apricots	200,000	2,500
Beans	20,000	1,000
Grapes	10,000	500
Onions	400,000	5,000
Pears	100,000	5,000
Peaches	100,000	1,250
Prunes	100,000	4,000
Raisins	5,000	250
Walnuts	378,000	5,670
Totals	6,815,000	$80,290

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry and sweet wines	6,560,500	$3,280,250
Cider	4,000	1,200
Vinegar	10,000	1,500

Number of wineries, 62; distilleries, 3; breweries, 2.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	8,000	$320,000
Stock	20,000	700,000
Dairy cows—Graded	10,000	400,000
Angus	700	40,000
Calves	5,000	50,000
Swine	10,000	50,000
Horses—		
Thoroughbred	200	80,000
Standard-bred	1,000	160,000
Common	6,000	600,000
Colts	2,000	40,000
Mules	1,000	75,000
Sheep	20,000	60,000
Lambs	9,000	11,000
Angora goats	200	450
Total stock all kinds	93,100	$2,586,450
Wool, pounds	45,000	$6,750

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	5,000	$45,000
Paper pulp, tons	7,300	15,000
Sash and door factories, number	1	250,000
Total value		$310,000

Power used for mills and manufactories in county—Steam, 12; electrical, 10.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, number	920	$2,800
Flowers and plants, acres	100	100,000
Honey	11,000	1,100
Alfalfa seed	1,500	175
Garden seed	12,000	3,000
Sugar beets, tons	150,000	500

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	..	500	$2,152,000
Cigars	3	15	25,000
Confectionery	3	10	20,000
Flouring mills	2	...	100,000
Furniture	1	150	125,000
Lime	3	250	900,000
Matches	1	...	100,000
Hides	2	...	12,000
Olive oil	1	...	......
Paper	1	150	30,000
Powder and explosives	3	1,200	......
Pickled olives	..	.....	10,000
Planing mills	4	200	50,000
Potteries	1	50	100,000
Sugar	1	450	10,800,000
Powder works	2	1,000	9,000,703
Rubber companies	1	.....	65,000
Oil	2	3,000	14,000,000

Manufactured Output.

	No.	*No. of Employes.*	*Quantity.*
Brick	8	...	269,000,000
Lime, barrels	3	250	600,000
Paper, pounds	1	150	30,000

DEL NORTE COUNTY.

Del Norte, as its name implies, is at the far north. It is situated in the northwest corner of the State. A county of scenery unsurpassed in its grandeur, its vast redwood forests, its clear winding streams, its green fertile fields, its giant redwoods, its mountains laden with precious ores, and its rich dairy lands make it one of the most desirable places for the home seeker.

Chief among Del Norte's industries is the dairying interest. Scattered throughout the coast portion are modern, well-equipped creameries where the product of thousands of cows is turned into butter.

This industry, with the coming of better facilities for shipment, will place Del Norte in the foremost rank as a butter-producing county. Farming is carried on to a considerable extent. A large portion of the soil is especially adapted to the culture of the apple, there being a total absence of the codling-moth pest. Pears, plums, cherries, and small fruits and berries of every description bear luxuriantly. On the Klamath River, in the southern part of the county, as well as on the Smith River, in the northern part, large, well-equipped salmon canneries are operated with great success. The center of trade lies in Crescent City, the county seat, nestled on a crescent-shaped beach, where the products of the county come for shipment, generally finding their market in San Francisco, the products in the main being lumber, butter, and from the farm.

Smith River is a small town in the center of the beautiful valley of the Smith River, where such business is carried on as is usually conducted in a farm and dairy district.

Requa, a small town near the mouth of the Klamath River, is a trading post for that district.

The arable portion of the county is confined generally to the coast portion, commencing at its northern boundary and extending through its entire length, excepting a few miles to the southward of Crescent City. The arable land may be divided into three classes: First, that formed by the disintegration of sands, which with the aid of fertilization and rotation produces good crops, and is especially adapted to the growth of apples, an industry yet in its infancy. Second, those lands formed by the constant washing of rich vegetable matter and the detritus carried by streams from the mountainsides and distributed in the valleys to a great depth, known as sediment lands. Third, marsh or lake lands, a large area of which borders on Lake Earl, at times partly inundated by the overflow of the lake, but which by a system of reclamation will constitute the most valuable land in the county for dairying purposes.

The redwood timber belt, comprising 200,000 acres, commences at the north boundary line and extends in an unbroken forest to the southern boundary of the county. It can be reasonably said that no grander or finer forest exists in the world. Its immensity can be better imagined when it is stated that a single tree yields sufficient clear lumber to build a modern cottage and finish it from cellar to garret, or more particularly, when it is stated that from a tract consisting of 160 acres there have been taken 27,802,121 feet, or an average of 173,763 feet per acre. East of the redwood belt are large tracts of sugar pine and fir.

Deposits of valuable ore lie in the hills of Del Norte, but not until recent years have those with means to develop mines turned their attention to this county.

Covering the entire expanse of coast line from Humboldt Bay to the Columbia River, the roadstead at Crescent City is the only point affording opportunity for a haven of refuge, and with assistance from the United States Government in the construction of a seawall from the United States lighthouse, to the westward of Crescent City, to an outlying rock, a distance of 2,000 feet, Crescent City harbor will be made a safe and secure refuge for the innumerable water-craft now plying along the coast. The present shipping is carried on over a wharf or pier, built on wooden piles, extending out to a depth of sixteen feet at low water.

Few counties on the Pacific coast afford a more varied opportunity for the pleasure-seeker, or those in quest of rest and recreation. This point may be reached from Grant's Pass in Oregon, the nearest railroad point, thence by stage road over mountain and through dale, the entire journey replete with grand scenery.

Del Norte County is almost devoid of railroad facilities, there being but fifteen miles in operation. However, the wonderful resources of the county have attracted the attention of the railroad corporations, and they have made a survey from the Southern Pacific system in Grant's Pass, Oregon, to Crescent City, this being the only natural pass from the great valleys of the interior to the coast.

STATISTICS OF DEL NORTE COUNTY, 1906-7.

General Statistics.

Area, 1,546 square miles, or 989,000 acres.

Number of farms	149
Number of acres assessed	213,422.48
Value of country real estate	$2,958,000
Of improvements thereon	$106,680
Of city and town lots	$83,720
Of improvements thereon	$131,350
Of personal property	$322,705
Total value of all property	$3,608,630
Expended on roads, last fiscal year	$10,000
Expended for bridges, last fiscal year	$20,000
Number of miles of public roads	135
Road levy per $100, 1907	35c
Value of county buildings	$21,000
Railroads, steam—miles, 20; assessed value	$35,000
Electric power plants—1; assessed value	$1,500

Cereal Products and Hay.

Tons of 2,000 pounds.

Wheat, 150 acres, 25 bushels to acre; barley, 350 acres, 30 bushels to acre; oats, 1,500 acres, 35 bushels to acre. Average per ton, $30. Total cereals, 1,900 acres.

Grain hay, 1,000 acres, 2 tons to acre; grass hay, 1,500 acres, 1½ tons to acre. Hay sells for from $12 to $18 per ton.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	3,500	500	4,000
Cherry	200	...	200
Peach	300	...	300
Pear	350	...	350
Plum	500	100	600
Prunes	250	...	250
Total fruit trees	5,350	600	5,950

Grapevines, 5 acres; berries, 25 acres.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	50	$1,500
Irish potatoes	300	9,000
Strawberries	...	750
Total		$11,250

Fish Industry.

	Value.
Salmon, 4,000 cases	$20,000
Fresh salmon, 5 tons	500
Other kinds, 300 barrels	3,000
Totals	$23,500

STATISTICS OF DEL NORTE COUNTY, 1906-7—Continued.

Dairy Industry.

	No.	Production.	Value.
Creameries	9	....	....
Skimming stations	1	....	....
Butter, pounds	..	800,000	$145,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	500	$10,000
Stock	1,500	22,500
Dairy cows—Graded	4,000	70,000
Swine	1,500	4,000
Horses—		
Thoroughbred	5	1,000
Standard-bred	10	2,000
Common	350	17,000
Colts	100	2,000
Mules	10	1,000
Sheep	1,500	4,000
Lambs	500	1,000
Angora goats	200	1,000
Common goats	150	300
Total stock all kinds	.....	$135,800
Wool, pounds	25,000	$4,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	450	$1,800
Ducks	4	24
Turkeys	15	250
Eggs	...	1,200
Total value		$3,274

Forest Products.

Area of timber lands, 146,000 acres, from $15 to $250 per acre; redwood, 100,000 acres; sawmills, 2, $300,000; lumber, including short stuff, 32,000,000 feet, average $15 per M.; shakes, 7,000,000.

Manufactories.

Meat products—Hides, 30 tons; lard, 7½ tons; meat packed, 100 tons; veal, 16 tons.

EL DORADO COUNTY.

El Dorado, the "Old Empire County", is situated about the middle of the eastern tier of counties. It is a county of hills and valleys. There are no great tracts of prairie land. The soil is as good as the best, and will produce all things that grow. No county under the sun has any greater possibilities than this county, and having once made history by the fact of gold being discovered here by Marshall, we are on the morning of a second awakening. It is true that there are no large farms here where you may see in use the combined harvester and thrasher, because this is not that kind of a county, but there are many vineclad hills where grapes are grown that cannot be surpassed, many orchards nestling in the little valleys that abound, where the luscious peach, the pear, the apple, the cherry, the olive, and many other varieties of fruit are grown that are known to the world as the production of El Dorado County, and that stand for good goods.

Irrigation facilities are more than ample, and if you want water it costs you twenty cents an inch. There are lots of free water ranches here, where the proprietor has the free use of all the water and more than he wants. Lots of ranches where free water may be had for the labor of digging ditches, etc.

Land in El Dorado County is cheap, much cheaper than it will be five years from now for many good truthful reasons. Why should an investor pay $100 per acre for land that will not raise any better fruits than land which can be bought in this county for $10, and even less in some instances? And again, we are going to have more railroads here, because they are indispensable, and because we have a field for them. Railroads will come as soon as the field is open. We are opening that field, and the railroads are looking at us now.

We have the best drinking water in the world here, because it comes from the lofty Sierras, where the snowcaps kiss the clouds.

We have a good high school and 65 public schools scattered over our county where children may attend. We have plenty of firewood here for the cutting. We have lumber galore, one mill cutting close to 200,000 feet per day. We have a power plant developing 6,000 horsepower, and we have opportunities for the erection of more. We have rich gold mines, and we have a slate quarry, the only one in the West, that produces just as good a quality of slate as any quarry in the world. We have good, substantial deposits of limestone, marble, asbestos, and enough granite to rebuild the world if it were destroyed, and within a few miles of the county seat all the ingredients to make cement are to be found, which deposits, however, are controlled by the cement producers.

Hunting and fishing are good, for we have part of the beautiful world-famed Tahoe within our borders, and a thousand other lakes of lesser note, where the weary toiler may go and rest with nature. Deer are plentiful, as also are the mountain and valley quail, which afford the sportsman ample opportunity to try his skill.

STATISTICS OF EL DORADO COUNTY, 1906-7.

General Statistics.

rea, 1,796 square miles, or 1,049,440 acres.	
umber of farms	1,480
umber of acres assessed	666,875
alue of country real estate	$2,685,860
f improvements thereon	$692,860
f city and town lots	$221,810
f improvements thereon	$491,355
f personal property	$652,585
otal value of all property (outside of railroads)	$4,744,470
xpended on roads, last fiscal year	$12,900
xpended for bridges, last fiscal year	$5,600
umber of miles of public roads	745
oad levy per $100, 1907	40c
alue of county buildings	$85,000
rrigating ditches	$269,000
ailroads, steam—miles, 92; assessed value	$817,295
lectric power plants—1; assessed value	$55,700
lectric power lines—miles, 36; assessed value	$15,000
umber of acres irrigated	15,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	450	100	$3,500
Grain hay	...	20,000	$240,000
Grass hay	...	1,000	8,000
Total hay	...	21,000	$248,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	5,000	2,600	7,600
Apricot	500	100	600
Cherry	2,600	500	3,100
Fig	1,500	...	1,500
Nectarine	1,500	...	1,500
Olive	4,000	1,000	5,000
Orange	800	100	900
Peach	120,000	14,000	134,000
Pear	10,000	8,000	18,000
Plum	5,000	...	5,000
Prunes	16,000	...	16,000
Quince	300	...	300
Other kinds	10,000	800	10,800
Total fruit trees	177,200	27,100	204,300
Almond	1,000	...	1,000
Chestnut	500	...	500
Walnut	400	...	400
Total nut trees	1,900	...	1,900
Grapevines, acres	1,500	500	2,000
Berries, acres	100	20	120

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	300,000	$4,500
Cherries	40,000	2,400
Figs	40,000	1,600
Pears	1,500,000	45,000
Peaches	250,000	7,500
Plums	648,000	19,440
Prunes	250,000	7,500
Totals	3,028,000	$87,940

Manufactured Output.

	No.	*No. of Employes.*	*Quantity.*
Cigars	3	6	288,000
Tallow, barrels	..	..	720
Slate, pounds	..	30	50,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	8,000	$3,200
Sweet wines	5,000	5,000
Beer, barrels	1,200	11,880
Brandy	2,000	4,000
Vinegar	5,000	1,250

Number of wineries, 6; distilleries 2; breweries, 1.

Dairy Industry.

	Production.	*Value.*
Butter, pounds	200,000	$5,000

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	3,000	$60,000
Stock	8,000	120,000
Dairy cows—Graded	3,500	70,000
Calves	2,800	28,000
Swine	1,000	5,000
Horses—		
Standard-bred	2,000	60,000
Common	1,000	15,000
Colts	500	5,000
Jacks and jennies	5	1,000
Mules	100	5,000
Sheep	3,000	7,500
Angora goats	2,000	4,000
Common goats	1,000	1,000
Total stock all kinds	27,905	$381,500
Wool, pounds	9,000	$900
Mohair, pounds	1,000	200

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,500	$6,000
Ducks	200	1,000
Turkeys	200	3,000
Eggs	300,000	5,000
Total value		$15,000

Forest Products.

	Amount.	*Value.*
Area of timber lands, Pine, acres	200,000	$2,000,000
Sawmills, number	7	105,000
Charcoal, sacks	1,000	500
Fuel, wood, cords	8,000	16,000
Lumber, feet	60,000,000	900,000
Piles	1,500	9,000
Posts, pieces	5,000	500
Shakes, thousand	600	4,800
Stave bolts, cords	50	250
Total value		$3,036,050

Power used for mills and manufactories in county—Steam, 50; electrical, 5; water, 20.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	2	75	$180,000
Carriages and wagons	5	5	10,000
Cigars	3	6	17,280
Confectionery	1	1	1,200
Cooper-shops	1	1	1,200
Foundries and iron works	2	5	15,000
Lime	2	10	28,800
Meat products—			
Hides	..	..	6,000
Lard	..	..	2,000
Tallow	..	..	1,200
Planing mills	2	10	30,000

Miscellaneous Products.

	Value.
Bees, hives, 400	$1,200
Honey	1,000

FRESNO COUNTY.

Fresno extends across from the high Sierras to the mountains of th Coast Range, and in this center of the valley every form of industr in any of the counties that make the watershed of the San Joaquin i found in a greater or less degree.

Its mountains contain lumber and minerals and fine scenery; its leve plains grow cereals and fruits, and vines and vegetables; it raises cattle and its western borders overflow with petroleum. But in addition t this diversity of interests, it has, as a great mainstay, the raisin industry with Spain as its only competitor.

The average rainfall is 10 inches. Fresno is a wonderful example o what irrigation has done and can do. The San Joaquin River forms the northern and eastern boundary line, but the stream is not so well located for irrigation purposes as is Kings River, which, rising in the Sierras, passes south, and then west and north, in a wide curve, through the center of the farming district, carrying through the summer a volume of water equal to 8,500 cubic feet per second.

The region is a network of streams of water, that is drawn off on the vineyards, deciduous or citrus fruit orchards, or alfalfa fields. The cost of water is low. The perpetual water right, included with the purchase price of the land, is about $6.25 per acre.

Though great as the raisin and fruit industry is, wheat is grown on vast areas, the ranches running in the thousands of acres and the product in good years amounting to millions of bushels, a considerable portion being worked into flour in Fresno. Barley is grown in large quantities, and so is alfalfa. There are creameries and skimming stations, and butter and cheese are exported. An unlimited market for dairy products, with the fact that one acre of alfalfa will keep one cow in green feed, offers the farmer of limited means an opening for immediate and profitable returns. Sheep by the thousands roam over the foothills.

Deciduous fruit shipments, green and dried, represent several million dollars. Citrus fruit growing is a developing industry. Watermelons are exported in hundreds of carloads. The vineyards cover thousands of acres, most of which are in raisin grapes, and the remainder in wine or table varieties. There are many large wineries. Excellent port, brandy, sherry, and angelica are made, as well as other varieties.

At the head of the long list of valuable products stands the raisin. When a vineyard is in full bearing it produces about 4,000 pounds of green grapes to the acre, which will dry to over one ton of raisins. The average product of five-year-old vineyards is a ton of raisins to the acre. The California raisin has possession of the American market, and is extensively shipped abroad.

The growing of nursery stock is a remunerative occupation. Honey is produced in considerable quantity, and more so with the increased production of alfalfa. Alfalfa honey equals in quality clover honey of e East. Gold is mined in the mountains, and millions of feet of mber cut annually, most of which is floated down in flumes. There re large planing mills and many lumber yards in the City of Fresno.

The growth of the dairy business dates back only a few years, hen smaller interests merged and became what may be properly called large clearing house for butter fat. Before this, dairying was conucted in a desultory way by ranchmen who gave their time to grain, neyards, or other possessions, and, these permitting, the cows received tention later on. Now the farmers find it advisable to attend to their ws.

The calves and hogs fed on the skimmed milk are as much a part of he dairy product as the cream itself.

Along the river bottoms of the Kings and San Joaquin sheep raising ourishes. Here, between October and April, scores of bands of sheep re herded every year. The section is fertile and rich in herbage, upon hich the animals thrive until the dry season sets in, when they are riven into the mountains.

The raising of hogs, cattle, horses, and mules has advanced both as o numbers and as to quality in breeding. Large numbers of cattle are eing received continually from Arizona, to be fattened and either laughtered here or reshipped to San Francisco and elsewhere.

Thoroughbred, standard-bred, and high-class draft stallions have een brought into the county, and great interest is manifested among orsemen in raising the grade of the runner, the trotter, and the work orse. Some of the best roadsters in the State are in Fresno, and very romising youngsters in the running line are also attracting attention, while the production of the heavier breeds has met with equal success.

In a general mention of the varied resources there must be consideraion of the mule. In this valley he finds an environment peculiarly dapted to his exacting requirements, and speedily attains the highest legree of mulish perfection.

STATISTICS OF FRESNO COUNTY, 1906-7.

General Statistics.

Area, 5,606 square miles, or acres.	3,587,840
Number of farms	17,500
Number of acres assessed	2,005,396
Value of country real estate	$20,229,854
Of improvements thereon	$4,504,741
Of city and town lots	$5,063,316
Of improvements thereon	$5,100,989
Of personal property	$5,702,927
Money and solvent credits	$151,025
Total value of all property	$40,752,852
Expended on roads, last fiscal year	$103,701
Expended for bridges, last fiscal year	$21,829
Number of miles of public roads	2,050
Road levy per $100, 1907	$163,011
Value of county buildings	$525,000
Irrigating ditches, miles, 3,000; cost	$3,000,000
Railroads, steam—miles, 261.92; assessed value	$6,170,531
Railroads, electric—miles, 8½; assessed value	$24,000
Electric power plants—1; assessed value	$54,550
Electric power lines—miles, 3 in city; assessed value	$11,600
9½ miles outside	$35,498
Number of acres irrigated	75,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	4,000	1,520	5,520
Apricot	87,682	7,250	94,932
Fig	52,120	22,000	74,180
Lemon	8,520	7,850	16,320
Nectarine	20,000	25,000	45,000
Olive	35,000	3,000	38,000
Orange	65,000	9,265	74,265
Peach	160,000	201,620	361,620
Pear	10,000	1,000	11,000
Plum	12,000	1,330	13,300
Prunes	20,000	1,420	21,420
Total fruit trees	474,322	281,255	755,557
Almond	5,500	2,265	7,765
Walnut	3,275	340	3,615
Total nut trees	8,775	2,605	11,380
Grapevines, acres	79,594	11,734	91,328
Berries, acres	200	30	230

Poultry and Eggs.

	Dozen.	*Value.*
Chickens, ducks, geese, turkeys, and eggs	9,112	$45,560

STATISTICS OF FRESNO COUNTY, 1906-7—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.
Wheat	16,560
Barley	11,127
Oats	790
Corn	75
Alfalfa hay	17,193

Fruit, Vegetables, Etc.

Green—	*Total Production. Tons.*	*Value.*
Apricots	1,500	$750,000
Nectarines	2,000	1,000,000
Oranges, boxes	45,000	45.000
Olives	750	15,000
Peaches	61,000	2,225,000
Total	......	$2,032,500

Dried—	*Tons.*	*Value.*
Apricots	1,000	$180,000
Figs, pounds	6,000,000	180,000
Gooseberries, pounds	200,000	10,000
Nectarines	400	88,000
Peaches	45.000	9,000,000
Raisins	62,000	5,580,000
Total	......	$14,838,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	13,000,000	$2,990,000
Brandy	1,000,000	400,000

Number of wineries, 18; distilleries, 10; breweries, 1.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	4	300,000	$900,000
Cheese, pounds		6.000	1.500

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	5,000	$150,000
Stock	60,000	90,000
Dairy cows—Graded	15,840	47,520
Angus	190	13,125
Calves	11,760	117,600
Swine	8,367	24,028
Horses—		
Thoroughbred	1,170	115,000
Standard-bred	1,506	150,600
Common	13.327	666.350
Colts	2,000	60,000
Mules	3,000	300,000
Sheep	63,862	255,440
Lambs	35,163	70,326
Total stock all kinds	221,185	$2,069,989

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	400,000	$4,000,000
Sawmills, number	8	400,000
Lumber, feet	90,000,000	2,700,000
Total value		$7,100,000

Manufactories.

	Quantity.	*Value of Product.*
Olive oil, gals	15,000	$30,000
Pickled olives, gals.	10,000	5,000

GLENN COUNTY.

Glenn County occupies a most favorable position in the State of California, being near the center of the Sacramento Valley and on both sides of the Sacramento River. The area of the county is 1,545 square miles, nearly evenly divided between the level, the foothills and the mountains, and containing almost every variety of soil and climate. The plains or level land is mostly farmed for wheat, barley, and hay, although many of the grain producers now have cattle, sheep and hogs, adding considerably to the revenue. The land along the Sacramento River is being sold in small tracts, and the production of vegetables, sugar beets, etc., has taken the place of the wheat fields. The statistics for the county show a substantial increase in the productions, and the building of three new schoolhouses in the River section during the past year is evidence of an increase in population. The increase in miles of irrigation ditches shows that the people are at last alive to the importance of uniting land and water, the latter being of sufficient volume to irrigate every acre of level land in the county, and the streams coming down from the coast mountains could be the means of producing sufficient power to run electric trains all over this section. The hill country has many fertile valleys, where farming and fruit raising are income-producing factors, in addition to the sheep and cattle.

During the past year an Eastern lumber company has acquired nearly 20,000 acres of the timber land in Glenn County, and a railroad to the mountains is only a matter of months.

The whole length of Stony Creek, from Orland to the county line, abounds in an excellent quality of stone for cement; a ledge of sandstone runs through the entire length of the county from Colusa northward; a big ledge of gold-producing rock is being worked on Briscoe Creek; the ore is low grade, but in such quantity that it must become a revenue producer. Another mineral ledge of immense size has been opened in the southwest corner of Glenn County in the shape of a covered mountain of manganese; the work so far shows a vein 30 feet wide, 200 feet deep, and nearly a mile long. All of these promising industries are lagging for the necessary capital to erect plants and for means of transportation.

STATISTICS OF GLENN COUNTY, 1906-7.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	25,650	17,200	$482,000
Barley	38,725	29,044	697,050
Oats	700	350	10,500
Rye	65	51	1,530
Corn	375	338	9,980
Total cereals	65,515	46,983	$1,201,060
Alfalfa hay	2,120	7,420	$43,520
Grain hay	12,212	15,283	137,547
Total hay	14,332	22,703	$181,067

Fish Industry.

	Pounds.	*Value.*
Salmon	26,680	$2,008
Other kinds	6,250	500
Totals	32,930	$2,508

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	154,440	$42,243
Butter, pounds (estimate)		52,500	13,112

STATISTICS OF GLENN COUNTY, 1906-7—Continued.

General Statistics.

Area, 1,545.9 square miles, or 989,374 acres.	
Number of farms	964
Number of acres assessed	639,999
Value of country real estate	$7,913,216
Of improvements thereon	$612,151
Of city and town lots	$166,495
Of improvements thereon	$210,525
Of personal property	$1,804,204
Total value of all property	$10,706,591
Expended on roads, last fiscal year	$27,121
Expended for bridges, last fiscal year	$8,356
Number of miles of public roads	433
Road levy per $100, 1907	35c
Value of county buildings	$133,000
Irrigating ditches—miles, 71; cost	$56,162
Railroads, steam—miles, 55.78; assessed value	$1,227,710
Electric power plants—32; assessed value	$9,000
Electric power lines; assessed value	$1,005

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	2,470	300	2,770
Apricot	3,690	275	3,965
Cherry	365	25	390
Fig	1,475	240	1,715
Lemon	2,285	320	2,605
Nectarine	180	10	190
Olive	1,160	210	1,370
Orange	5,165	1,600	6,765
Peach	4,250	530	4,780
Pear	2,825	245	3,070
Plum	2,100	315	2,415
Prunes	6,000	375	6,375
Quince	210	...	210
Other kinds	345	120	465
Total fruit trees	35,520	4,565	37,085
Almond	5,400	460	5,860
Chestnut	15	.....	15
Pecan	51	5	56
Walnut	1,600	385	1,985
Total nut trees	7,066	850	7,916
Grapevines	75	10	85
Berries, acres	83	14	97

Livestock Industry.

	Number.	*Value.*
Cattle—Stock	11,040	$164,710
Dairy cows—Graded	1,515	37,865
Angus	5	250
Holsteins	10	500
Jersey	25	750
Shorthorns	1	50
Calves	5,220	52,199
Swine	8,835	35,340
Horses—		
Thoroughbred	3	6,000
Common	2,384	95,346
Colts	1,038	25,945
Jacks and jennies	15	4,550
Mules	2,545	203,584
Sheep	86,321	258,963
Angora goats	4,763	11,908
Total stock all kinds	123,720	$897,960
Wool, pounds	733,728	$88,047
Mohair, pounds	35,723	8,931

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	65,660	$1,315
Apricots	35,410	1,072
Blackberries	16,200	810
Beans	12,230	370
Corn	74,200	1,113
Cherries	5,500	330
Figs	76,600	1,532
Grapes	81,400	1,221
Lemons, boxes	975	2,925
Loganberries	21,000	1,050
Onions	218,000	2,725
Oranges, boxes	2,820	7,040
Olives	14,000	420
Pears	118,300	3,549
Peaches	48,750	1,462
Peas	7,340	220
Persimmons	4,530	136
Plums	31,280	782
Irish potatoes	455,000	5,890
Sweet potatoes	44,300	665
Prunes	11,750	234
Quinces	2,215	45
Raspberries	9,820	491
Strawberries	14,380	869
Tomatoes	212,400	3,186
Total	....	$39,452

Dried—	*Pounds.*	*Value.*
Almonds	33,600	$4,032
Apples	7,870	630
Prunes	595,320	17,859
Totals	636,790	$22,521

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	2,135	$7,462
Ducks	81	365
Geese	5	60
Turkeys	611	12,220
Eggs	74,810	11,221
Total value		$31,328

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	100,392	$803,136
Sawmills, number	1	....
Fuel, wood, cords	5,400	37,800
Lumber, feet	560,000	11,200
Posts, pieces	1,680	336
Shakes, thousand	43,000	430
Total value		$852,902

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 405	....	$1,620
Honey	2,850	285
Sugar beets, tons	18,000	90,000

The Hamilton Sugar Beet Factory is located in Glenn County, and as a new industry in the Sacramento Valley is proving a success. This year it employed 300 men, and turned out a product valued at $265,000.

HUMBOLDT COUNTY.

Humboldt County lies along the coast in the northwestern part of the State. In length it extends north and south over 100 miles, and its average width is about 40 miles, and near the central part it is about 50 miles from the seacoast to its eastern boundary.

Topographically it is hilly and mountainous, with a number of beautiful valleys extending back from the coast along some of the larger rivers for distances varying from 10 to 20 miles.

The scenery of some of the mountain districts is exceedingly grand and picturesque, rivaling any to be found in the Coast Range.

An abundance and variety of wild game is to be found in all parts of the county, and many varieties of fish inhabit the waters along the coast. During the fall and winter seasons the catching of salmon in some of the larger rivers forms an important industry.

The soil of the valley lands, the river bottoms, and also that on the hills for a considerable distance back from the coast, is black and rich, and very productive.

The county is plentifully watered. The Klamath River, which has its source in the State of Oregon, flows through the northeastern portion of the county, and is the largest of the rivers which run through or touch the county. The opportunity for the generation of electric power on this swiftly flowing river, which carries a large volume of water during the entire year, could scarcely be surpassed anywhere in the State. Other rivers, namely, Eel River, Mad River, Bear River, Mattole River, Elk River and Redwood Creek, all rise in the mountains and flow in a northwesterly direction to the seacoast. The Trinity and Van Duzen rivers are tributaries of other rivers, the former, rising near the eastern boundary of Trinity County, flows across that county into Humboldt and empties into the Klamath River, where the northern boundary of the Hoopa Valley Indian Reservation intersects the Klamath River, some twenty miles from the coast. The Van Duzen is a river of over 70 miles in length, which flows in the same direction as the others and delivers its waters into Eel River some 10 or 12 miles from the coast.

Thousands of springs and creeks throughout the county, together with the rivers above mentioned, make Humboldt County the best watered in California.

The rainfall during the wet season, usually from October to April, is about 46 inches, and is entirely sufficient to always insure the biggest kinds of crops. Irrigation in Humboldt is never necessary.

Without danger of contradiction, one may safely say that Humboldt County can produce as great and as choice a variety of the products of the soil as any other section of its size within the temperate zone. Three potatoes weighing fifteen pounds, or an average of five pounds each, were grown by an Eel River farmer this summer, and quantities of immense apples weighing from one to one and one half pounds each, and pears weighing nearly two pounds each are not unusual. A yield of 10 tons of potatoes to the acre on the bottom lands has been reported many times.

The United States Census report gives Humboldt County the top rank for the production of corn and oats per acre, and wheat grown on Humboldt hills took the first prize at the Chicago World's Fair, and also showed the record yield per acre, which was from 60 to 100 bushels for various samples. All other crops grow proportionately well.

All the fruits, such as apples, pears, peaches, cherries, apricots, nectarines, plums, prunes, etc., yield generously wherever cultivated in the localities best suited to the respective varieties.

A great variety of cultivated berries will grow and produce splendidly in all sections of the county, and immense numbers of wild blackberries, huckleberries and other kinds are found throughout the county.

All the varieties of vegetables and grains adapted to the soil of any and all portions of the United States grow to perfection in Humboldt County.

The leading industry of the county is the manufacture of redwood lumber, the exports of which alone are about 250,000,000 feet per year, besides that which is used for building and other purposes within the county, which is not inconsiderable.

The estimated supply of standing timber is over 45,000,000,000 feet, including an acreage of redwood timber amounting to over 500,000 acres, while the pine, oak and other timbers swell the acreage to at least 400,000 more.

The manufacture of redwood shingles, which is the most important of the minor branches of the lumber industry, is carried on very extensively, and the product of the shingle mills of this county, being a superior article, finds a ready market throughout the Eastern States, and also in a number of the foreign markets. Large numbers of railroad ties are yearly shipped to Mexico and South America.

Humboldt County boasts of having the only electric shingle mill in the State.

Dairying, as will be seen by reference to the table of statistics hereto attached, is the second industry in importance, and a steady flow of its products into the markets along the coast during the entire year keeps plenty of money in circulation in the dairying districts all the time.

One woolen mill, located in Eureka, has been in operation almost all the time since 1901, and turns out some of the finest goods in that line manufactured on the coast.

Sash and door factories and planing mills are operated at Eureka, Arcata, Samoa and Fortuna, and the products of these are always in the greatest demand and bring topnotch prices in all markets to which they are shipped. A barrel factory is also located at Arcata.

Shipbuilding has been carried on quite extensively on Humboldt Bay for a great many years, the yards turning out from four to five schooners a year. The pine for their construction is obtained in the forests of the county and is splendidly adapted to that purpose.

Two tanneries are also operated in this county, and obtain the tan bark necessary in their business from the extensive oak forests which mostly lie just back of the redwood belt.

At Briceland, in the southern part of the county, is located a large extractor, or factory, which extracts the tanning properties from the oak bark for shipment. This product is put into barrels and shipped out by way of Shelter Cove, an open roadstead on the southern coast of Humboldt. Large quantities of tan bark itself are also shipped to the tanneries in other parts of the State.

Along the Klamath and Trinity rivers, in the northeastern portion of the county, and also at Gold Bluff on the northern coast, placer mining for gold is a leading industry. The gold-bearing gravel also contains considerable platinum, a portion of which is recovered. Some very promising copper ledges are being developed in the Horse Mountain district, also in the northwestern part of the county; in fact, good copper prospects have been discovered in many parts of the county. Granite and sandstone for building purposes abound, limestone is plentiful in some sections, mineral paint has been produced in commercial quantities, while mineral water is abundant, and figures as an article of commercial export. Petroleum has been discovered in the southern part of the county, and natural gas from a prospecting well at Briceland has heated and lighted that town for a number of years.

Humboldt County has within its boundaries about 130 miles of railroads, none of them however connecting the county with the outside world.

But during the past few months active construction work has been in progress on the southern end of the San Francisco and Northwestern Railway in Humboldt County, while at the same time a large force of men and teams has been rushing work in this direction (towards Humboldt) on the northern end of the Northwestern and Pacific Railroad in Mendocino County. This means that Humboldt will not be much longer without rail communication with San Francisco and other points. A number of commodious and well-equipped steamers, however, ply between Eureka and the ports both north and south, which afford ample transportation facilities at all times.

Eureka, the county seat, had in 1904 a population of 11,111 persons. Since then, however, its growth has been more rapid than formerly, and it is estimated that there is now a population of 15,000 or more in the city.

A great many lumber carrying vessels enter Humboldt Bay each year, and convey the products of the mills and woods to every part of the civilized world.

The bay is a perfectly sheltered and land-locked harbor, 14 miles long by from 1 to 4 miles wide. The Government life-saving station is situated on the north spit near the entrance to the bay, and there is also maintained a system of harbor lights.

A Government Land Office, Custom House and Weather Bureau are located in Eureka, and a site has recently been purchased in the heart of the city by the Government on which to erect a $130,000 Federal building. It is understood that work on this building will begin early in 1908.

Plenty of good wagon roads is a notable feature of Humboldt County. Two of them running south, one along or near the coast, and the other through the interior, connect Humboldt with Mendocino County on the south, another running eastward leads into Trinity County, while the one running north along the coast passes through Del Norte County and on to Oregon.

The public schools of Humboldt rank in efficiency with any in the land. The entire population of the county will probably not exceed 30,000, and the number of school children is about 7,900, yet there are within the county 106 common schools and 4 high schools, employing altogether 186 teachers.

Among other things, Eureka, the county seat, has about 10 miles of electric street car lines, the finest court house and other county buildings in northern California, many common schools, one high school, 13 churches, 3 daily and 2 weekly newspapers, 60 or more secret society lodges and organizations, numerous clubs and several splendid hospitals and sanitariums. Nearly all the streets in the business portion of the city are bituminized, and most of the remaining ones are well graveled. The streets are broad, with 12-foot sidewalks on either side. The climate of the city is cool at all seasons, and the health conditions excellent.

The inland portions of the county have a splendid climate also. The summer season in the hills and mountains is quite warm, while the winters, although not excessively cold, see more or less snow fall on the mountains.

STATISTICS OF HUMBOLDT COUNTY, 1906-7.

General Statistics.

Area, 3,507 square miles, or acres.	2,224,480
Number of acres assessed	1,538,650
Value of country real estate	$16,345,155
Of improvements thereon	$1,117,635
Of city and town lots	$4,652,840
Of improvements thereon	$2,710,360
Of personal property	$3,208,660
Total value of all property	$28,034,650
Expended on roads, last fiscal year	$83,080
Expended for bridges, last fiscal year	$16,675
Number of miles of public roads	1,172
Road levy per $100, 1907	40c
Value of county buildings	$280,000
Railroads, steam—miles, 126; assessed value	$1,025,415
Railroads, electric—miles, 9½; assessed value	$26,125
Electric power plants—4; assessed value	$180,895
Electric power lines — miles, 90; assessed value	$14,275

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Barley	625	625	$18,750
Oats	2,750	2,062	61,860
Total cereals	3,375	2,687	$80,610
Alfalfa hay	175	875	$13,125
Grain hay	5,250	7,500	150,000
Grass hay	12,625	18,950	284,250
Total hay	18,050	27,325	$447,375

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	100,000	5,000	105,000
Cherry	600	.....	600
Peach	2,500	.....	2,500
Pear	500	.....	500
Prunes	15,000	.....	15,000
Total fruit trees	118,600	5,000	123,600
Walnut	350	.....	350

Fruit, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples	10,000,000	$150,000
Beets	100,000	50,000
Cherries	60,000	3,600
Pears	100,000	1,500
Peaches	250,000	12,500
Peas	100,000	20,000
Irish potatoes	2,000,000	30,000
Prunes	1,500,000	30,000
Strawberries	100,000	10,000
Totals	14,210,000	$307,600

Wines, Brandies, Etc.

	Gallons.	Value.
Beer, barrels	9,600	$76,800
Cider	32,500	8,125
Vinegar	10,000	600

Number of breweries, 2.

Fish Industry.

	Pounds.	Value.
Salmon	3,314,900	$102,125
Other kinds	666,150	22,400
Totals	3,981,050	$124,525

Dairy Industry.

	No.	Production.	Value.
Creameries	14	....	....
Skimming stations	13	....	....
Butter, pounds.	..	4,522,000	$1,311,380
Condensed milk, cases	..	10,000	35,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	6,000	$30,000
Ducks	300	1,800
Geese	100	1,200
Turkeys	400	9,600
Eggs	420,000	105,000
Total value		$147,600

STATISTICS OF HUMBOLDT COUNTY, 1906-7—Continued.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	3,634	$145,360
Stock	26,275	394,125
Dairy cows—Graded	28,160	844,800
Jersey	256	25,600
Calves	9,546	76,368
Swine	9,615	28,845
Horses—		
Thoroughbred	2	1,000
Standard-bred	439	32,925
Common	10,284	514,200
Colts	876	21,900
Mules	460	23,000
Sheep	100,000	400,000
Lambs	50,000	200,000
Common goats	2,500	5,000
Total stock all kinds	242,047	$2,713,123
Wool, pounds	582,650	$168,968

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	9	29	$78,342
Foundries and iron works	2	78	183,000
Planing mills	6	135	745,500
Tanneries	2	50	300,000
Woolen mills	1	46	55,000
Ice	2	6	25,350
Boiler works	1	25	50,000

Forest Products.

	Amount.	*Value.*
Area timber lands, acres	900,000	....
Pine, acres	180,000	....
Redwood, acres	538,000	....
Other kinds	182,000	....
Sawmills, number	11	....
Lumber, feet	244,237,882	$4,870,230
Pickets, pieces	1,030,725	18,000
Posts, pieces	21,520	3,225
Railroad ties, pieces	495,139	198,055
Sash and door factories, number	6	....
Shakes, thousand	12,177	121,750
Shingles, thousand	712,027	1,139,240
Stave bolts, cords	800	5,200
Total value		$6,355,700

Power used for mills and manufactories in county—Steam, 39; electrical, 11.

Miscellaneous Products.

	Pounds.	*Value.*
Honey	1,000	$150

Manufactured Output.

	Quantity.
Cigars	1,425,000

KERN COUNTY.

Kern County, lying in the southern end of the San Joaquin Valley, its eastern boundary extending on to the Mojave Desert over the extreme southerly end of the Sierra Nevada Mountains, is the second largest county in the State and probably has the most diversified resources of any.

At Randsburg, on the eastern border, is one of the largest gold mines on this coast, and the country around Randsburg has many smaller mines that are free-milling ore, which make them paying properties for people or corporations of small means.

Along the southern border where the line crosses the San Emidio Mountains are large deposits of iron ore and antimony which are yet undeveloped, and along the western side of the county are the Sunset, Midway, and McKittrick oil fields, lying along the eastern base of the Coast Range Mountains, and which promise to yield untold wealth in their future production of oil.

In the northern part of the county, and surrounding the town of Delano, is a large body of good land which is now attracting considerable attention from investors, as development has shown that within a few feet of the surface lies an unlimited quantity of water which can be raised to the surface to transform the arid plains into orchards and alfalfa fields.

In the northeastern part is the mining town of Kernville, surrounded by good mines, and near it on the south fork of Kern River is the South Fork Valley, where numerous prosperous stockmen have their alfalfa fields that furnish feed to the stock that pasture in the high Sierras in the summer time.

In the center and surrounding the town of Bakersfield, the county seat, lie thousands of acres of fertile land that are irrigated by Kern River, and which are mostly used to raise stock and alfalfa, but will produce anything that can be raised where there is good land and an abundance of sunshine.

Quite a large amount of capital is being interested in the installation of pumping plants in the Weed Patch, which is a fertile tract of land lying at the base of the Coast Range and Sierra Nevada mountains, and ranging in distance between eight and twenty miles from Bakersfield in a southeasterly direction and has heretofore been uncultivated on account of scarcity of water.

A short distance north of Bakersfield lies the famous Kern River oil field, the production from which has amounted to many million barrels, and which undoubtedly will produce for a great many years to come.

In the Kern River and Sunset oil fields we have numerous refineries that are producing thousands of tons of asphalt that finds a ready market in all parts of the United States.

There are two transcontinental railroads passing through the county, with branch roads running to the McKittrick, Sunset, and Kern River oil fields.

In the Kern River cañon we have one electric power plant, which furnishes light and power to the cities of Bakersfield and Kern. One completed, one nearly completed, and one just commencing work that will furnish electricity for Los Angeles.

STATISTICS OF KERN COUNTY, 1906-7.

General Statistics.

Area, 8,100 square miles, or acres.	5,184,000
Number of farms	900
Number of acres assessed	3,032,493
Value of country real estate	$10,810,843
Of improvements thereon	$1,896,406
Of city and town lots	$1,388,015
Of improvements thereon	$1,929,360
Of personal property	$6,739,576
Total value of all property, including railroads	$30,149,898
Expended on roads, last fiscal year	$52,850
Expended for bridges, last fiscal year	$8,825
Number of miles of public roads	1,600
Road levy per $100, 1907	25c
Value of county buildings	$212,000
Irrigating ditches—miles, 210; cost	$342,580
Railroads, steam—miles, 300; assessed value	$5,893,995
Railroads, electric—miles, 7½; assessed value	$48,750
Electric power plants—3; assessed value	$1,523,510
Electric power lines — miles, 141; assessed value	$362,070
Number of acres irrigated	130,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	16,000	7,950	$238,500
Barley	12,000	7,000	210,000
Corn	8,000	6,500	149,500
Total cereals	36,000	21,450	$598,000
Alfalfa hay	.....	21,400	$214,000
Grain hay	.....	10,000	110,000
*Total hay	.....	31,400	$324,000

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*In figures given on hay no mention is made except of that shipped out of the county.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	1	2	$2,500
Brick	2	40	20,580
Cigars	3	10	20,000
Confectionery	2	6	10,000
Flouring mills	1	12	91,533
Foundries and iron works	1	95	21,975
Lime	4	100	100,000
Meat products—			
Hides, number	..	353,070	31,775
Tallow, pounds	..	198,866	9,945
Olive oil	..	....	160
*Planing mills	2	4	......

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*For local consumption.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apricots	800,000	$16,000
Lemons, boxes	2,000	1,000
Oranges, boxes	17,000	34,000
Peaches	800,000	16,000
Total	....	$70,000

Dried—	*Pounds.*	*Value.*
Apricots	40,000	$6,000
Peaches	200,000	18,000
Prunes	1,000,000	50,000
Raisins	2,000,000	100,000
Totals	3,240,000	$174,000

Canned—	*Cases.*	*Value.*
Apricots	525	$2,755
Grapes	30	90
Peaches	2,200	9,900
Plums	150	450
Tomatoes	25	60
Totals	2,930	$13,255

The above figures are on articles shipped out of the county, as there is no way to secure correct data on that which is consumed within the county.

Livestock Industry.

	Number.	*Value.*
*Cattle—Stock	60,000	$1,200,000
Dairy cows—Graded	2,500	75,000
Thoroughbred—		
†Herefords	...	.....
Holsteins	100	5,000
Jersey	100	5,000
†Shorthorns	...	.....
Calves	10,000	100,000
Swine	8,000	96,000
Horses—		
Thoroughbred	15	15,000
Common	7,000	560,000
Colts	1,000	40,000
Mules	1,200	120,000
Sheep	120,000	600,000
Lambs	60,000	120,000
Total stock all kinds	269,915	$2,936,000
Wool, pounds	1,560,000	$195,000

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*There were probably 20,000 head of beef cattle shipped out of the county, of an average value of $40 each, or a total value of $800,000, many of them having been shipped into the county for the purpose of feeding.

†For breeding purposes.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	3	....	....
Butter, pounds	..	474,810	$142,445

STATISTICS OF KERN COUNTY, 1906-7—Continued.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	10,000	2,000	12,000
Apricot	25,000	.....	25,000
Cherry	1,000	.....	1,000
Fig	1,000	.....	1,000
Lemon	500	.....	500
Nectarine	1,000	.....	1,000
Olive	5,000	.....	5,000
Orange	6,000	500	6,500
Peach	41,000	6,000	47,000
Pear	1,500	.....	1,500
Plum	6,000	.....	6,000
Prunes	41,000	.....	41,000
Quince	500	.....	500
Total fruit trees	139,500	8,500	148,000
Almond	2,000	.....	2,000
Pecan	200	.....	200
Walnut	200	.....	200
Total nut trees	2,400	.....	2,400
Grapevines, acres	1,100	.....	1,100
Berries, acres	55	.....	55

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 8,000	...	$24,000
Beeswax	800	200
Honey	240,000	14,400
Alfalfa seed	40,000	6,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	2,000	$8,000
Ducks	50	300
Geese	30	300
Turkeys	300	7,500
Eggs	120,000	20,400
Total value		$36,500

No mention in the above except poultry farms.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	10,000	......
*Sawmills, number	2	......
Lumber, feet	650,000	$13,000

Power used for mills and manufactories in county—Steam, 5; water, 1.

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*Two small mills to supply the demand in the mountain districts.

Manufactured Output.

	Quantity.
Brick	2,100,000
Cigars	400,000
Flour, barrels	17,435
Lime, barrels	120,000
Hides, pounds	357,070
Tallow, barrels	500

LAKE COUNTY.

By her sister counties, Lake has long been cheerfully accorded the title of "The Switzerland of America," owing to her beauty of scenery. The county is located in the heart of the Coast Range, about 100 miles north of San Francisco, and is about 75 miles long and 25 miles wide. Mount St. Helena guards the southern extremity. Clear Lake is a splendid sheet of fresh water 25 miles long and from 2 to 10 miles broad. With the lake surface at an elevation of 1,350 feet above sea level; having a depth sufficient to float vessels of considerable tonnage and draft, receiving in its basin the waters from several streams of considerable flow; stocked with an amazing wealth of native food fishes; bordered by smiling valleys of great fertility, by orchards of luscious fruit, by gently swelling slopes, by rugged mountains, by wild cañons touched with a certain savage beauty; and bearing upon its heaving breast a constantly increasing proportion of the internal commerce of the community, Clear Lake is the pride of Lake County, as well as the source of its name.

Although classed as mountainous, Lake County has a number of very fertile valleys, some of them being of large area. Artesian water is obtainable in profuse quantities, and with comparatively small outlay of money or effort. Fields are growing luxuriant crops of grain, though annually sown in the same crops for more than a half century. A variety of soils is found throughout the county, and even the valleys show differences. Generally the valleys are rich with alluvium, but in places there are extensive tracts of adobe, black and heavy, and apparently inexhaustible in productiveness. Occasionally a sandy loam is found in the valleys, especially in the neighborhood of the streams traversing the county at short intervals. On the plateau crowning the low foothills which ring the valleys is a lighter soil, but when cleared is capable of raising large vineyards and orchards of peaches, prunes, etc. The rocky hillsides furnish pasture for flocks of Angora goats.

Large bodies of sugar and yellow pine, fir, cedar, and oak give employment to several sawmills and furnish the home market a good quality of lumber. The minerals have heretofore been represented by the quicksilver industry, although gold, silver, copper, and oil have been discovered in small quantities. Besides quicksilver, immense quantities of mineral water have been bottled at the many mineral springs and shipped to all parts of the country. The several mineral springs are the sites for as many health resorts, as many as thirty thousand guests being entertained from all parts of the country each summer. Some of them go to the resorts for their health, the bright, clear atmosphere being very beneficial, and the waters frequently having a highly curative property in certain complaints. Others seek the deer, the fishing, and other sports. Among the resorts are Bartlett, Highlands, Adams, Harbin, Zeigler, Witter, and Anderson springs; Blue Lakes, Laurel Dell, Hoberg's, Soda Bay, Glenbrook, Carlsbad, Saratoga, Bonanza, Astorg, England, Howard, and Bynum.

There are several mines from which large amounts of quicksilver have been taken. Natural gas is found. There are large deposits of sulphur and of borax in some parts of the county.

STATISTICS OF LAKE COUNTY, 1906-7.

General Statistics.

Area, 1,332 square miles, or 852,480 acres.	
Number of farms	925
Number of acres assessed	336,895
Value of country real estate	$1,984,986
Of improvements thereon	$528,451
Of city and town lots	$269,793
Of improvements thereon	$271,415
Of personal property	$599,330
Total value of all property	$3,653,975
Expended on roads, last fiscal year	$10,000
Expended for bridges, last fiscal year	$8,500
Number of miles of public roads	564
Road levy per $100, 1907	50c
Value of county buildings	$32,000
Irrigating ditches	$3,000
Electric power plants—1; assessed value	$1,500
Electric power lines—miles, 3; assessed value	$1,000
Number of acres irrigated	200

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	2,623	1,213	$41,860
Barley	2,470	1,338	32,970
Oats	.....	415	11,700
Corn	526	513	11,060
Total cereals	6,149	3,479	$97,590
Alfalfa hay	1,212	3,720	$27,520
Grain hay	6,855	8,805	92,970
Grass hay	300	300	3,000
Total hay	8,367	12,825	$123,490

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	28,205	10,800	39,005
Apricot	1,990	100	2,090
Cherry	1,400	600	2,000
Fig	2,275	200	2,475
Lemon	31	25	56
Nectarine	220	100	320
Olive	6,130	200	6,330
Orange	500	125	625
Peach	8,510	3,500	12,010
Pear	16,000	9,000	25,000
Plum	4,800	2,000	6,800
Prunes	46,700	500	47,200
Quince	200	80	280
Total fruit trees	......	......	144,191
Grapevines	825,000	24,000	1,065,000
Berries, acres	100	......	100

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	4,120	$12,400
Ducks	300	1,200
Geese	85	850
Turkeys	1,500	9,000
Eggs	280,000	56,000
Total value		$79,450

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	582,000	$11,600
Apricots	16,700	600
Blackberries	12,200	600
Beans	40,000	800
Beets	50,000	500
Cabbage	50,000	1,000
Celery	2,000	100
Cauliflower	5,000	250
Corn	10,500	200
Currants	2,000	200
Cherries	15,000	1,050
Figs	28,000	840
Gooseberries	3,400	200
Grapes	1,970,000	19,700
Loganberries	3,000	1,800
Onions	18,000	360
Olives	8,000	500
Pears	1,200,000	40,000
Peaches	76,000	1,520
Peas	9,500	450
Plums	112,000	2,000
Irish potatoes	1,400,000	21,000
Prunes	3,882,000	41,670
Quinces	1,600	24
Raspberries	3,500	350
Strawberries	23,000	1,840
Tomatoes	231,000	2,310
Totals	9,795,000	$153,464

Dried—	*Pounds.*	*Value.*
Almonds	13,200	$1,650
Apples	28,000	1,960
Apricots	3,000	600
Beans	24,000	960
Onions	4,000	160
Pears	173,300	21,675
Peaches	6,000	480
Peas	250	25
Plums	272,200	1,620
Prunes	1,334,000	40,020
Walnuts	5,200	832
Totals	1,883,150	$69,972

Canned—	*Cases.*	*Value.*
Apricots	200	$400
Blackberries	200	400
Beans	50,100	100,200
Corn	200	200
Cherries	100	250
Gooseberries	100	200
Grapes	150	300
Pears	500	1,000
Peaches	500	1,000
Plums	100	200
Tomatoes	1,000	1,500
Totals	52,150	$105,650

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 500	......	......
Honey	10,000	$1,000
Hops	75,000	7,500
Alfalfa seed	90,000	10,800
Mineral water, cases	75,000	500,000

STATISTICS OF LAKE COUNTY, 1906-7—Continued.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	5	....	......
Butter pounds	..	114,000	$3,420
Cheese, pounds	..	54,750	7,665

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	2,350	$56,750
Stock	6,100	60,000
Dairy cows—Graded	1,330	26,000
Thoroughbred—		
Jersey	140	3,500
Shorthorns	50	1,000
Calves	3,800	27,000
Swine	3,850	19,050
Horses—		
Standard-bred	30	5,000
Common	2,625	260,000
Colts	500	12,500
Jacks and jennies	15	10,000
Mules	275	27,500
Sheep	9,750	27,000
Lambs	1,000	3,000
Angora goats	4,000	12,000
Total stock all kinds		$550,300
Wool, pounds	45,700	$7,310
Mohair, pounds	20,000	5,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	589,000	$117,800
Sweet wines	27,000	6,750
Vinegar	500	125

Number of wineries, 13.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	121,000	$605,000
Sawmills, number	10	20,000
Fuel, wood, cords	5,500	14,000
Lumber, feet	4,000,000	64,000
Posts, pieces	4,000	500
Shakes	150,000	1,200
Total value		$704,700

Power used for mills and manufactories in county—Steam, 18; electrical, 1; water, 2.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	3	16	$2,500
Cigars	1	2	......
Flouring mills	3	10	30,000
Meat products—			
Lard	..	..	6,000
Meat packed	..	..	7,000
Tallow	..	..	2,000
Olive oil	1	1	800
Pickles	..	..	300
Pickled olives	..	..	350
Planing mills	8	..	10,000

Manufactured Output.

	Quantity.
Flour, barrels	4,000
Olive oil, gallons	200

LASSEN COUNTY.

Lassen County lies in the northeastern part of California along the Nevada line. It is traversed from south to north by the Nevada-California-Oregon Railway (narrow-gauge), which connects at Reno, Nevada, with the Southern Pacific system. The located line of the Western Pacific—in course of construction—runs through the southern portion of the county. Susanville, the county seat, is in Honey Lake Valley, a little south of the center of the county.

Lassen embraces large areas comprising rich valley lands, suited to agriculture; rolling hills and uplands, affording splendid range for stock; and mountain table lands covered with timber.

The county has a population of only about 5,000. It could easily support many times that number. The assessment roll now foots over five and a half millions. The county has no debt and the tax rate is only about $1.60 per $100 valuation. The people are generally well-to-do and prosperous. The bank at Susanville, with a capital of $50,000, has more than $300,000 on deposit, which shows a condition of easy finances.

The principal present industries are farming and stock raising. There are paying mines in the county, but as a whole Lassen in not mineral. Timber lands which are not in forest reserves are now generally held in private ownership, but as yet the manufacture of lumber has not been commenced.

But farming and stock raising will always be the principal industries of the county. Climate and soil are particularly adapted to them.

The altitude of the largest, most fertile and most productive valleys, such as Honey Lake Valley, Big Valley, and Long Valley, is a little over 4,000 feet. Other large valleys, like Madeline Plains, Willow Creek Valley, and Secret Valley, are in the neighborhood of 5,000 feet above sea level. While the high valleys are not as well adapted to general farming as the lower ones, they are quite productive, and well suited to the stock-raising business. The climate generally is similar to that of the northeastern states, so far as range of temperature is concerned, but our summer season is quite dry, making irrigation necessary as a rule. With irrigation, where the altitude is not too great, any of the ordinary products of the temperate zone can be produced in abundance and of fine quality. Apples, pears, cherries, peaches, apricots, and berries of all kinds do splendidly. Of farm products alfalfa is probably the most important, though native grasses, timothy, and redtop are extensively raised.

Good hay and grass and pure cold water make the county an ideal one for dairying. There are a number of creameries in the county, and their product commands the top price in city markets.

Improved farm lands range in price from $25 to $100 or more per acre.

District schools are scattered all over the county. A county high school is located at Susanville. There are quite a number of churches in the county, including Methodist, Baptist, Catholic, and others. Three weekly newspapers are published—the Lassen Advocate and Lassen Weekly Mail at Susanville, and the Big Valley Gazette at Bieber.

Susanville is the largest town, with a population of about 1,000. It has a good and abundant water supply and good facilities for fighting fire. Its stores are well stocked, and goods are sold at reasonable prices. Business buildings, as a rule, are substantial, and residences handsome.

Lassen County has a range of temperature wide enough to give a pleasing variety to the seasons. Health conditions are fine. Pulmonary diseases are very rare, and malaria almost unknown. There are still large quantities of land open to entry, which, with water for irrigation, will make good farms and homes. There is plenty of water to irrigate these lands.

STATISTICS OF LASSEN COUNTY, 1906-7.

General Statistics.

Area, 4,690 square miles, or acres.	3,001,105
Number of farms	660
Number of acres assessed	677,045
Value of country real estate	$3,389,354
Of improvements thereon	$424,185
Of city and town lots	$79,350
Of improvements thereon	$203,778
Of personal property	$1,164,872
Total value of all property	$5,261,539
Expended on roads, last fiscal year	$19,000
Expended for bridges, last fiscal year	$12,000
Number of miles of public roads	623
Road levy per $100, 1907	40c
Value of county buildings	$42,000
Irrigating ditches	$37,500
Railroads, steam—miles, 116.64; assessed value	$468,490
Electric power plants—1; assessed value	$6,000
Electric power lines	$26,500

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	12,000	8,000	$200,000
Barley	3,000	1,520	45,600
Oats	4,000	1,750	52,500
Rye	1,600	500	12,500
Total cereals	20,600	11,770	$310,600
Alfalfa hay	5,420	24,390	$121,950
Grain hay	500	1,500	7,500
Grass hay	87,000	174,000	609,000
Total hay	92,920	199,890	$738,450

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	240,000	$1,800,000
Sawmills, number	10	20,000
Lumber, feet	12,000,000	145,000
Posts, pieces	15,000	1,200
Railroad ties, pieces	250,000	15,000
Shakes, thousand	45	275
Shingles, thousand	400	1,600
Total value		$1,983,075

Power used for mills and manufactories in county—Steam, 15; water, 3.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	10.000	2,000	12.000
Apricot	200	100	300
Cherry	500	200	700
Nectarine	200	50	250
Peach	1,000	500	1.500
Pear	800	200	1.000
Plum	1,000	200	1.200
Prunes	500	250	750
Quince	10	20	30
Total fruit trees	14,210	3,520	17,730
Walnut	100	50	150
Blackberries, acres	20	10	30
Gooseberries, acres	15	5	20
Loganberries, acres	7	10	17
Raspberries, acres	22	15	37
Strawberries, acres	30	10	40
Currants, acres	17	5	22

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	2,293	$55,032
Stock	22,846	285,575
Dairy cows—Graded	13	520
Calves	9,332	46.660
Swine	1,678	5,034
Horses—		
Thoroughbred	10	9,500
Standard-bred	58	9,500
Common	6,707	151.500
Colts	450	16,740
Jacks and jennies	56	4.480
Mules	201	9,715
Sheep	32,736	81.915
Lambs	30,000	60,000
Common goats	500	3.500
Wool, pounds	300,000	60.000

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	4	363,000	$98,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,003	$5,000
Ducks	20	240
Geese	10	240
Turkeys	100	2,400
Eggs	15,000	5,250
Total value		$13,130

STATISTICS OF LASSEN COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	770,000	$8,000
Apricots	6,000	200
Blackberries	5,000	500
Beans	1,000	35
Beets	42,000	1,260
Cabbage	60,000	1,800
Cauliflower	1,000	25
Corn	12,000	400
Currants	3,000	75
Cherries	7,300	220
Gooseberries	1,600	160
Loganberries	400	40
Onions	21,000	850
Pears	13,000	260
Peaches	15,000	600
Peas	4,500	135
Plums	25,000	750
Irish potatoes	225,000	5,000
Prunes	3,000	120
Raspberries	8,000	800
Strawberries	3,200	320
Tomatoes	9,000	225
Totals	1,264,800	$14,575

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	1	6	$1,000
Confectionery	2	4	800
Flouring mills	3	8	13,850
Jewelry	2	3	4,000
Leather goods	3	3	10,000
Meat products—			
Hides, number	..	2,000	4,000
Lard, pounds	..	10,000	800
Planing mills	3	6	15,000

Wines, Brandies, Etc.

	Barrels.	*Value.*
Beer	300	$1,500
Cider	30	400
Vinegar	25	375

Number of breweries, 1.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 675		$675
Honey	100,000	10,000
Alfalfa seed	30,000	3,600

LOS ANGELES COUNTY.

In wealth, population, and resources Los Angeles is the most important county in southern California. There are two rivers in the county: the Los Angeles and the San Gabriel. During a large part of the year these are dry beds of sand, what little water they contain finding its way through the porous sand to the bedrock. In the winter they are dangerous streams. The Los Angeles River rises in the western part of the San Fernando Valley, about 12 miles northwest of the city, and flows easterly 18 miles to the Los Angeles Pass. Its stream is fed all along by springs. Two other "rivers," the Pacoima and the Tejunga, join it in the San Fernando Valley. Turning south, it flows through the Los Angeles Pass, and on through the city.

Los Angeles County embraces within its limits a great variety of scenery and climate. Within its territory may be found the climate and scenery of almost every part of the State, from the cool and breezy seashore to the warm inland plains and bracing mountain tops. Of the area of the county, about four fifths is capable of cultivation, the remainder being mountainous. The shore line is 85 miles in length. Nine tenths of the population is within thirty miles of the ocean.

The marvelous growth which has been made during the past few years may be seen from the statement that, within the space of twenty-four years, the population of the county has increased more than tenfold, and the assessed valuation of property in proportion.

The chief industry is horticulture, the list of products including everything that can be grown in the State, and almost everything that can be raised in semi-tropic countries. The area of land devoted to horticultural purposes is being rapidly extended, as the large tracts are subdivided and improved.

The county is well provided with transportation facilities. A dozen lines of railroad center in Los Angeles City, tapping almost every section of the county, while coast steamships call regularly at the leading seaports.

Perhaps the most important enterprise for Los Angeles is the big breakwater by the Federal Government at San Pedro. By means of this breakwater the depth of water over the bar will be so increased as to permit ocean-going vessels to come to the wharves, and Los Angeles will then be able to compete for its share of the growing Oriental trade. Other shipping points of the county are Port Los Angeles, near Santa Monica, and Redondo.

The San Gabriel Valley, a choice section of Los Angeles County, has the Sierra Madre range on the north. These mountains are grand and precipitous, inclosing the valley like a wall. This valley is the best known of any portion of southern California. Even before there was any "boom" here worthy of mention, lands in the valley commanded a comparatively high price. As with most attractive sections, the level-headed mission fathers discovered its advantages, and founded the San

Gabriel Mission—whose church is still in good preservation—in 1771. Now railroads traverse the valley, and the land is rapidly being transformed into a succession of small homes and thriving little cities. The valley contains 100 square miles of territory. The San Gabriel contains some of the choicest fruit land in southern California, and is largely devoted to the raising of oranges and lemons, as well as deciduous fruits.

Pasadena, a beautiful city, is located at the foot of the Sierra Madre range, about seven miles from Los Angeles. Within twenty years Pasadena has grown from a sheep pasture to a city of beautiful homes, with a world-wide reputation. Other settlements in the valley are Alhambra, Monrovia, Duarte, and Azusa, all of which are mainly supported by horticulture.

Adjoining San Gabriel Valley on the east is Pomona Valley. Irrigation is cheaply supplied to this section from the San Antonio River. The soil and climate are peculiarly adapted to the culture of citrus fruits. Railroad facilities are very good, and increasing, which has caused the valley to settle up rapidly. It contains a number of flourishing towns, the chief of which is Pomona, one of the most thriving cities of southern California. For miles in every direction around Pomona extend continuous orchards of oranges, lemons, apricots, peaches, prunes, olives and other fruit trees, a specialty being made of olive culture.

Other important sections of the county are Los Nietos Valley, a well-watered district, noted for corn, alfalfa, and dairy products; the stretch of country between Los Angeles City and the ocean; San Fernando Valley, north of Los Angeles, in which a large amount of fine wheat is raised; and Antelope Valley, an elevated region in the northern part of the county, where land is cheap and, with water, very productive.

Los Angeles enjoys railroad competition in the shape of three transcontinental lines. The Pacific Coast Steamship Company runs vessels every few days from Los Angeles County ports to San Francisco and San Diego.

There is a great variety of soil in Los Angeles County, varying from light sandy loam to heavy adobe.

A mistaken idea prevails to some extent that farming is only carried on in Los Angeles County by means of irrigation, and that without it crops would be a failure. For grains and winter crops irrigation is not employed. Corn is irrigated in some localities, being a summer crop, but is successfully grown in many places without irrigation. Upon some lands, after a crop raised without irrigation has been harvested, another is raised by means of irrigation. On irrigated land two or three crops a year are frequently raised. With an artificial supply of water, the farmer is rendered independent of the season's rain, while the product of his lands is enormously increased.

The development of the horticultural industry during the past few years has been remarkable. The most important horticultural product is the orange. Besides the orange and lemon, the principal fruits raised are the almond, fig, prune, apricot, walnut, peach, pear, and berries.

Deciduous fruits are shipped fresh, canned, dried, and crystallized. An active demand for our dried fruits has grown up in Europe.

Alfalfa, which is largely grown for hay, is a most valuable forage plant. It is cut from three to six times a year. Large quantities of wheat and barley are raised. Corn sometimes grows to a height of twenty feet. Pumpkins have been raised weighing over 400 pounds.

There is a beet sugar factory at Alamitos. Los Angeles honey is celebrated all over the country. In the neighborhood of Los Angeles calla lilies, tuberoses, carnations, and other flowers are grown by the acre. Hundreds of acres are devoted to the cultivation of celery, which is shipped East by the trainload. Winter vegetables, such as string beans, tomatoes, green peas, and chile peppers, constitute a big business.

Until only a few years ago, most of the butter consumed in southern California was imported from the North and East. This is no longer the case, a number of creameries having been established during the past few years, with most successful results.

Poultry does well in Los Angeles County when it is given the same attention it receives in the East. Eggs always command a good price.

Ostriches are raised for their plumes, and the industry is profitable. There is a large ostrich farm at South Pasadena.

Among the game found in the county are wild geese, ducks, snipe, rabbits, squirrels, foxes, deer, wildcats, California lions, and bear, the latter being found in the northern part of the county.

The angler finds plenty of trout in the mountain cañons. In the ocean there is excellent fishing, both with line and seine, and some remarkable catches are made. The yellowtail, ranging from 15 to 80 pounds, is very numerous in the waters of the Pacific. The tuna attains a length of five feet or more, and a weight of from 100 pounds upward. "Jewfish" are sometimes caught weighing 400 pounds.

Although Los Angeles County is chiefly noted as a horticultural section, its mineral wealth is by no means unimportant. Including petroleum, it ranks fourth in mineral products among the counties, and is the only one which leads in five mineral products. Los Angeles is the center of a number of rich mineral fields in southern California which annually produce many millions of dollars.

One of the most remarkable features of development in Los Angeles County has been the greatly increased production of petroleum. For over twenty-five years petroleum has been produced on a limited scale in Los Angeles and Ventura counties, but it is only within the past few years that the industry has assumed great importance. The oil produced in California differs from that of the Eastern States, being of a heavier grade, with an asphaltum base, and it is used almost exclusively for fuel. It has been adopted by most of the leading factories of this section, and is used largely by the railroads. A careful test made with a locomotive showed that oil at $1 a barrel is equivalent to coal at $4 a ton.

The school facilities of Los Angeles are especially good. Besides the complete system of public schools, private schools and colleges abound in Los Angeles, Pasadena, and other towns. Many Eastern people avail themselves of the opportunity to send children with a tendency to weak lungs to a country where plenty of out-of-door exercise is a possibility every day in the year. Most of the leading religious denominations are represented, not only by scores of churches, but also by one or more religious colleges. The work of the schools is further supplemented by an army of specialists in music, painting, and every department of art. The Chautauqua has an active membership of nearly a thousand, and meets annually at Long Beach. Lectures and other entertainments, by home and foreign talent, are of almost daily occurrence. The educational and social facilities afforded by Los Angeles are, in the widest sense of the word, unsurpassed. Public libraries are numerous and well stocked with the latest works.

Catalina Island is a most attractive and popular resort in the Pacific, just off the coast of Los Angeles County. Between this resort and Los Angeles City there is a most excellent rail and boat service.

STATISTICS OF LOS ANGELES COUNTY, 1906-7.

General Statistics.

Area, 3,880 square miles, or acres.	2,483,200
Number of farms	7,892
Number of acres assessed	116,397
Value of country real estate	$40,137,410
Of improvements thereon	$7,895,085
Of city and town lots	$163,791,110
Of improvements thereon	$76,162,935
Of personal property	$87,732,818
Total value of all property	$375,719,358
Expended on roads, last fiscal year	$264,988
Expended for bridges, last fiscal year	$40,108
Number of miles of public roads	4,090
Road levy per $100, 1907	60c
Value of county buildings (2)	$4,000,000
Irrigating ditches—miles, 210; cost	$315,000
Railroads, steam — miles, 685.468; assessed value	$13,372,393
Railroads, electric — miles, ——; assessed value	$22,923,685
Electric power plants—19; assessed value	$1,100,000
Electric power lines — miles, 2,000; assessed value	$9,484,145
Number of acres irrigated	66,060

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	1,168,000	$243,200
Sweet wines	1,136,250	375,375
Beer, barrels	202,737	1,204,600
Brandy	25,000	12,500
Vinegar	10,000	1,000

Number of wineries and distilleries, 60; breweries, 3.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	108,527	39,817	148,344
Apricot	137,842	36,256	174,098
Cherry	1,674	500	2,174
Fig	21,093	984	22,077
Lemon	440,836	35,718	476,554
Nectarine	2,263	217	2,480
Olive	245,207	61,190	306,397
Orange	1,816,069	329,324	2,145,393
Peach	204,599	......	204,599
Pear	60,484	......	60,484
Plum	49,656	......	49,656
Prunes	55,000	......	55,000
Quince	5,000	......	5,000
Total fruit	3,152,250	504,006	3,652,256
Almond	146,657	......	146,657
Pecan	1,225	......	1,225
Walnut	223,758	49,856	273,614
Total nut	371,640	49,856	421,496
Grapevines	5,124,000	......	5,124,000
Berries, acres	2,367	......	2,367

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	12	321	$563,845
Paper boxes	6	186	193,752
Wood boxes	5	114	327,811
Brick	14	810	930,000
Brooms	6	71	142,361
Carriages and wagons	13	128	315,325
Cigars	50	245	376,390
Clothing	13	301	415,627
Coffee, spices, etc.	10	63	501,819
Confectionery	19	460	1,072,836
Cooper shops	3	56	256,819
Electrical supplies	6	170	426,816
Flouring mills	9	246	3,418,762
Foundries, machine shops, and iron works	49	11,248	3,516,740
Furniture	30	425	915,268
Jewelry	9	72	201,815
Leather goods	12	129	361,886
Lime	1	15	18,000
Malt	3	...	770,000
Meat products—			
Hides	5	621	785,840
Lard	..	...	314,726
Meat packed	..	...	2,918,350
Tallow	..	...	192,500
Olive oil	5	76	300,000
Paper	1	19	65,000
Pickles	7	155	420,230
Pickled olives	4	76	475,000
Iron pipe	7	357	1,356,725
Sewer pipe	3	95	175,817
Planing mills	54	1,750	5,217,875
Potteries	9	163	349,817
Salt	1	15	15,430
Soap	4	75	575,800
Artificial stone	3	76	141,217
Granite	7	25	80,000
Marble	2	16	18,000
Sandstone	1	5	7,000
Syrups and extracts	10	40	219,375
Tanneries	2	35	281,715
Tin and galvanized iron	47	263	711,125
Willow and wooden ware	3	36	81,462
Wood turning and carving	4	18	40,150
Miscellaneous	26	560	1,496,346

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	45,385	27,307	$719,210
Barley	55,832	27,916	558,320
Corn	7,916	8,000	200,000
Total cereals	109,133	63,223	$1,477,530
Alfalfa hay	13,140	68,700	$540,900
Grain hay	65,906	115,343	1,153,430
Total hay	79,046	184,043	$1,694,330

STATISTICS OF LOS ANGELES COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	2,880,556	$43,208
Apricots	3,846,000	76,920
Asparagus	8,000	900
Blackberries	789,000	47,340
Beans	1,000,000	25,000
Beets	220,000	1,150
Cabbage	5,890,000	58,900
Celery, dozen	95,000	18,000
Caulilflower	5,750,000	108,500
Corn, dozen	250,000	25,000
Cherries	12,000	600
Figs	478,000	14,340
Grapes	36,812,500	368,125
Grape fruit, boxes	15,000	26,250
Lemons, boxes	860,900	1,937,025
Loganberries	218,000	17,440
Nectarines	56,575	1,132
Onions	125,000	3,750
Oranges, boxes	1,811,500	2,717,250
Pears	680,000	17,000
Peaches	5,114,425	90,000
Peas	1,216,000	30,400
Persimmons	8,000	400
Plums	825,000	16,500
Irish potatoes	4,966,145	50,000
Sweet potatoes	1,437,450	28,749
Prunes	550,000	15,000
Quinces	15,000	1,200
Raspberries	82,000	8,640
Strawberries	8,695,646	434,820
Tomatoes	2,000,000	30,000
Total	....	$6,213,539
Dried—	*Pounds.*	*Value.*
Almonds	150,000	$19,500
Blackberries	514,000	71,972
Beans	8,000,000	260,000
Onions	1,000,000	30,000
Peaches	423,298	42,330
Peanuts	5,000	300
Prunes	91,660	6,416
Raisins	500,000	25,000
Walnuts	6,712,740	1,006,911
Totals	17,396,861	$1,462,429
Canned—	*Cases.*	*Value.*
Apricots	10,000	$30,000
Beans	15,000	26,250
Corn	1,000	15,000
Pears	5,125	13,425
Peaches	8,716	22,968
Strawberries	28,260	103,040
Tomatoes	72,250	108,375
——— ———	2,000	100,000
Totals	145,026	$417,215

Manufactured Output.

	Quantity.
Brick	175,000
Brooms, dozen	47,787
Cigars	94,097
Flour, barrels	584,732
Lime, barrels	6,000
Malt, tons	4,300
Hides, pounds	5,817,565
Lard, pounds	3,051,236
Meat packed, pounds	3,187,492
Tallow, barrels	7,000
Olive oil, gallons	150,000
Paper, pounds	247,000
Pickles, gallons	800,000
Salt, tons	5,145
Soap, pounds	817,465

Fish Industry.

	Pounds.	*Value.*
All kinds	4,372,825	$218,641

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	12	....	....
Skimming stations	6	....	....
Butter, pounds	..	3,559,757	$1,067,927
Cheese, pounds	..	1,200,000	216,000
Condensed milk, cases	..	126,561,268	1,897,429

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	3,650	$146,000
Stock	12,000	360,000
Dairy cows—Graded	25,606	1,280,300
Guernsey	50	5,000
Herefords	50	5,000
Holsteins	500	50,000
Jersey	300	30,000
Calves	8,506	85,060
Swine	16,240	170,880
Horses—		
Thoroughbred	500	175,500
Standard-bred	22,790	1,697,250
Common	4,800	192,000
Colts	5,464	109,280
Jacks and jennies	500	5,000
Mules	2,051	154,825
Sheep	42,914	180,010
Lambs	18,305	45,915
Angora goats	500	5,000
Common goats	500	2,500
Total stock all kinds	165,226	$4,699,520
Wool, pounds	300,398	$40,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	34,286	$205,716
Ducks	3,167	18,072
Geese	476	3,808
Turkeys	4,760	119,000
Eggs	2,246,245	673,873
Total value		$1,020,469

Forest Products.

	Amount.	*Value.*
Area of timber lands, oak, pine, mesquite, and redwood, acres	587,520	....
Fuel, wood, cords	6,000	$48,000

Power used for mills and manufactories in county—Steam, 149; electrical, 223.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 30,000	......	$150,000
Beeswax	25,000	7,000
Flowers and plants, acres	613	45,975
Honey	2,400,000	150,000
Alfalfa seed	8,780	900
Sugar beets, tons	60,000	360,000
Petroleum, barrels	3,243,000	1,297,200

MADERA COUNTY.

Madera County is located in the center of the San Joaquin Valley between Fresno and Merced counties. The eastern portion of the county is mountainous, the Sierra Nevadas, heavily timbered with forests of pine and cedar, occupying over half of its territory. In these mountains a number of small rivers rise and serve as feeders to the San Joaquin River, which flows along the eastern and southern and western lines of the county. The other streams of the county reaching the valley are the Fresno and Chowchilla, neither of which, however, has running water during the entire year, though they supply water to irrigate several thousand acres of land. From the foothills to the western boundary line, a distance of over 40 miles, the country is practically level and easily cultivated. The soil is rich and produces large crops. There are three irrigation systems—that of the Madera Canal and Irrigation Company, the Chowchilla system, and that of the Miller & Lux estate. All kinds of agricultural pursuits are followed profitably. The principal industries are lumbering, quarrying, stock raising, farming, fruit growing, and mining. Mining is carried on extensively in the mountains, the minerals found being gold, copper, silver, and iron. The large power plant of the San Joaquin Light and Power Company is near North Fork, Madera County. This enterprise supplies Fresno, Madera, and a number of other valley cities and towns with electricity for power and illumination.

The county seat and principal city of the county is Madera, which has a population of about 2,600 people. Other towns are Raymond, Grub Gulch, Fresno Flats, Sugar Pine, O'Neal's, North Fork, Gold, Berenda, Borden, and Minturn.

STATISTICS OF MADERA COUNTY, 1906-7.

General Statistics.

Area, 2,200 square miles, or acres.	1,408,000
Number of acres assessed	724,333
Value of country real estate	$4,080,560
Of improvements thereon	$526,315
Of city and town lots	$306,535
Of improvements thereon	$262,100
Of personal property	$1,372,010
Total value of all property	$6,580,985
Expended on roads, last fiscal year	$24,653
Expended for bridges, last fiscal year	$3,904
Number of miles of public roads	700
Road levy per $100, 1907	40c
Value of county buildings	$160,000
Irrigating ditches—miles, 130; cost	$45,000
Railroads, steam—miles, 3; assessed value	$84,300
Electric power plants—1; assessed value	$78,800
Acres irrigated—	
Canal	11,270
Pumps	700

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	....	....
Butter, pounds		200,000	$40,000

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	2,500	$75,000
Stock	2,623	310,735
Dairy cows—Graded	2,000	50,000
Calves	4,663	26,945
Swine	3,618	12,825
Horses—		
Standard-bred	2,811	99,395
Colts	808	16,980
Jacks and jennies	27	2,295
Mules	2,270	120,990
Sheep	8,756	21,890
Lambs	3,850	1,925
Angora goats	220	550
Total stock all kinds	57,746	$739,530
Wool, pounds	87,560	$13,134

STATISTICS OF MADERA COUNTY, 1906-7—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat		24,200	$701,800
Barley		36,300	726,000
Total cereals		60,500	$1,427,800
Alfalfa hay	6,000	24,000	$192,000
Grain hay	3,000	2,250	22,500
Total hay	9,000	26,250	$214,500

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	10,000	......	10,000
Apricot	20,000	......	20,000
Cherry	35	......	35
Fig	1,500	......	1,500
Lemon	100	......	100
Olive	5,500	......	5,500
Orange	400	......	400
Peach	41,800	20,000	61,800
Prunes	14,000	......	14,000
Quince	25	......	25
Other kinds	10	......	10
Total fruit trees	93,370	......	113,370
Almond	2,550	......	2,550
Walnut	50	......	50
Total nut trees	2,600	......	2,600
Grapevines	1,850,000	600,000	2,450,000
Berries, acres	100	....	100

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	75,000	$1,875,000
Cedar, acres	4,000	....
Pine, acres	71,000	....
Sawmills, number	3	1,200,000
Laths	33,500,000	837,500
Sash and door factories	1	60,000
Total value		$3,972,500

Power used for mills and manufactories in county—Steam, 3; water, 1.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	100,000	$4,000
Blackberries	100,000	6,250
Olives	200,000	5,000
Totals	400,000	$15,250
Dried—	*Pounds.*	*Value.*
Almonds	80,000	$6,000
Apricots	100,000	20,000
Figs	....	4,800
Grapes	500,000	15,000
Peaches	650,000	65,000
Raisins	2,500,000	125,000
Totals	3,830,000	$235,800

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	100,000	$15,000
Sweet wines	1,100,000	270,000
Brandy	10,000	5,000

Number of wineries, 2; distilleries, 2.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,092	$2,730
Ducks	400	2,400
Turkeys	500	9,000
Total value		$16,130

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 600	.....	$600
Honey	4,000	400
Windows and doors	.....	250,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	1	50	$100,000
Planing mills	1	..	....
Granite	2	..	125,000
Sash and door	1	75	250,000
Sawmills	3	900	937,500

MARIN COUNTY.

Marin County is decidedly one of water frontage, being bounded on the west and south by the Pacific Ocean and by the Golden Gate, which separates it from San Francisco by only a mile and a half at its nearest point, and on the east by San Francisco Bay.

The topographical features are rolling hills and numerous small valleys. A part of the Coast Range crosses Marin in a northwesterly and southeasterly direction, and much of the surface of the county is broken and hilly, but a considerable portion immediately on the shore is composed of marsh and overflowed lands. The highest land is Mount Tamalpais, which has an elevation of 2,608 feet.

The soil varies from the rich adobe clay of the salt marshes to the sharp, gravelly loam of the higher foothills. In the valleys it is composed of heavy black loam with an admixture of gravel; in the foothills a reddish loam prevails, sharper, and carrying less adobe. It is all easily worked, heavily charged with the elemental constituents of plant life, admirably suited to horticultural purposes, and wherever worked to fruit yields heavily. Irrigation is not required. The depth of the soil, its retentive nature, and ample rainfall in winter, render artificial watering unnecessary.

Annual average rainfall at Point Reyes, 17.56; Point Bonita, 25.39; San Rafael, 39.58. Mean summer temperature of San Rafael, 76° for June, July, August and September; for the other months, 61°.

The principal industry is dairying, but of late years attention has been paid to fruit growing. Some of the finest apples grown in the State are produced. On the dairy lands of the Novato ranch there are ten orchards. On every rented subdivision of this, and the Burdell ranch, are apple, pear, quince, fig, pomegranate, persimmon, apricot, peach, plum, and other fruit trees, the thrifty growth and large yield from which prove the superior adaptability of the soil and climate of this portion to fruit growing. On the Novato ranch is one of the largest fruit orchards, including one of the oldest and most celebrated apple orchards in the State.

The land is generally held in large tracts, and rented out for dairying purposes. As a result there is but a sparse population, and but little advance is made in horticulture, although the greater part of the county is eminently fitted for this industry. The DeLong orchard was planted in 1857, and has been in continuous bearing from the beginning.

Immense amounts of vegetables are shipped from the lowlands.

The shipments of butter are enormous, and the quality is first class.

Most of the large ranches are stocked by the owners, and divided into tracts, which are leased at annual rentals, according to the number of cows.

San Rafael is the county seat. It has many fine buildings, public and private, elegant hotels, banks, fine churches, schools, electric lights, and a perfect sewerage system. It is a noted place of residence for San

Francisco business men, and its hotels are a favorite resort for invalids and tourists. Its climate is regarded as very favorable for those with pulmonary complaints. Its private dwellings are elegant and its drives most beautiful and romantic. The road to the summit of Mount Tamalpais is a continuous and easy grade. San Rafael, in a sheltered valley, is secure from ocean fogs and winds. It is in constant communication with San Francisco by rail and ferry at Point Tiburon.

Sausalito is also a favorite place of residence for San Francisco businessmen, possessing features similar to San Rafael. Novato is the center of the fruit district; Point Reyes of the dairy interests.

At San Quentin is located one of the State prisons. It is situated on San Francisco Bay, about 12 miles north of San Francisco, with which it is connected by ferry.

STATISTICS OF MARIN COUNTY, 1906-7.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	462,600	......
Beets	2,200	$1,100
Cabbage	2,800	420
Celery	1,000	30
Cauliflower	22,500	225
Cherries	400	30
Grapes	760,000	7,700
Onions	8,500	85
Pears	6,000	80
Peaches	1,280	640
Peas	7,500	94
Quinces	5,220	52
Tomatoes	318,000	3,212
Totals	....	$14,932

Dried—	*Pounds.*	*Value.*
Onions	20,000	$200
Prunes	4,000	120
Totals	24,000	$320

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	782	12,103	$351,076
Corn	43	380	1,706
Total cereals	825	12,483	$352,782
Grain hay	5,700	8,550	$128,250

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	704	$17,690
Stock	4,300	118,604
Dairy cows—Graded	24,495	797,820
Holsteins	2,362	60,865
Jersey	1,505	65,000
Shorthorns	700	......
Calves	3,527	20,870
Swine	9,953	72,234
Horses—		
Thoroughbred	2	......
Standard-bred	1	......
Common	3,056	210,010
Sheep	1,315	3,615
Lambs	223	426
Total stock all kinds		$1,367,134

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	14,000	$63,000
Ducks	15	....
Geese	25	....
Turkeys	47	....
Eggs	1,613,548	....

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	7,660	1,963	9,623
Apricot	2,312	50	2,362
Cherry	213	.....	213
Fig	32	.....	32
Lemon	3,000	.....	3,000
Orange	189	.....	189
Peach	2,170	50	2,220
Pear	771	.....	771
Plum	331	20	351
Prunes	3,326	100	3,426
Quince	232	.....	232
Total fruit trees	236	.....	.....
Almond	140	.....	140
Walnut	2	25	27
Total nut trees	142	25	167
Grapevines	.....	.....	2,091

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	3	109,500	$13,687
Butter, pounds	..	2,114,390	429,888
Cheese, pounds	2	2,400	240

General Statistics.

Area, 516 square miles, or 330,000 acres.

Number of farms	400
Number of acres assessed	324,624
Value of country real estate	$6,497,407
Of improvements thereon	$1,753,755
Of city and town lots	$2,823,005
Of improvements thereon	$2,554,727
Of personal property	$1,488,418
Total value of all property	$15,125,334
Expended on roads, last fiscal year	$3,964,656
Expended for bridges, last fiscal year	$290,069
Number of miles of public roads	268
Road levy per $100, 1907	37.4c
Value of county buildings	$143,000

MENDOCINO COUNTY.

Mendocino County has 100 miles of coast line. In general topography it is mountainous, with valleys lying between the mountain chains and along the coast. It, together with the counties of Humboldt and Trinity, embodies the greater part of the northern Coast Range mountains, and contains their highest peaks and deepest cañons, fertile valleys, wooded slopes, rushing rivers, and picturesque scenery. It shares with Sonoma, Humboldt, and Del Norte the glory of the great redwood belt.

The county has a length of 85 miles from north to south, and the width is 45 miles from east to west. It is traversed the entire length by the Coast Range, which is composed of two parallel ridges. These mountains vary in height from 1,000 to 3,000 feet. Their lower slopes have a gentle declivity, while the higher portions are generally precipitous and furrowed with ravines and gulches. There are many small productive valleys throughout the county.

Mendocino is well watered with the numerous streams which take their rise in the mountain chain which intersects her territory. The Eel River, running north, and the Russian River, running south, have their sources in this county, and are the principal streams. A large number of tributaries connect with them, while down the slope of the western ridge large numbers of creeks, some of which might aspire to the dignity of rivers, find their way to the Pacific.

Almost the entire coast section is composed of valleys, in some places extending inland five miles, and the soil is very fertile and productive. The towns are all short distances apart, and most of the larger ones have large sawmills and are the shipping points for large quantities of lumber, ties, tanbark, etc.

In Ukiah Valley there is the greatest variety of soil, even on a small tract. All of the best lands are under cultivation. Holdings are not large, 200 acres of valley land being an exceptional farm, and the tendency is to subdivision.

The soil in Yorkville Valley is a rich, black loam, and well adapted to the growing of vegetables, fruits, grains, and hops. The soil of the hillsides and mountains is well suited to the growing of grass, vines, and fruits, and in some places grain.

Anderson Valley is a long, narrow strip of land lying between two chains of mountains. It extends 17 miles southeast and northwest, and is from 1 to 2 miles in width. The soil in this valley is a rich alluvium, and is well adapted to the growing of vegetables, fruits, and cereals. The soil of the hills is a rich, black loam, except in a few places, where there is adobe and gravel.

In Potter Valley the soil is mostly a sedimentary deposit, but a variety exists—some clay, a small amount of adobe, and some lands well adapted to fruit raising.

In little Lake Valley the soil generally is a rich, sandy loam, but in a few places a black loam is found. The soil is very productive, and never in the history of the valley has there been anything approaching a failure.

Wheat, barley, oats, and corn are the principal grains raised. Hops, beans, potatoes, and garden vegetables of various kinds are raised profitably in several localities. Fruits of widely varied nature are grown in gradually increasing quantities, oranges, lemons, figs, prunes, peaches, plums, apricots, apples, and pears being cultivated. The apples have been noted for their excellence for nearly twenty years. The Bartlett pears are eagerly sought by the canning companies. The planting of pear orchards has been encouraged of late years by the demonstration repeatedly given that this fruit tree is a reasonably certain bearer, and the returns are large. Strawberries, blackberries, and loganberries are cultivated increasingly, with good results.

There are extensive horse and cattle ranges. Dairying is a remunerative occupation, and with railroad facilities this line of production will be vastly increased. The making of cheese is followed with profit in Upper Lake.

Along the coast from Hardy south to Gualala there is a strip of farming and dairy land, varying in width from ½ to 5 miles, and comprising as rich and productive soil as can be found anywhere. Around Manchester, Bridgeport, and Point Arena are located a number of creameries that stand at the head of the California list in competition.

The principal agricultural industries are wool growing, dairying, poultry and stock raising, and the growing of hops, grain and other cereals, potatoes, apples, and fruits of almost all descriptions. Wine making is very thriving, and new vineyards are constantly coming into bearing.

Dairying is one of the leading interests. There are some up-to-date creameries, with numerous skimming stations. The butter produced is of a very high grade, and finds a ready market.

Stock raising, grazing, and wool growing are very much in evidence. There are about 1,000,000 acres of land specially adapted for grazing purposes. The shipments of wool, of a grade second to none, amount to about 1,000,000 pounds per annum.

The Angora goat thrives well, the mountains being an ideal pasture.

Hops are a very prolific crop and of the finest grade.

Crops of wheat, oats, and barley are always certain.

Potatoes and apples of a very fine quality are raised and bring remunerative prices. The apples excel in size and flavor.

The Bartlett pear, nectarine, peach, and fig are grown very successfully. Berries of all descriptions grow abundantly and are of large size and fine flavor.

No irrigation is required, and crops do not suffer from drought at any time.

In the county are large tracts of redwood, covering over 600,000 acres, the lumber cut from which amounts to 100,000,000 feet annually. The lumber mills, in addition to having their logs floated on the streams on which they are situated, have modern railroads extending into the heart of the redwood belt. The largest mill in the interior is at Willits. All employ a large number of persons in the woods, about the shipping points, on their railroads, and in their mills. Shingles, boxes, and other lumber products are manufactured and shipped in large quantities.

Ukiah, the county seat, is located on the California Northwestern Railroad.

Most of the trade is carried by vessels from coast points to San Francisco. The California Northwestern Railroad, connecting with San Francisco, runs 60 miles through the county from south to north.

All the streams abound in trout. Game—quail, grouse, pigeons and deer—is abundant.

Land suitable for agricultural purposes, fruit growing, etc., can be obtained at reasonable prices.

STATISTICS OF MENDOCINO COUNTY, 1906-7.

General Statistics.

Area, 3,460 square miles, or acres.	2,214,400
Number of acres assessed	1,530,469
Value of country real estate	$8,366,742
Of improvements thereon	$1,212,689
Of city and town lots	$670,690
Of improvements thereon	$10,033,756
Of personal property	$2,215,594
Total value of all property	$22,499,390
Expended on roads, last fiscal year	$46,743
Expended for bridges, last fiscal year	$39,967
Number of miles of public roads	1,160
Road levy per $100, 1907	40c
Value of county buildings	$81,000
Railroads, steam—miles, 185; assessed value	$1,288,348
Electric power plants—11; assessed value	$110,000
Number of acres irrigated	2,400

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	2,800	1,500	$53,000
Barley	2,130	1,065	37,275
Oats	1,850	1,180	47,200
Alfalfa hay	1,380	5,000	$65,000
Grain hay	13,100	14,000	210,000
Total hay	14,480	19,000	$275,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	212,000	162,000	374,000
Cherry	42,000	......	42,000
Fig	100	......	100
Olive	60,000	......	60,000
Orange	3,000	......	3,000
Peach	4,000	2,000	6,000
Pear	196,000	30,000	226,000
Plum	75	......	75
Prunes	464,000	......	464,000
Quince	50	......	50
Total fruit	981,225	194,000	1,175,225
Almond	8,000	......	8,000
Chestnut	4,000	500	4,500
Walnut	34,000	2,000	36,000
Total nut	46,000	2,500	48,500
Grapevines	700,000	800,000	1,500,000

	Pounds.
Loganberries	43,000
Blackberries	30,000
Raspberries	18,000
Strawberries, 5 acres	......

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	20,000,000	$25,000
Blackberries	8,000	400
Beans	12,000	240
Beets	5,000,000	25,000
Cabbage	300,000	3,000
Celery	3,000	150
Cauliflower	4,000	225
Corn	12,000	120
Currants	1,000	100
Cherries	4,000	400
Figs	3,000	200
Gooseberries	200	20
Grapes	10,000,000	100;000
Loganberries	6,800	475
Onions	300,000	6,000
Pears	928,000	18,560
Peaches	1,000	35
Peas	150,000	1,500
Plums	1,200	24
Irish potatoes	1,460,000	14,600
Prunes	2,250,000	22,500
Quinces	800	10
Raspberries	7,500	450
Strawberries	50,000	3,500
Tomatoes	50,000	500
Totals	40,552,500	$233,009

Dried—	*Pounds.*	*Value.*
Almonds	200	$20
Apples	80,000	6,400
Beans	1,000	25
Onions	3,000	60
Peas	2,300	138
Prunes	900,000	29,250
Walnuts	10,000	1,500
Totals	996,500	$37,393

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	10,000	$300,000
Stock	15,860	237,900
Dairy cows—Graded	6,400	128,000
Calves	5,020	25,100
Swine	16,000	32,000
Horses—		
Standard-bred	10	2,000
Common	5,000	375,000
Colts	600	6,000
Jacks and jennies	2	150
Mules	300	15,000
Sheep	89,300	232,250
Lambs	3,100	3,100
Angora goats	4,000	10,000
Total stock all kinds	155,592	$1,366,500
Wool, pounds	700,000	$140,000
Mohair, pounds	30,000	6,000

STATISTICS OF MENDOCINO COUNTY, 1906-7—Continued.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	125,000	$37,500
Beer, barrels	2,280	4,560
Vinegar	1,500	150

Number of wineries, 8; breweries, 2.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	12	......	....
Butter, pounds	..	500,000	$150,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	20,000	$50,000
Ducks	120	360
Turkeys	1,500	5,250
Eggs	500,000	100,000

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 550	.....	$1,650
Flower and plants, acres	6	3,500
Honey	8,000	800
Hops	2,500,000	200,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	1	10	$20,000
Brick	6	30	32,000
Cigars	2	6	40,000
Flouring mills	2	7	47,000
Planing mills	3	30	120,000
Tanneries	4	12	5,000

Forest Products.

	Amount.	*Value.*
Area timber lands, acres	850,000	....
Tanbark, acres	100,000	....
Pine, acres	110,000	....
Redwood, acres	640,000	....
Sawmills, number	27	$420,000
Fuel, wood, cords	500,000	3,000,000
Laths	12,000	....
Lumber, feet	175,000,000	....
Tanbark, cords	15,000	315,000
Pickets, pieces	5,000,000	....
Piles	3,000	....
Posts, pieces	120,000	....
Railroad ties	4,000,000	3,000,000
Shakes	600,000	....
Shingles	200,000	....

Power used for mills and manufactories in county—Steam, 27.

MERCED COUNTY.

Merced County is in the heart of the San Joaquin Valley. The greater part of its area, which is about 90 miles east and west and 40 miles north and south, extends from the foothills of the Sierra Nevada range on the east to the summit of the Coast Range on the west.

With the exception of a small portion of the eastern part, and that situated on the eastern slope of the Coast Range, the county is almost a level plain, broken only by watercourses. The San Joaquin River passes in a northerly and southerly direction almost through the center of the county. To the west of the San Joaquin River are the rolling foothills of the Coast Range. A large number of creeks take their rise in the mountain ranges on both sides of the valley. The principal stream is the Merced River, which, having its source in Mariposa County, in the Yosemite Valley, runs the greater part of its course through Merced, flowing through the entire length of the county, and reaching the San Joaquin on its western border.

On the eastern side of the San Joaquin are bottom and plains lands, skirted on the east by a narrow strip of low foothills. The Merced River bottom has an average width of three miles, with an abrupt bluff on each side.

Irrigation is an absolute necessity over the larger portion of Merced County for the production of fruits, alfalfa, grain, and vegetables. Two of the largest and most complete irrigation systems in the State are owned and operated—one on the east side, the other on the west side, of the San Joaquin River.

Considerable attention is being given to the breeding of dairy stock, and the dairy business has gone ahead with such rapidity that it has become the principal industry. Some of the best equipped creameries in the United States are to be found in Merced County, and some of the recently constructed ones are models of up-to-date factories. The great success of the creamery business is not only based upon good markets and shipping facilities, coupled with thorough manufacturing processes, but also, and especially, is due to the great alfalfa growing industry.

One acre and a half of some land will produce ten tons of alfalfa hay and support one cow, whose milk will sell for $40 at the creamery, one calf worth $10, and two pigs worth $20.

Merced County is the natural sweet potato belt of the State. In the county are several thousand acres of land that seem to be peculiarly adapted to their growth, as experience has demonstrated. Cereals of most kinds are raised, and even with its other great resources it is one of the leading wheat, barley, and corn producers.

Alfalfa grows prolifically, and produces four crops a year, besides pasturage. Table, raisin, and wine grapes find a natural home. Orange, lemon, olive, and fig trees thrive well, while apples, cherries, peaches, apricots, prunes, pears, nectarines, quinces and persimmons are very profitable. The smaller fruits, such as strawberries, blackberries, raspberries, currants, and gooseberries, yield abundantly. Walnuts, chestnuts, pecans, almonds, and peanuts are easily raised.

A commercial product is buhach, from which the celebrated insect powder is manufactured and sent all over the United States.

The Chowchilla Ranch and Pastoral Company, located near the city of Merced, is extensively engaged in the raising of pure-bred and graded shorthorn cattle. The herd of thoroughbred Durham cattle on the Howard ranch is second to none in the State. There are also large flocks of pure-bred and high-grade Merino sheep. The raising and fattening of hogs for market has proved very profitable. Poultry raising is a paying industry. Climatic conditions are favorable to the raising of chickens.

Merced is the county seat. It has fine educational facilities and modern systems of sewers and water supply, and is lighted by electricity. It is the starting point, via the Coulterville route, to the world-famed Yosemite Valley. Merced Falls, Snelling, LeGrand, Dos Palos, Volta, Los Banos, Atwater, and Cottonwood are thriving towns, located in districts with surroundings of exceptional fertility.

Merced County is traversed by two transcontinental railroads, viz: the Southern Pacific and the Santa Fé.

The settlement of land by colonization has resulted very successfully. No more successful colonies can be cited than those of Dos Palos, the Rotterdam, the Pioneer, El Capitan, and the British, all regularly laid out in tracts of five, ten, and twenty acres. Diversified farming is practiced, and comfortable homes and thrifty farms are the result.

Among the most important enterprises of Merced County should be mentioned the Yosemite Valley Railroad, the construction of which was completed May 15, 1907. The City of Merced is its initial point, the line extending thence a distance of 78 miles to El Portal, the terminus at the Yosemite National Park line. It is a standard-gauge, steam railroad, having complete terminus facilities in Merced, including general office building and depot, roundhouse, turntable, storehouse and switchyards. It was constructed with the view of handling the immense tourist travel to and from the Yosemite Valley each year, and has track connections at Merced with the Santa Fé and the Southern Pacific trunk lines. Incidentally it will develop the mining and agricultural interests along the line of the Merced River from Merced to Yosemite.

The Yosemite Valley ranks first among the many natural attractions of California, with its climate, fruit and flowers, mountain and seaside resorts. It is situated in the heart of the Sierra Nevadas, in the central part of the State, and tributary to Merced County. Since its discovery its fame has spread to the remote parts of the earth, and it has become a point of worldwide interest. The new rail route to Yosemite traverses the entire course of the picturesque Merced River Cañon, from the foothills to the very portal of Yosemite. It is an ideal trip, 80 miles of mountain scenery, a most fascinating journey, and a fitting introduction to the greater beauties of Yosemite itself.

The City of Merced thus becomes a lively, interesting place, with the great numbers of tourists from all parts of the world passing to and from the valley at all seasons of the year. It also becomes a distributing point for large quantities of produce and other merchandise, as it requires no small amount to supply the hotels and camps in the valley. As the volume of traffic to and from the valley increases from year to year, the demand for supplies of all kinds must increase correspondingly and create a good home market for the ranch and business interests of the City and County of Merced.

STATISTICS OF MERCED COUNTY, 1906-7.

General Statistics.

Area, 2,000 square miles, or acres.	1,280,000
Number of farms	2,000
Number of acres assessed	1,176,776
Value of country real estate	$9,691,921
Of improvements thereon	$951,938
Of city and town lots	$568,190
Of improvements thereon	$829,735
Of personal property	$2,407,868
Total value of all property	$14,449,652
Expended on roads and bridges, last fiscal year	$56,367
Number of miles of public roads	965
Road levy per $100, 1907	40c and 10c
Value of county buildings	$187,000
Irrigating ditches — miles, 151½; cost	$308,883
Railroads, steam — miles, 153.81; assessed value	$3,224,715
Electric power plants—1; assessed value	$20,450
Electric power lines — miles, 18½; assessed value	$21,537
Number of acres irrigated	150,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	19,281	6,601	$184,828
Barley	63,831	54,025	1,350,625
Oats	15,189	1,813	50,764
Rye	6,083	436	13,080
Corn	2,100	1,179	29,475
Total cereals	106,484	64,054	$1,628,772
Alfalfa hay	19,827	31,934	$255,472
Grain hay	31,854	37,526	337,734
Total hay	51,681	69,460	$593,206

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	4,569	3,143	7,712
Apricot	5,621	6,089	11,710
Cherry	215	757	972
Fig	7,350	7,593	14,943
Lemon	385	225	610
Nectarine	590	42	632
Olive	1,750	2,850	4,600
Orange	2,050	1,300	3,350
Peach	69,750	153,947	223,697
Pear	5,200	4,100	9,300
Plum	2,000	350	2,350
Pomelo	4	.....	4
Prunes	10,260	2,152	12,402
Quince	529	100	629
Almond	18,750	5,250	24,000
Chestnut	20	39	59
Pecan	9	10	19
Walnut	857	1,179	2,036
Persimmons	50	25	75
Total nut trees	2,586	2,526	5,112
Grapevines	1,650	1,273	2,923
Blackberries, acres	25	6	31
Loganberries, acres	18	5	23
Strawberries, acres	10	..	10

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	104,480	$1,044
Apricots	17,375	695
Asparagus	4,000	200
Blackberries	110,000	5,500
Beans	35,000	700
Cabbage	65,000	650
Celery	9,500	118
Cauliflower	45,000	675
Corn	155,000	3,100
Figs	49,050	981
Lemons, boxes	300	1,200
Loganberries	85,000	3,400
Nectarines	1,500	15
Onions	15,000	300
Oranges, boxes	2,965	4,447
Olives	223,600	4,472
Pears	100,350	1,505
Peaches	1,016,082	17,781
Peas	20,000	800
Persimmons	300	12
Plums	22,210	222
Irish potatoes	485,100	7,276
Sweet potatoes	12,250,100	153,126
Quinces	18,000	270
Raspberries	7,000	420
Strawberries	24,000	1,440
Tomatoes	450,000	1,800
Tomatoes, boxes	22,000	13,200
Total	....	$276,813

Dried—	*Pounds.*	*Value.*
Almonds	98,222	$12,768
Apples	1,375	126
Apricots	1,300	130
Beans	227,630	4,552
Figs	593,800	23,752
Onions	95,000	1,425
Pears	900	90
Peaches	65,725	5,358
Prunes	104,070	3,312
Raisins	150	8
Walnuts	7,312	877
Totals	1,195,484	$52,208

Canned—	*Cases.*	*Value.*
Beans, string	2,200	$10,000
Grapes	1,200	4,500
Peaches	12,000	45,000
Tomatoes	3,000	5,100
Potatoes	400	800
Totals	18,800	$65,400

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	3	....	....
Skimming stations	3	....	....
Butter, pounds	..	439,628	$109,907
Cream, pounds	..	4,349,678	1,087,414

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	1,000	$4,500

Power used for mills and manufactories in county—Electrical, 1; water, 1.

STATISTICS OF MERCED COUNTY, 1906-7—Continued.

Manufactured Output.

	Quantity.
Brick	1,250,000
Flour, barrels	44,000
Hides	8,000
Tallow, pounds	55,000
Olive oil, gallons	1,600
Pickled olives, gallons	2,500

Poultry and Eggs.

	Dozen.	Value.
Chickens	4,720	$18,880
Ducks	145	1,160
Geese	29	225
Turkeys	1,884	50,868
Eggs	204,892	51,223
Total value		$121,956

Livestock Industry.

	Number.	Value.
Cattle—Beef	996	$29,880
Stock	38,248	573,720
Dairy cows—Graded	17,250	690,000
Calves	6,899	68,990
Swine	23,450	234,500
Horses—		
Thoroughbred	17	17,000
Standard-bred	2,318	231,800
Common	2,553	153,180
Colts	1,294	25,880
Jacks and jennies	114	11,440
Mules	2,791	318,650
Sheep	71,759	251,156
Lambs	39,320	98,300

Livestock Industry—Continued.

Angora goats	3,000	7,500
Common goats	2,300	.....
Total stock all kinds	212,309	$2,714,296
Wool, pounds	720,970	$72,097

Manufactories.

	No.	No. of Employes.	Value of Product.
Brick			1,250,000
Flouring mills	2	...	176,000
Meat products—			
Hides	..	...	32,000
Tallow	..	...	5,500
Olive oil	..	...	1,600
Pickled olives	..	...	1,750

Wines, Brandies, Etc.

	Gallons.	Value.
Brandy	3,000	$3,000
Cider	500	250
Vinegar	750	375
Claret	25,350	3,802
Port	65,000	19,500
Sherry	300	90

Number of wineries, 1; distilleries, 2.

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 1,666	......	$2,499
Honey	66,640	4,700
Syrup, gallons	1,600	1,120

MODOC COUNTY.

Modoc County lies in the extreme northeastern corner of California. The county is a succession of mountain ranges and valleys branching off from the Sierra Nevada Mountains, the principal spur of which is the Warner Range. It is principally drained by Pitt River, which flows into the Sacramento, near Redding, Shasta County. The lava-bed section occupies over one half the total area. The county has two large lakes, but barring the lakes and the large cattle ranges it is sparsely settled.

The valleys are the principal features, the leading ones being Surprise, Goose Lake, Hot Springs, Jess, Big, and Little Hot Springs.

Wheat, barley, fruit, vegetables, and hay are the leading staples. Thousands of acres are in alfalfa, and the stock and dairying industries are thriving. Every ranch has a fine orchard, and ranch houses and barns, costing $5,000 or $6,000 in total improvements, are not uncommon. Trees, both shade and ornamental, abound around every place.

The climate is that of the temperate zone, and the products are those of the great intermountain region which stretches from the Sierra to the western plains of Kansas. Snow falls in the valleys and much deeper in the mountains, forming the principal supply of moisture for the development of the country. Stock is usually fed for several months through the winter, although it is not always necessary so to do. The thermometer will sometimes run below zero for a few days in the winter, but not for very long, and 90° is extreme heat for summer. Even in summer the evenings are cool and delightful.

The county is well watered. Surprise Valley has nearly twenty streams, which run both winter and summer. Goose Lake Valley is equally fortunate, while the Pitt River supplies water for many farms and ranches. Many springs exist, especially in the mountains; and in Surprise Valley there are many artesian wells.

The timber of the county is pine and fir in the Warner Range, and sugar pine in the western part.

Horticulture has had but a small place in the industries, only sufficient fruit for home uses being raised. However, the gradual approach of the railroad running north from Reno, Nevada, will increase the productivity in this line immensely, as the county is well adapted to apples, pears, and berries. The wild plum is about the only native fruit. The cultivated fruits were brought in the earlier days from Eastern States by the immigrants who came across the plains. A great deal of orchard planting has been done within the last few years.

The last five years have seen a great deal of reservoir work undertaken throughout the county and its tributary valleys. The rains come in time to insure abundant harvests year after year.

The nearest railroad point to Alturas, the county seat, is Madeline, in Lassen County. Daily trains are run from Madeline to Reno, Nevada.

There are flouring mills located at Bidwell, Lake City, Cedarville, New Pine Creek, Alturas, and Adin. There are sawmills located at Bidwell, Cedarville, Eagleville, Willow Ranch, Davis Creek, Jess Valley, Alturas, Adin, and Willow Valley.

STATISTICS OF MODOC COUNTY, 1906-7.

General Statistics.

Area, 4,097 square miles.	
Money in solvent credits	$95,751
Number of acres assessed	594,079
Value of country real estate	$2,720,773
Of improvements thereon	$428,183
Of city and town lots	$99,844
Of improvements thereon	$225,283
Of personal property	$1,356,314
Total value of all property	$4,926,148
Expended on roads, last fiscal year	$1,550,957
Road levy per $100, 1907	30c
Value of county buildings	$13,950
Electric power plants—3; assessed value	$7,395
Electric power lines—miles, 8; assessed value	$975

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	6,596	47,099	$907,138
Barley	4,448	6,982	119,598
Oats	168	147	3,473
Rye	31	28	728
Corn	10	1,000	80
Total cereals	11,253	55,266	$1,031,017
Alfalfa hay	6,457	17,437	$40,729
Grain hay	1,267	2,192	10,858
Grass hay	30,661	62,097	181,917
Total hay	38,385	81,726	$233,504

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	18,961	2,520	21,481
Apricot	555	72	627
Cherry	761	394	1,155
Nectarine	5	5	10
Peach	1,869	490	2,359
Pear	1,720	299	2,019
Plum	2,037	252	2,289
Prunes	1,252	54	1,306
Quince	19	10	29
Total fruit trees	27,379	4,096	31,275
Walnut	89	.....	89
Grapevines	6	12	18

Berries, all kinds, 23 acres, 500 bushes.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	106,000	$636,000
Pine, acres	820	....
Sawmills, number	10	....
Fuel, wood, cords	384	....
Lumber, feet	2,415,000	107,150
Sash and door factories, number	1	....
Shakes	80,000	400
Shingles	1,211,000	4,594
Total value		$748,144

Power used for mills and manufactories in county—Steam, 8; electric, 2; water, 2.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	11,039	$218,218
Stock	45,227	413,140
Dairy cows—Graded	898	15,454
Angus	7	350
Herefords	27	1,860
Shorthorns	528	5,225
Calves	9,975	63,360
Swine	7,992	26,351
Horses—		
Thoroughbred	17	7,756
Standard-bred	24	261
Common	7,798	141,555
Colts	1,494	25,308
Jacks and jennies	44	2,523
Mules	268	4,870
Sheep	43,573	79,398
Lambs	19,467	25,488
Angora goats	237	90
Common goats	17	165
Total stock all kinds	148,438	$4,741,615
Wool, pounds	323,400	$11,394
Mohair, pounds	325	....

Wines, Brandies, Etc.

	Gallons.	*Value.*
Beer, barrels	1,140	$1,140
Cider	9,980	1,132
Vinegar	1,120	520
Total		$2,792

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,747	$4,343
Ducks	67	145
Geese	5	.....
Turkeys	276	1,241
Eggs	62,729	5,568
Total value		$11,297

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	30,000	$7,500
Butter pounds	..	55,943	2,259
Cheese, pounds	..	10,000	.....

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 774	......	$423
Honey	13,908	823
Alfalfa seed	240,310	5,421
Grass seed	300	30
Sugar beets, tons	100,000	500

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Clothing	1	1	$1,050
Flouring mills	7	16	95,970
Leather goods	3	4	10,000
Planing mills	1	2	2,000

STATISTICS OF MODOC COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	3,265,600	$16,771
Apricots	79,081	3,803
Blackberries	6,700	345
Beans	43,170	2,181
Beets	486,930	1,212
Cabbage	288,965	2,870
Celery	2,000	160
Cauliflower	1,200	40
Corn	7,000	315
Currants	5,890	171
Cherries	47,359	1,150
Gooseberries	2,570	.....
Grapes	200	.....
Loganberries	3,483	134
Onions	95,475	800
Pears	146,570	1,702
Peaches	127,154	2,953
Plums	168,565	1,280
Irish potatoes	13,256,000	$10,243
Prunes	41,763	392
Quinces	150	2
Raspberries	17,066	660
Strawberries	14,696	1,108
Tomatoes	114,260	3,298
Totals	8,221,847	$51,590
Dried—	*Pounds.*	*Value.*
Apples	1,225	$132
Beans	600	150
Onions	3,000	90
Walnuts	500	...
Totals	5,325	$372

Manufactured Output.

	Quantity.
Flour, barrels	303,150

MONO COUNTY.

Mono is a long, narrow county lying on the eastern slope of the Sierras, its greatest length bordering on the State of Nevada, which forms its northeastern boundary, its general direction being southeast and northwest.

The general contour is mountainous and very rough, all but 400 square miles, or less, being mountainous. The western portion lies among the Sierra Nevada Mountains, along their summit, the heights being clad in snow, and the slopes of the range being covered with forest trees.

Among the highest peaks are Mount Dana, 13,627 feet; Mount Lyell, 13,217 feet; and Castle Peak, 13,000 feet. The greater portion of the population is in the eastern part, in the valleys and the mining camps in the surrounding mountains. This portion, which has always been considered a strange, mysterious country, is of a desert-like, volcanic character, abounding in salt pools, alkali, and volcanic table-lands, its character being significantly indicated by some of the local names, such as Hot Springs, Geysers, Sulphur Springs, Black Lake, Soda Pond, Volcano, Obsidian Mountain, Deep Cañon, Volcanic Tableland, Red Crater, Adobe Meadows, and Oasis.

Mono Lake, the ''Dead Sea of America,'' is one of the attractions, and situated in the center of the county; it is about 12 miles long and 8 miles wide; its waters are a somewhat unusual compound, various chemical substances being found in solution in them. Several attempts have been made to utilize this water without success. This lake has all the appearances of having once been the scene of volcanic action. The country surrounding it, as Bodie, Aurora, Lundy, Tioga, and Benton, abounds in minerals. The lake has a number of small streams flowing into it, but is without a perceptible outlet.

Owens River in the south, which takes its rise in a high peak in the Sierras, and Kitten and Walker rivers in the north, are the principal streams. One passes through the southern part into Inyo County. The other after rising in Mono County, continues its course into the State of Nevada. These two streams with their branches, together with the small streams that flow into Mono Lake, furnish the principal water supply for irrigation.

The retaining of the snow in the high mountains, at the sources of the streams used for irrigation, until later in the season, assures an abundance of pasturage on the mountain ranges, which are thronged with vast herds of cattle and bands of horses and sheep that are brought from the lower sections to graze during the summer.

That portion of the valley soil lying contiguous to the streams is very rich. A great deal of the sagebrush land, formerly considered barren, is found to be very productive when placed under cultivation. Thus the area of tillable land has been vastly increased within the last few years, and wherever water can be got on to the land, even well up on the foothills, there are farms that are making comfortable homes for their owners.

The agricultural resources are chiefly confined to the raising of hay and the hardier cereals and vegetables for home consumption. The small surplus finds a ready market in the mining camps. Apples raised in the lower valleys are of superior quality and flavor and thrive well. Plums and peaches are grown on a limited scale. Berries also do well, considering the high altitude.

Grazing is the leading industry, and the pasturage is good and plentiful. Herds of dairy cattle are moved from the valleys during the summer, and an excellent product of butter is made. Large bands of sheep are also driven to its mountains for summer pasturage. Goats, hogs, horses, poultry, and mules are raised in large numbers.

The timber belt is very large and the product of good marketable quality, but as there is no means of transportation to market, the development of the lumber interests is retarded, although considerable quantities are used for local mining purposes.

Bridgeport is the county seat, and is located in a prosperous farming section.

Considerable mining for precious metals is carried on, the leading camp being Bodie. This industry is prosperous. The introduction of the cyanide process, and the installing of electric power plants on the several streams of the county, thereby furnishing cheap power, make it possible to work at a profit large bodies of low-grade ore that heretofore were of no value, on account of cost of reduction.

STATISTICS OF MONO COUNTY, 1906-7.

General Statistics.

Area, 2,796 square miles, or acres.	1,789,440
Number of farms	170
Number of acres assessed	166,783
Value of country real estate	$518,960
Of improvements thereon	$158,480
Of city and town lots	$17,660
Of improvements thereon	$81,620
Of personal property	$413,253
Total value of all property	$1,163,029
Expended on roads, last fiscal year	$2,865
Expended for bridges, last fiscal year	$642
Number of miles of public roads	292
Road levy per $100, 1907	25½c
Value of county buildings	$45,600
Railroads, steam—miles, 68; assessed value	$90,015
Electric power plants—2; assessed value	$26,000
Electric power lines—assessed value	$4,000
Number of acres irrigated	10,710
Balance grazing land.	

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	40	28	$1,500
Barley	40	32	1,120
Oats	20	16	560
Alfalfa hay	2,215	6,645	$39,870
Grass hay	6,750	10,125	60,750
Total hay	8,965	16,770	$100,620

Forest Products.

	Amount.	*Value.*
Sawmills, number	2	$5,500
Fuel, wood, cords	5,000	15,000
Lumber, feet	400,000	6,400
Total value		$26,900

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	1,659	......	1,659
Apricot	5	......	5
Cherry	38	......	38
Nectarine	10	......	10
Peach	36	......	36
Pear	100	......	100
Plum	210	......	210
Quince	5	......	5
Total fruit trees.	2,063	......	2,063
Grapevines, acres.	2	......	2
Berries, acres	1	......	1

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	242	$6,050
Stock	2,088	20,880
Dairy cows—Graded	228	5,100
Calves	650	3,150
Swine	129	645
Horses—		
Thoroughbred	4	1,150
Standard-bred	314	14,470
Common	667	18,820
Colts	280	5,375
Jacks and jennies	5	180
Mules	45	1,920
Sheep	6,258	16,145
Common goats	220	264
Total stock all kinds.	11,130	$94,149

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	151	$755

Miscellaneous Products.

	Number.	*Value.*
Bees, hives	233	$233

Mono has one limekiln that turns out about $2,000 worth of lime a year.

MONTEREY COUNTY.

Monterey County is situated about 100 miles south of San Francisco, and 500 miles north of Los Angeles, on the Pacific coast. It is 124 miles long and 45 miles wide, its extreme length being from north to south.

Owing to the peculiar topography, with its rough mountains and broad plains, its great river running from south to north, with tributaries from either side, its rolling hills and rugged mountains, it is found to be a miniature of the State, with its entire diversity of climate and soil, enabling it to yield everything produced in the State, and rendering it one of the most desirable regions for settlement.

Its rivers furnish a never-failing supply of water for irrigation, and the mountains abound in minerals—gold, silver, copper, coal, bitumen, and oil.

The county is divided into three sections—the mountains and hills on the east, mountains and hills on the west, and the great Salinas Valley situated between these ranges of mountains.

The portion of Pajaro Valley lying south of the Pajaro River, and running to Monterey Bay on the southwest, is in Monterey County, and is about 15 miles long, and from 6 to 8 miles wide. The land is exceedingly fertile and under a thorough system of cultivation, producing immense crops of all kinds of vegetables, grain, fruit, and berries. Well-tilled farms greet the eye, and villages, school houses, churches, and picturesque residences dot the landscape in every direction. The foothills are covered with flocks and herds, and the lower ranges are timbered with live oak. The Pajaro River flows southwesterly and finds an outlet in Monterey Bay, near the mouth of the Salinas River.

The great Salinas Valley opens out on Monterey Bay and extends southward 100 miles, with an average width of 10 miles; therefore its area is about 1,000 square miles, or 640,000 acres. The Salinas River flows through its entire length. The land may be divided into three classes, viz: First, the heavy, rich bottom lands, which produce almost everything, the soil being sediment and black adobe, which often contains just enough sand to make it work easily. Second, the mesa or table-lands, particularly adapted to growing wheat, barley, and other cereals. Third, the uplands and slightly rolling hills, some of which are the finest fruit lands in California, and will produce oranges, lemons, grapes, peaches, apricots, almonds, walnuts, figs, apples, plums, pears, berries and all other fruits common to the State.

Nearly all semi-tropical fruits do well in some part of this county, especially in the thermal belt along each side of Salinas Valley. A number of orange and lemon trees in yards of Salinas City hang full of fruit each year and are never injured by frost.

In barley, beets, and carrots, this valley can not be surpassed.

Going south, wheat excels; and grapes, peaches, prunes, apricots,

cherries, and almonds grow to perfection in the foothills, cañons, and small valleys, and figs do well in sheltered places.

Olive trees flourish with all the vigor they possess in their native country. Currants, gooseberries, blackberries, loganberries, and raspberries grow luxuriantly. Strawberries are in the market all the year round, and are shipped from Pajaro by carloads. Grapes grow to perfection everywhere in the county, except in the heavy bottom lands of the lower Salinas Valley.

As to potato raising, the Salinas Valley has no equal; here is the home of the famous Salinas Burbanks that are in such great demand all through the northwest, and thousands of sacks are shipped to the Philippine Islands. As high as four hundred bushels to the acre have been raised near Salinas.

Dairying is a very prominent, if not a leading industry, most of the dairies being devoted to butter making. Some of the finest dairies in the State are in Monterey County, and some of the best butter in the State is made here. They have the latest and best improved machinery, and have found their business very profitable.

Extensive work has been done in the last few years in bringing the valley under a thorough system of irrigation. Opposite Soledad, on the south side of Salinas River, considerable irrigation is done around Fort Romie on lands purchased by the Salvation Army, and sold on most favorable terms to worthy poor in need of homes. This is one of the most prosperous colonies in America. Around the Spreckels sugar factory, 4 miles from Salinas City, a great deal of land has been irrigated for raising beets. This is the largest beet-sugar factory in the world.

The main transcontinental line of the Southern Pacific Railroad enters this county through Pajaro Valley on the north, and runs southeast through its entire length, paralleling the Pajaro and Salinas rivers.

Pajaro is the great shipping point for apples, berries, all fruits, and dairy products of its section.

Hotel Del Monte, "the queen of American watering places," including the main structure and two annexes, together with the connecting wings, is simply immense, and everything connected with the establishment is on the same magnificent scale. The grandeur of the hotel is repeated in the grounds, which cover 140 acres, laid out in lawns, flower beds, parks, and groves, and the landscape gardening is a marvel of beauty.

A little farther on is Monterey, situated on the beach of Monterey Bay, lying back on her sloping hills, and overlooking the placid waters of the bay—one of the grandest and most beautiful townsites nature ever formed.

Two miles farther on is Pacific Grove. Nestled among the pines is this little town, with beautiful streets, magnificent cottages, fine churches and school houses, charming drives, and with never a saloon in its sacred limits.

The harbor of Monterey Bay is second in importance on the coast. The largest battleships of our navy find anchorage within 100 feet of the shore, and during heavy storms at sea it is not unusual to see many ships of different nations anchored in the calm waters of the bay. The fishing is incomparable for quantity and variety, and a cannery is located at Monterey. There is an abalone canning factory located at

Point Lobos, and one at Point Sur. Monterey Bay contains about one hundred and fifty species of food fish, and many are annually taken for market. There is a whaling company at Monterey, and some seasons many whales are captured.

Salinas City, the county seat, is in the heart of the best portion of Salinas Valley, the head of the first division of the railroad, near the Spreckels sugar factory, and contains extensive gas and water works, a large flouring mill, a large creamery, a planing mill, and shops, banks, churches, and school houses. There are many magnificent residences and well-improved streets. Fraternal societies are well represented.

Soledad, named for Soledad Mission, is in another wheat belt, and is an important shipping point for grain and dairy products. It is the nearest point to Paraiso Springs, whose waters contain medicinal properties of a high order.

The narrow-gauge railroad from Pajaro to Salinas parallels the main line on the west, taps Monterey Bay at Moss Landing—where there are extensive warehouses and lumber yards, and where the coast vessels stop regularly for grain and merchandise—then continues to Spreckels' sugar factory, and is used principally for hauling beets to the factory and lime rock from the quarries, though considerable grain is shipped by it from the region west of Salinas.

STATISTICS OF MONTEREY COUNTY, 1906-7.

General Statistics.

Area, 3,450 square miles.	
Number of farms	3,407
Number of acres assessed	855,791
Value of country real estate	$9,095,185
Of improvements thereon	$1,618,970
Of city and town lots	$2,106,380
Of improvements thereon	$1,860,255
Of personal property	$1,435,212
Total value of all property	$16,116,002
Expended on roads, last fiscal year	$65,076
Expended for bridges, last fiscal year	$29,500
Number of miles of public roads	780
Road levy per $100, 1907	40c
Irrigating ditches—miles, 291; cost	$117,500
Railroads, steam—miles, 168.81; assessed value	$3,008,925
Railroads, electric—miles, 6; assessed value	$10,000
Electric power plants—4; assessed value	$73,000
Electric power lines—miles, 35; assessed value	$5,000
Number of acres irrigated	25,150

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	29,500	13,125	$393,750
Barley	78,540	44,610	947,800
Total cereals	108,040	57,735	$1,341,550
Alfalfa hay	4,450	3,700	$30,400
Grain hay	27,250	38,050	356,500
Total hay	31,700	41,750	$386,900

Wines, Brandies, Etc.

	Barrels.	Value.
Beer	4,500	$27,500

Number of breweries, 2.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	266,430	100,500	366,930
Apricot	29,960	5,000	34,960
Cherry	2,150	200	2,350
Fig	250	100	350
Lemon	125	50	175
Nectarine	150	25	175
Olive	5,840	200	6,040
Orange	150	50	200
Peach	7,150	1,600	8,750
Pear	8,950	2,850	11,800
Plum	1,400	300	1,700
Prunes	22,200	100	22,300
Quince	175	50	225
Other kinds	550	25	575
Total fruit trees	345,480	111,050	456,530
Almond	2,300	400	2,700
Chestnut	70	...	70
Walnut	685	225	910
Other nuts	50	20	70
Total nut trees	3,105	645	3,750
Grapevines	10,225	1,500	11,725
Berries, acres	793	1	794

Poultry and Eggs.

	Dozen.	Value.
Chickens	14,315	$60,000
Ducks	205	950
Geese	148	1,090
Turkeys	262	2,910
Eggs	587,350	118,705
Total value		$183,655

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, number	3,750	......
Honey	49,500	$3,960
Sugar beets, tons	110,000	550,000

STATISTICS OF MONTEREY COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	20,967,000	$663,560
Apricots	59,000	7,350
Asparagus	12,000	960
Blackberries	1,200,000	45,000
Beans	365,500	25,665
Beets	16,500,000	40,150
Cabbage	4,000	100
Celery	10,000	500
Corn	430,000	3,800
Cherries	5,000	150
Grapes	125,000	1,250
Loganberries	500,000	20,000
Olives	100,000	3,000
Pears	110,000	4,120
Peaches	85,000	2,100
Peas	240,000	4,800
Plums	1,000	75
Irish potatoes	26,080,000	410,500
Prunes	191,500	5,520
Quinces	1,000	200
Raspberries	451,000	22,700
Strawberries	3,001,000	225,300
Tomatoes	30,000	900
Totals	61,968,000	$1,487,600

Dried—	*Pounds.*	*Value.*
Almonds	15,000	$1,510
Apples	103,000	8,180
Apricots	2,500	175
Beans	27,000	8,100
Peaches	3,000	240
Plums	2,000	100
Prunes	3,000	150
Walnuts	1,500	170
Totals	157,000	$18,625

Canned—	*Cases.*	*Value.*
Apples	300	$700
Apricots	250	600
Blackberries	150	450
Cherries	100	300
Grapes	300	600
Nectarines	100	200
Pears	200	200
Peaches	500	1,000
Plums	100	175
Raspberries	50	150
Strawberries	75	225
Tomatoes	200	300
California sardines	18,000	129,600
Totals	20,225	$134,450

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	53	....	....
Skimming stations	14	....	$12,800
Butter, pounds	..	572,842	140,540
Cheese, pounds	..	2,121,500	292,980
Total			$446,320

Fish Industry.

	Pounds.	*Value.*
Salmon	660,000	$23,100
Other kinds	800,000	24,000
Totals	1,460,000	$47,100

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	9,350	$282,125
Stock	31,900	575,100
Dairy cows—Graded	8,345	254,640
Shorthorns	1	200
Calves	9,350	83,250
Swine	13,250	95,400
Horses—		
Thoroughbred	181	54,500
Standard-bred	3,100	330,000
Common	11,350	908,000
Colts	3,490	209,400
Jacks and jennies	41	3,700
Mules	535	48,500
Sheep	21,850	70,400
Lambs	3,700	7,100
Angora goats	1,700	6,900
Common goats	625	1,400
Total stock all kinds	118,768	$2,930,115
Wool, pounds	179,000	27,120
Mohair, pounds	18,400	3,880

Forest Products.

	Amount.	*Value.*
Sawmills, number	3	....
Fuel, wood, cords	32,500	$195,000
Lumber, feet	150,000	15,000
Pickets, pieces	292,000	18,000
Piles	300	4,500
Posts, pieces	100,506	10,312
Total value		$242,812

Power used for mills and manufactories in county—Steam, 40; electrical, 10.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	1	15	$24,000
Cigars	5	28	....
Confectionery	6	20	....
Lime	1	100	540,000
Planing mills	6	48	....
Artificial stone	2	8	5,000
Sugar, beet	1	600	1,000,000
Fish products, 2 canneries, sardines in cases	..	160	129,600

Manufactured Output.

	Quantity.
Brick	99,000
Crackers, pounds	1,540,000
Hides, pounds	360,000
Tallow, barrels	350

NAPA COUNTY.

Napa County lies in a northeasterly direction from San Francisco, its county seat, Napa, being about 40 miles from San Francisco and about 70 miles southwesterly from Sacramento. Though one of the smallest, it is one of the most important counties of the State, on account of its proximity to the great market of San Francisco, with which it has several lines of rail and water communication, the variety and wealth of its agricultural, mineral, and manufactured products, the fertility of its soil, the salubrity of its climate, and the excellence of its educational facilities. The length is about 50 miles, and its width varies from 30 to 35 miles.

Spurs of the Coast Range Mountains having a northwesterly trend divide the county into several valleys and afford a variety of scenery of unsurpassed beauty. The western boundary runs for its entire length from San Pablo Bay to Mount St. Helena, along the top of one of these ridges. The only valley of importance intersecting the slope of this western range is Brown's Valley, a productive glen that lies west of Napa City and contains many pretty suburban homes. East of this range, extending for almost the entire length of the county, lies the beautiful Napa Valley, varying in width from 1 to 5 miles, and opening at its lower end into a wide, fanlike expanse of tule land. Mount St. Helena, at the head of this valley, rears its summit nearly 4,500 feet above the level of the sea. The valley is watered by numerous streams that flow from the mountains and find their way into Napa River, which flows the entire length of the valley, and is navigable for steamers and sailing craft as far as Napa City.

The northeastern half of the county is broken by ranges of high mountains into several valleys, of which Berryessa, the most easterly, is the largest.

The rainfall averages so well that a shortage of crops is unknown. The influence of the ocean breeze is felt during the summer to an extent amply sufficient to temper the sun's heat, while the hills act as a barrier against the fogs. The foothills are especially famed for their climatic features, and here are some of the most noted health resorts in the State.

The soil may be divided into five classes. The first class, termed argillaceous, is common to the mountains on the east side of the county, and is not very productive. The second class, adobe, does not exist to any great extent. The best soil is the loam, which may be found in all the valleys, but principally in Napa. Tule soil is found from Napa City southward, and along the margin of the bay. The last class is lava, a decomposed volcanic formation, and is excellent for vineyards. It is found in the vicinity of Howell Mountain.

As the climate of Napa Valley corresponds strikingly in its main features to that of the south of France, grape growing, wine making, and horticulture are followed with great success. The olive, which requires a temperate climate, and dreads equally excessive hot or cold weather, thrives remarkably, and has been largely planted on stony hillsides that would be almost useless for other fruits. The oil and pickled olives manufactured are not excelled by any other domestic or imported product.

Napa County at one time led the State in the amount of wine produced, but the ravages of the phylloxera caused the death of many of the finest vineyards, and curtailed the production of grapes. Some of these vineyards have been replanted with resistant vines, and thus the output of wine is increasing.

The raising and curing of French prunes has been brought to a high state of excellence. Cherries and peaches are successful crops, and walnuts, almonds, apricots, pears, and apples thrive in all sections. While Napa County makes no claims to general adaptability to the culture of citrus fruits, there are few orchards that do not contain a number of orange and lemon trees to provide for the use of the family and for local sale. The output is uniformly of fine quality. Berries of all kinds thrive, and form a very material part of the produce.

Diversified farming is carried on on a large and profitable scale, the nature of the crops raised depending upon the character of the soil. The hay crop is generally large, and, being near to market, finds a profitable sale. Wheat, oats, barley, and corn are raised on a large scale, particularly in the eastern valleys. Potatoes, asparagus—in fact, vegetables of all kinds—do well. All the crops are raised without irrigation, the rainfall being ample, even in the driest years, to insure a good crop.

More and more attention is being paid, year after year, to dairying and stock raising, and also to poultry raising.

Napa County has always been noted for the fine horses that its farms produce. The most complete establishment devoted exclusively to the breeding of thoroughbred horses, the Napa Stock Farm, has several high-class imported stallions, and over sixty thoroughbred mares.

Quicksilver, magnesite, mineral waters, and building stone are produced in large quantities.

Napa City is situated at the head of navigation on Napa River. It is chiefly interested in the manufacture of leather and leather goods. There are tanneries, glove factory, shoe factory, woolen mill, and many other industries. It has excellent streets and buildings, fine schools and numerous churches. The State Hospital is located a short distance from the city. At Yountville, 9 miles from Napa, is the State home for volunteer soldiers.

St. Helena, farther up the valley, is the second town in size, and is chiefly devoted to the wine-making industry. It is also the business center for Pope Valley. Here is situated the St. Helena Sanatorium and the health-food factory.

Napa County is famous for the excellence of its roads and the size and number of its stone bridges. All the main county roads are sprinkled in the summer, and rural delivery routes carry the daily mail to the doors of the country people.

STATISTICS OF NAPA COUNTY, 1906-7.

General Statistics.

Area, 800 square miles, or 512,000 acres.

Number of farms	3,600
Number of acres assessed	411,596
Value of country real estate	$5,375,220
Of improvements thereon	$3,057,230
Of city and town lots	$1,118,755
Of improvements thereon	$1,826,600
Of personal property	$2,350,750
Total value of all property	$14,134,151
Expended on roads, last fiscal year	$24,000
Expended for bridges, last fiscal year	$15,000
Number of miles of public roads	453
Road levy per $100, 1907	34c
Value of county buildings	$130,000
Railroads, steam—miles, 55; assessed value	$1,043,927
Railroads, electric—miles, 12½; assessed value	$95,838
Electric power lines—miles, 9; assessed value	$4,960

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	49,000	8,000	57,000
Apricot	15,000	2,500	17,500
Cherry	30,000	2,450	32,450
Fig	2,000	200	2,200
Lemon	500	250	750
Nectarine	400	100	500
Olive	42,000	600	42,600
Orange	3,800	1,200	5,000
Peach	104,000	8,300	112,300
Pear	63,400	1,000	64,400
Plum	85,000	2,650	87,650
Prunes	128,000	33,800	161,800
Quince	6,500	380	6,880
Other kinds	1,200	450	1,650
Total fruit trees	530,800	61,880	592,780
Almond	5,000	1,600	6,600
Walnut	10,600	1,490	12,090
Total nut trees	15,600	3,090	18,690
Grapevines	1,028,700	109,688	1,138,388

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,161,000	$21,375
Apricots	23,550	706
Blackberries	43,500	1,975
Cherries	410,000	28,840
Grapes	20,732,000	270,530
Pears	906,600	18,790
Peaches	859,310	29,664
Plums	344,285	5,749
Irish potatoes	3,600,000	36,000
Prunes	11,231,500	167,142
Totals	39,319,745	$581,251
Dried—	*Pounds.*	*Value.*
Almonds	32,040	$3,320
Apples	160,000	10,900
Pears	175,722	17,572
Peaches	1,600,044	16,005
Plums	46,000	4,700
Prunes	4,046,500	202,250
Totals	6,060,206	$254,747

Canned fruits not segregated, but the total value is fairly estimated at $250,000.

Manufactured Output.

	Quantity.
Ice cream	$20,000
Millstuffs	45,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	3,932,350	$786,092
Beer, barrels	....	80,000
Brandy	6,592	3,690

Number of wineries, 38; distilleries, 2; breweries, 3.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	5	....	....
Skimming stations		122,150	$34,899
Milk sold, gals.		229,178	30,344
Cream sold, gals.		43,076	22,008

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	1,114	$34,870
Stock	1,902	31,360
Dairy cows—Graded	1,264	36,920
Jersey	200	1,500
Calves	1,268	9,772
Swine	2,584	16,305
Horses—Standard-bred	147	15,300
Colts	164	1,500
Mules	44	3,390
Sheep	4,000	12,000
Lambs	1,000	1,000
Angora goats	190	830
Total stock all kinds	13,877	$164,747

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	4,614	$22,862
Ducks	77	381
Geese	50	472
Turkeys	288	5,493
Eggs	123,594	30,844
Total value		$60,052

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	4,075	$24,675

Power used for mills and manufactories in county—Steam, 25; electrical, 14.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	1	12	$13,000
Cement	1	200	2,620,625
Confectionery	..	...	20,000
Foundries and iron works	1	4	4,000
Planing mills	1	25	50,000
Tanneries	2	182	680,000
Beer	..	...	80,000
Shirts	2	112	174,000
Shoes	1	100	200,000
Gloves	2	281	510,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	3,200	2,240	$67,200
Barley	4,800	1,920	48,000
Oats	5,400	1,620	64,800
Corn	1,600	1,500	45,000
Total cereals	15,000	7,280	$225,000
Alfalfa hay	400	2,000	$16,000
Grain hay	21,600	43,200	561,600
Grass hay	400	632	3,750
Total hay	22,400	45,832	$581,350

NEVADA COUNTY.

Nevada County is situated in that part of the State of California generally known and designated as the northern portion, although its county seat, Nevada City, is but 60 miles from the city of Sacramento. It has an area of about 1,000 square miles, and is bounded on the north by Sierra County, on the east by the State line between the states of California and Nevada, on the south by Placer County, and on the west by Yuba County. From the Yuba County line Nevada County is hemmed in by the Middle Yuba and the Bear rivers, until their sources are reached. The South Yuba River heads in the high Sierras, and runs across the county almost its entire length from east to west.

The climate is more varied than that of any other part of the State. On the rolling foothills of the western portion, where snow and frost are seldom seen, the elevation is slightly above the sea level; while on the eastern boundaries are the snowcapped peaks of the Sierra Nevadas, with an elevation of nearly 8,000 feet.

The Southern Pacific Railroad skirts the southern boundary line of the county for over 30 miles from west to east. From Colfax, on the line of the Southern Pacific Railroad, a narrow-gauge railroad leads through Grass Valley, the metropolis of the county, to Nevada City, the county seat, a distance of 22 miles. This line passes through some of the finest Bartlett pear and grape land in the West. Grass Valley and Nevada City being only four and a half miles apart, are connected by an electric road also. The California Midland Railroad, under course of construction, will connect Nevada City, Grass Valley, Auburn of Placer County, and Marysville of Yuba County.

The principal industries of the county are farming, stock raising, fruit growing, and mining. Nevada County has two of the largest and best equipped electric power plants in the State, and has a water supply system which is unexcelled and which is essential to the mine operator, the farmer and the fruit grower. It has a network of ditches, flumes and waterways aggregating 1,000 miles in length.

In the production of gold Nevada County stands preëminently the leading county of the West. It has been a continual producer since the year 1849, during which period of time it has added to the circulating medium of the world the gross amount of $265,000,000. For nearly forty years Nevada has been the banner gold-producing county of the State, during which time she has yielded annually an average of $2,250,000. For the year 1905 (the latest report available at this writing), the State Mining Bureau has accredited Nevada County with having produced in gold $3,179,715, and $32,523 in silver. Some of the mines of the county are working at a depth of 4,000 feet, and have proven conclusively that in every instance where depth has been attained the ore bodies and the values are equally distributed.

Copper deposits are also found within the county, and at the present time several mines are being opened, and undoubtedly within a short space of time this county will take its place among the large copper-producing counties of the State.

STATISTICS OF NEVADA COUNTY, 1906-7.

General Statistics.

Area, 1,016 square miles, or 650,240 acres.

Number of farms	520
Number of acres assessed	493,938
Value of country real estate	$2,576,180
Of improvements thereon	$1,487,710
Of city and town lots	$412,405
Of improvements thereon	$1,305,060
Of personal property	$988,935
Total value of all property	$6,770,290
Expended on roads, last fiscal year	$22,927
Expended for bridges, last fiscal year	$7,590
Number of miles of public roads	650
Road levy per $100, 1907	50c
Value of county buildings	$100,000
Mining and irrigating ditches—miles, 1,000; cost	$4,223,760
Railroads, steam—miles, 53.63; assessed value	$1,044,742
Railroads, electric; assessed value	$47,200
Electric power plants—4; assessed value	$164,810
Electric power lines—miles, 64; assessed value	$33,050
Number of acres irrigated	340

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Alfalfa hay	200	500	$8,500
Grain hay	5,000	3,725	65,500
Grass hay	200	650	7,800
Total hay	5,400	4,875	$81,800

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	13,520	1,170	14,690
Apricot	160	30	190
Cherry	305	75	380
Fig	300	25	325
Lemon	5	10	15
Nectarine	36	10	46
Olive	50	50	100
Orange	40	160	200
Peach	12,515	1,550	14,065
Pear	30,400	8,000	38,400
Plum	1,300	2,000	3,300
Prunes	6,175	300	6,475
Quince	150	.....	150
Persimmon	8	5	13
Pomegranate	12	3	15
Total fruit trees	64,976	13,388	78,364
Almond	110	300	410
Chestnut	21	10	31
Pecan	5	...	5
Walnut	200	850	1,050
Total nut trees	336	1,160	1,496
Grapevines	630	230	860
Berries, acres	29	8	37

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	......	....
Butter, pounds	..	85,480	$28,422

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	165,000	$4,125
Apricots	900	36
Blackberries	45,000	2,250
Beans	25,000	1,250
Beets	35,000	700
Cabbage	160,000	2,400
Celery	7,000	350
Corn	21,000	270
Currants	870	44
Cherries	15,000	1,050
Figs	20,840	521
Grapes	175,000	4,375
Loganberries	1,000	120
Nectarines	840	35
Onions	2,400	120
Oranges, 25-lb. boxes	75	150
Olives	500	30
Pears	900,000	45,000
Peaches	40,000	2,000
Peas	15,000	600
Persimmons	200	4
Plums	66,000	4,000
Irish potatoes	350,000	5,250
Prunes	160,000	4,800
Quinces	4,000	80
Raspberries	4,750	380
Strawberries	5,000	500
Tomatoes	20,000	500
Total	......	$80,940

Dried—	*Pounds.*	*Value.*
Prunes	12,000	$600
Walnuts	7,500	935
Totals	19,500	$1,535

Wines, Brandies, Etc.

	Gallons.	*Value.*
Sweet wines	9,600	$5,400
Beer, barrels	4,250	40,163
Vinegar	3,800	950

Number of wineries, 2; breweries, 5.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	400	$14,000
Stock	5,725	114,500
Dairy cows—Graded	600	24,000
Jersey	50	3,000
Calves	1,411	14,110
Swine	450	3,150
Horses—		
Standard-bred	211	31,650
Common	1,365	136,500
Colts	200	10,000
Mules	45	4,500
Sheep	5,000	15,000
Lambs	1,500	3,000
Angora goats	350	1,050
Common goats	150	300
Total stock all kinds	17,457	$374,760
Wool, pounds	33,000	$8,250

STATISTICS OF NEVADA COUNTY, 1906-7—Continued.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	600	$3,000
Turkeys	40	840
Eggs	23,100	5,775
Total value		$9,615

Forest Products.

	Amount.	*Value.*
Area of timber lands, partly timbered, acres	19,000	....
Cedar, acres Pine, acres.. Fir, acres...	19,000	$190,000 00
Sawmills, number	6	....
Fuel, wood, cords	32,460	162,300 00
Laths	721,400	2,524 90
Lumber, feet	33,475,000	585,812 50
Paper pulp, tons	9,480	260,600 00
Pickets, pieces	30,000	636 00
Posts, pieces	6,000	1,500 00
R. R. ties, pieces	50,000	23,750 00
Shakes	900,000	9,900 00
Total value		$1,237,023 40

Power used for mills, mines, and manufactories in county—Steam, 20; water, 40.

Miscellaneous Products.

		Value.
Natural ice, tons	75,000	$187,500
*Gold	......	3,179,715
*Silver	......	32,523
*Granite, cubic feet	2,155	2,570

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*Latest figures (1905).

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	1	75	$83,619
Cigars	6	16	47,405
Confectionery	4	4	5,750
Foundries and iron works	3	45	100,000
Meat products—			
Hides	..	...	12,090
Lard	..	...	7,812
Paper	1	170	495,000

Manufactured Output.

	Quantity.
Cigars	998,000
Hides, pounds	117,000
Lard, pounds	62,500
Paper, pounds	16,500,000

ORANGE COUNTY.

Orange County is one of the youngest counties, having been organized in 1889 from a portion of Los Angeles County. Its area is divided into mountains, 65; foothills, 150, and valleys, 550 square miles.

The Santa Ana range of mountains is the line between Orange and San Bernardino counties at the northeast corner of the former county. It is also the dividing line between Orange and San Diego counties on the east. This range also sends up a line of foothills westwardly along the seashore nearly halfway across the county. All of the western portion of the county is included in the Santa Ana plain, or valley. There are also several small valleys among the foothills and along the mountain streams. The Santa Ana plain is covered with a rich loam, and, with the exception of some patches of alkali, is very productive. The highest point of land is what is locally known as Saddleback, or Santa Ana Peak, with an elevation of 5,675 feet.

There is an abundant water supply. The Santa Ana River enters near the northeast corner, and traverses the entire Santa Ana plain flowing into Newport Bay. Besides this stream there is Santiago Creek; also Aliso, Trabuco, Mission Vieja, San Juan and Coyote creeks, and other streams. The last-named creek forms the boundary between Orange and Los Angeles counties on the west. The artesian belt running through Orange County furnishes a plentiful and cheap water supply, and makes the section as nearly independent of rainfall as it is possible to be. Much artesian water has been developed; more in the artesian belt west of the river than in any other portion. There hundreds of artesian wells have been sunk, and the farmers have installed pumping plants and organized irrigation districts.

In the foothills a sharp, gravelly loam of a reddish color prevails. Descending into the valleys, this loam loses its color and its sharpness and becomes black, with a large admixture of adobe and frequent streaks of alkali. West of the Santa Ana River large deposits of peat are found, the product of tule roots and other swamp vegetation. This varies in depth from a few inches to sixteen feet. This land is considered the best for agricultural purposes, and is held at a high figure.

All the fruits do well. Many varieties of oranges and several of lemons are grown. Oranges are shipped from the last of December until June, and the bulk in March and April.

There are some portions where apples are grown which vie with those of the Eastern States, in size, flavor, and appearance. It was only during the past few years that much fruit besides oranges and grapes was grown. Now, however, large orchards are annually being planted to almost every known variety.

Apricots, peaches, apple, oranges, lemons, figs, prunes, and walnuts do well, apricots especially holding front rank, with walnuts in the second place.

The larger amount of the fruit produced finds a market in the East, the citrus fruits and walnuts being shipped entirely out of the county. The deciduous fruits are very largely disposed of to the drying establishments and packing-houses, and by them shipped, both dried and green, to Eastern States.

The rich bottom lands yield immense crops of corn, and large portions grow the finest alfalfa and natural grasses.

The mesa, or uplands, are of the finest quality, and admirably adapted to barley, oats, wheat, flax, hemp, and the vine, as well as all the ordinary northern fruits.

Every character of soil that is found in California can be duplicated in these lands, and every product grown in the semi-tropics can be successfully raised.

Celery raising has grown to a very large industry, the output reaching 1,800 carloads.

While celery growing is occupying much attention, other sources of income are not neglected, and of these the most important are the dairy interests and the rearing of cattle and hogs.

The shipping of vegetables, consisting of early onions, potatoes, cauliflower, cabbage, etc., is a growing and profitable business.

The sugar beet is raised extensively, and a factory is located at Los Alamitos. This factory runs four months, and consumes the product of over four thousand acres, turning out millions of pounds of sugar ready for table use. The big sugar factories at Chino and Oxnard draw extensively from the soil of this county, thousands of tons of beets being shipped to these places from the vicinity of Anaheim, Buena Park, Garden Grove, Westminster, and Bolsa every year.

No business has developed more rapidly than the oil industry. North and east of Fullerton thousands of dollars have been expended in sinking wells, several of which have turned out to be gushers.

Santa Ana is the county seat. Anaheim is next in size, Orange following. Tustin is a charming suburb of Santa Ana, with splendid orchards, attractive homes and people of refinement. Fullerton is a place of much business and the headquarters of the oil industry of that section. El Toro is made up in a large measure of English settlers of wealth and progressive ideas. San Juan Capistrano, in the extreme south, is the seat of one of the largest and most interesting old missions.

STATISTICS OF ORANGE COUNTY, 1906-7.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	100	$3,000
Stock	5,675	113,500
Dairy cows—Graded	1,750	52,500
Jersey	3,850	96,250
Calves	2,700	13,500
Swine	2,300	23,000
Horses—		
Thoroughbred	40	8,000
Standard-bred	1,350	101,250
Common	2,700	135,000
Colts	1,600	48,000
Mules	520	31,200
Sheep	28,000	70,000
Lambs	7,000	3,500
Total stock all kinds	......	$698,700
Wool, pounds	252,500	$31,562

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	37,900	$9,475
Sweet wines	25,500	12,750
Beer, barrels	6,000	48,000
Brandy	2,100	3,675

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	....	....
Skimming stations	5	....	....
Butter, pounds	..	696,800	$174,200
Butter, creamery	..	129,464	44,050
Cheese, pounds	..	129,464	44,050
Condensed cream, cases of 4 doz.	..	87,500	306,250
Cream shipped, lbs.	..	788,700	78,870
Milk shipped, lbs.	..	1,172,305	18,757
Milk, domestic use, lbs.	..	4,877,600	68,042

STATISTICS OF ORANGE COUNTY, 1906-7—Continued.

General Statistics.

Area, 780 square miles, or 439,261 acres.

Number of farms	4,349
Number of acres assessed	439,261
Value of country real estate	$6,937,450
Of improvements thereon	$1,435,100
Of city and town lots	$3,240,495
Of improvements thereon	$2,285,300
Of personal property	$1,958,795
Total value of all property	$15,857,140
Expended on roads, last fiscal year	$49,519
Road levy per $100, 1907	40c
Value of county buildings	$121,000
Irrigating ditches, miles	123
Railroads, steam—miles, 98.95; assessed value	$157,345
Railroads, electric—miles, 31.83; assessed value	$196,215
Electric power plants—1; assessed value	$56,230
Number of acres irrigated—	
Serano & Carpenter Irrigation Co., acres	1,600
Santa Ana Valley Irrigation Co., acres	17,000
Anah W. Water Co., acres	8,000
By pumping plants and artesian wells	7,000
227 pump plants	43,595

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	1,500	820	$2,050
Barley	35,190	12,317	307,925
Oats	400	100	2,500
Beans	14,000	4,480	313,600
Corn	2,200	1,100	27,500
Total cereals	35,290	18,817	$653,575
Alfalfa hay	3,000	12,000	$120,000
Grain hay	34,000	34,000	340,000
Total hay	37,000	46,000	$460,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	13,550	1,340	14,890
Apricot	173,770	28,990	202,760
Fig	2,500	......	2,500
Lemon	57,500	56,350	113,850
Olive	23,000	......	23,000
Orange	620,500	200,300	820,800
Peach	35,000	14,550	49,550
Pear	5,050	750	5,800
Plum and prunes	20,100	......	20,100
To. fruit trees	950,970	302,280	1,253,250
Walnut	137,000	80,250	217,250
Grapevines	600	......	....
Berries, acres	300	......	....

Manufactories.

	No.	No. of Employes.	Value of Product.
Bookbinderies	1	...	....
Cigars	2	10	....
Flouring mills	1	10	$210,500
Foundries and iron works	1	...	....
Ice plant, tons	1	1,930	9,900
Lumber yards	12	69	....
Planing mills	4	66	....
Nurseries	10	...	....
Cement pipe and artificial stone	7	40	....
Marble	1	3	....
Sugar, beet	1	...	....
Syrups and extracts, pounds	..	10,920,000	....
Peat fuel	1	8	....
Tiling	2	...	15,000

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	556,500	$5,565
Apricots	1,000,000	20,000
Asparagus	40,260	6,000
Blackberries, crates	5,330	7,995
Cabbage, tons	8,000	160,000
Figs	25,000	500
Grapes, tons	6,000	90,000
Lemons, boxes	35,200	52,800
Loganberries, crates	2,400	3,000
Loquats, tons	63	4,410
Oranges, boxes	875,520	1,313,280
Olives, tons	300	45,000
Peaches	5,250,000	105,000
Plums	1,010,000	20,200
Irish potatoes, tons	25,000	750,000
Sweet potatoes, tons	1,125	45,000
Raspberries, crates	800	1,000
Strawberries, crates	24,000	30,000
Tomatoes, tons	10,000	80,000
Totals		$2,739,750
Dried—	*Pounds.*	*Value.*
Apricots	603,200	$96,512
Walnuts	5,760,500	748,865
Totals		$845,377
Canned—	*Cases.*	*Value.*
Pears	400	$800
Pears, gal.	100	400
Peaches	2,225	4,450
Peaches, gal.	2,070	8,280
Tomatoes	55,000	82,500
Tomatoes, gal.	2,450	6,125
Taylor cannery, assorted	9,500	65,000
Huntington Beach cannery—		
Sauerkraut	1,000	1,500
" tons	350	21,000
" and pork	500	750
" and wieners	500	750
Chiles, ½-lb. tins	200	200
Totals		$191,755

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 2,800	.....	$5,600
Beeswax	2,000	500
Flowers and plants, acres	10	10,000
Honey	200,000	12,000
Honey, comb	6,000	600
Sugar beets, tons	50,055	250,275
Chili peppers, dry, tons	100	20,000
do green, tons	200	5,000
Peanuts	900,000	36,000
Celery, carloads	2,700	500,000
Celery planted	6,000	....
Green peas	560,000	28,000
Green beans	560,000	33,600
Wood, cords	2,000	16,000
Crude oil, barrels	1,967,528	1,180,517
Crude oil, carloads shipped from Olinda	5,571	....

Poultry and Eggs.

	Dozen.	Value.
Chickens	20,000	$100,000
Ducks	200	1,000
Geese	100	2,000
Turkeys	260	5,200
Eggs	2,800,000	700,000
Total value		$808,200

Manufactured Output.

	Quantity.
Brick	125,000

Fish Industry.

	Pounds.	Value.
Various kinds	621,270	$24,850

PLACER COUNTY.

Placer County lies between latitude 38° 70′ and 39° 30′. Its direction is northeast and southwest. It is about 100 miles long and of varying widths, from 10 to 30 miles, the course and distance being defined by the course of the rivers which mark its boundaries. It extends from about 8 miles from the Sacramento River to the summit of the Sierra Nevada Mountains. Just above Auburn, between the Bear and American rivers, the county is very narrow, being but about 8 miles across. Above Auburn it widens out into the two divides lying between the Bear River and the Middle Fork of the American River. These are known as the Dutch Flat or Railroad Divide, and the Forest Hill Divide. The southwestern portion is more regular in shape than the part just described. This section contains the foothill and level agricultural lands. Its shape is nearly a parallelogram, the southwest two thirds being on the plains proper, and the northeast one third being the foothill and fruit district.

Of the area, 810 square miles are mountainous, 450 foothills, and the remainder valleys. The entire extent faces toward the west, extending from an altitude of some 40 feet on the plains in the western portion to over 7,000 feet at its eastern boundary line, embracing nearly every variety of climate known in the State. At the eastern boundary, separating it from the State of Nevada, is Lake Tahoe, one of the most picturesque lakes in America. The topography of Placer County is as irregular as is its shape. Imagine the whole Atlantic coast from Labrador to Tallahassee incorporated into one county, and one will have a fair idea of what may be found in Placer, exaggerated as to size, but not as to the great variety of climate, elevations, soils, and resources. As to the latter, the whole Atlantic seaboard can hardly equal the endless variety to be found within the borders of this county, which rivals Florida in the quality of its oranges, excels New Jersey in peaches, equals the New England States in its granite quarries, and compares favorably with Maine in the quality of its lumber.

From an elevation of about 2,500 feet up to the summit of the mountains snow falls in the winter, light at the lower edge of the line, and increasing in depth as it ascends the Sierras. Here is a strip of territory from the snow line up to an elevation of 3,000 feet, particularly well adapted to the apple, the pear, and a great variety of vegetables.

The soil of the western or valley portion is of the same general alluvial composition as all the soil in the Sacramento Valley, and is well adapted to the growth of grain. Over 30,000 acres are annually devoted to wheat, barley, oats, and hay. The low foothills back of Lincoln are excellent for the grape.

The soil of the valley lands is mostly a red loam, mixed with considerable clay in spots; that of the foothills is a gravelly red loam, in places light and sandy, and is excellent for the production of fruits.

Farther up the soil changes to a red character, with a slate bedrock. This, too, is very fertile. The agricultural region includes the valley and foothill lands all the way from the western boundary to an elevation above Colfax. The foothills everywhere possess a soil which only needs cultivation. The granite soils around Newcastle are composed largely of clay, sand, soda, potash, lime, phosphorus, iron, and magnesia. The constant decomposition that is going on appears to be of nearly endless duration, and of such a nature as to render the soil almost inexhaustible. Artificial fertilization has not yet been found necessary.

For an irrigation water supply Placer has three sources—the Yuba, Bear and American rivers. Including its branches, the Bear River irrigation ditch is 200 miles in length. This system has been increased in its capacity, and brings water from the Yuba River, so that an abundance is assured. There are several other canals, originally built for mining but now used for irrigation.

Placer County holds a foremost position among the fruit producers. and it is the most easterly of the counties of California. With the Central Pacific Railroad running the entire length of her territory, she is one day nearer the Eastern market than any other part of the State, a very large item in the shipping of green fruit. In her thermal belt fruit ripens earlier than in most other places in the State, another large advantage. Pears, plums, prunes, apples, apricots, cherries, persimmons, pomegranates, quinces, and figs all do well. Peaches have been grown for the past twenty-five years, and failure of a crop is unknown. Fine oranges are produced, and Placer holds a position beside Butte in the northern citrus belt. In the production of small fruits, berries, and table grapes Placer holds a foremost place.

The largest cherry trees in the world are at the ranch of Robert Hector, from one of which has been picked as high as 3,000 pounds in one season. At the Pan-American Exposition Placer won gold medals for peaches, oranges, and grapes. An exhibit of fifty oranges averaged twenty-four ounces in weight.

A lemon that was on exhibition at the Sacramento Chamber of Commerce measured 22 inches in circumference the small way, and weighed three and a half pounds.

Olive growing is a profitable industry. The principal orchards are provided with manufacturing plants and are producing a very fine quality of oil.

Dairying and stock and poultry raising are extensive industries. Butter making is carried on in the summer, the mountain ranges providing plenty of natural feed; the butter is of a very fine quality.

Considerable quantities of vegetables are raised, not only for local consumption, but also for shipment abroad.

Much sugar and yellow pine, fir, spruce, and cedar are found in the mountains, and the lumber output from that section has been very large for many years. Oak and scrub pine abound all over the foothills, and fuel is plentiful.

Placer County ranks well up among the mining counties. Her average yearly contribution to the world's wealth is something above the million mark. The total production since the discovery of gold at Auburn, May 16, 1848, is estimated at much over $75,000,000. The mining methods include drift, river, placer, and quartz. Placer's drift mines are among the largest in the world.

The granite quarries rank with the best in the United States. Nearly all the street curbing in San Francisco is from the Placer quarries, while the State Capitol is an example of the value and beauty of foothill granite.

Potter's clay is found in abundance at Lincoln, from which is manufactured sewer pipe, tiling, pressed brick, architectural terra cotta, and glazed brick for interior decoration.

Placer County is a natural sanatorium. As a resort for patients suffering from pulmonary diseases, leading physicians say it has no equal on the Pacific Coast. It is here patients find relief and some of them are cured. The altitude is just right for people suffering from asthma or bronchial diseases.

STATISTICS OF PLACER COUNTY, 1906-7.

General Statistics.

Area, 1,390 square miles.	
Number of farms	948
Number of acres assessed	654,000
Value of country real estate	$3,866,345
Of improvements thereon	$1,185,525
Of city and town lots	$587,125
Of improvements thereon	$922,215
Of personal property	$902,450
Total value of all property	$7,636,660
Expended on roads, last fiscal year	$39,000
Expended for bridges, last fiscal year	$10,000
Number of miles of public roads	862
Road levy per $100, 1907	40c
Value of county buildings	$260,000
Irrigating ditches; cost	$149,915
Railroads, steam—miles, 131.47; assessed value	$3,267,730
Electric power plants—3; assessed value	$35,400
Electric power lines—miles, 80; assessed value	$40,000
Number of acres irrigated	13,800

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	19,700	4,700	$125,000
Barley	10,960	2,150	41,400
Oats	6,540	1,500	31,500
Total cereals	37,200	8,350	$197,900
Grain hay	29,200	39,000	$351,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	21,050	5,400	26,450
Apricot	14,200	7,650	21,850
Cherry	20,100	9,400	29,500
Fig	6,900	2,650	9,550
Lemon	985	460	1,445
Nectarine	7,600	2,430	10,030
Olive	40,100	11,490	51,590
Orange	36,400	13,100	49,500
Peach	980,050	583,200	1,563,250
Pear	110,200	51,300	161,500
Plum	116,400	170,300	286,700
Prunes	8,750	1,975	10,725
Quince	1,940	320	2,260
Other kinds	13,250	5,400	18,650
Total fruit	1,377,925	865,075	2,243,000
Almond	8,100	3,940	12,040
Walnut	900	300	1,200
Total nut	9,000	4,240	13,200

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	70,000	$21,000
Sweet wines	130,000	45,500
Beer, barrels, 4,000	20,000	5,750
Brandy	8,000	6,500
Vinegar	5,000	750

Number of wineries, 2; distilleries, 2; breweries, 2.

Dairy Industry.

	No.	*Gallons.*	*Value.*
Creameries	4	76,200	$19,000
Butter, pounds		4,800	1,440

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	1,600	$32,000
Stock	1,640	25,200
Dairy cows—Graded	2,680	65,600
Thoroughbred—Jersey	200	5,000
Calves	1,040	5,450
Swine	802	2,300
Horses—		
Thoroughbred	8	3,700
Standard-bred	7	1,800
Common	1,580	58,300
Colts	320	5,200
Jacks and jennies	59	1,020
Mules	281	8,700
Sheep	23,400	48,000
Lambs	1,975	1,975
Common goats	840	840
Total stock all kinds	36,432	$265,085
Wool, pounds	40,000	$5,000

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	100,000	....
Sawmills, number	3	$38,950
Laths, thousand	1,000	....
Lumber, feet	19,000,000	300,000
Posts, pieces	200,000	....
Total value		$338,950

Power used for mills and manufactories in county—Steam, 3.

Manufactured Output.

	Quantity.
Brick	2,000,000
Olive oil, gallons	2,000

STATISTICS OF PLACER COUNTY, 1906-7—Continued.

Manufactories.

	No.	No. of Employes.	Value of Product.
Cigars	2	8	$15,200
Confectionery	2	6	2,000
Olive oil	2	6	4,500
Pickled olives	2	..	1,000
Sewer pipe	..	..	300,000
Planing mills	2	10	20,000
Potteries	1	450	350,000
Granite, cars 300	..	..	....
Tiling	..	..	50,000

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	236,000	$4,720
Apricots	319,040	19,142
Blackberries	95,000	3,800
Currants	2,000	150
Cherries	634,400	63,440
Figs	9,000	360
Grapes	1,456,400	50,974
Oranges, boxes	55,000	56,000
Pears	2,443,520	61,083
Peaches	7,854,528	$274,908
Plums	7,346,856	257,139
Raspberries	30,000	1,500
Strawberries	120,000	5,000
Tomatoes	160,000	3,200
Total	....	$801,416
Dried—	*Pounds.*	*Value.*
Figs	5,000	$250
Peaches	10,000	500
Totals	15,000	$750
Canned—	*Cases.*	*Value.*
Apples	300	$600
Blackberries	200	400
Pears	1,000	2,000
Peaches	4,000	8,000
Tomatoes	3,000	5,000
Totals	8,500	$16,000

Miscellaneous Products.

	Value.
Flowers and plants, acres 10	$3,000

RIVERSIDE COUNTY.

Riverside is one of the youngest counties, having been formed in 1893 from the southwestern part of San Bernardino and the northern part of San Diego.

The progress of the county is practically confined to its northwest corner, embracing the largest orange-growing district in the world. The rest is largely an undeveloped desert region, believed to be a storehouse of useful minerals and metals.

The county recently has had exceptional progress and prosperity, and a considerable area of new land has been brought under cultivation. Many new orchards, both citrus and deciduous, have been set out.

Alfalfa has also been planted on a large scale.

The orange crop in the county is the largest in the State. The growing of citrus fruits is the main industry, although deciduous fruits of most kinds do well, particularly apricots and prunes. The olive thrives, and a very fine grade of oil is produced. Melons and cantaloupes are extensively grown and mature early.

Diversified farming is quite a feature in several sections. Alfalfa grows luxuriantly; broomcorn does well, and is a very prominent and profitable crop. The sugar beet thrives, and considerable new land has recently been put under cultivation.

Dairying is profitable, and modern creameries with the latest appliances are located in different sections. The stock used for dairying purposes is of a very high grade, mostly pure-bred representatives of the milk strains.

Considerable stock and hogs are fattened for market, and poultry raising receives considerable attention.

Bee keeping is another growing industry, and a fine grade of honey is produced.

In 1901 the city of Riverside completed a $40,000 steam-power plant, to generate electricity for power and lighting purposes. The sewer system has been extended and the streets extensively improved.

The Riverside Water Company is the chief of the companies that supply Riverside with its fine water system, that has a continuous and ample flow.

The rapid development of Strawberry Valley as a health resort has done much to stimulate local trade.

The importance of Perris has been increased by the rapid development of water, and the consequent large acreage of new land put under cultivation. Thousands of acres in this vicinity have been planted to alfalfa.

Hemet has a large flouring mill, fruit-drying plant, and broom factory in successful operation. The shipments of olives are large. Fine raisins are produced in this section, and the grain industry is flourishing.

At Elsinore coal mines are successfully operated, and a superior quality of potter's clay is obtained in the vicinity. The domestic water system is owned by the city. Fine apricots, prunes, olives, and other fruits are raised. Seven miles distant is the Good Hope gold mine, with a stamp mill and cyanide plant. During the open season Lake Elsinore abounds with wild ducks of various kinds, making it an attractive place for sportsmen.

A modern and progressive colony has been established at Ethance, possessing what is undoubtedly the most perfect and complete private irrigation system in the State. The colony has an electric plant of the most modern type, which is utilized to generate power for pumping and lighting purposes. Broomcorn, sugar beets, and alfalfa produce profitable crops.

Indio is a little health resort that lies below sea level. A number of artesian wells have been developed, and much land in the vicinity has been placed under cultivation. Watermelons and cantaloupes are extensively grown.

STATISTICS OF RIVERSIDE COUNTY, 1906-7.

General Statistics.

Area, 7,000 square miles, or acres.	4,480,000
Number of acres assessed.....	1,157,206
Value of country real estate...	$18,800,000
Of improvements thereon	$8,500,000
Of city and town lots.........	$6,500,000
Of improvements thereon.....	$6,300,000
Of personal property..........	$5,000,000
Total value of all property....	$45,100,000
Expended on roads, last fiscal year	$59,994
Expended for bridges, last fiscal year	$1,824
Number of miles of public roads	1,282
Road levy per $100, 1907......	50c
Value of county buildings.....	$321,267
Irrigating ditches—miles, 130; cost	$2,500,000
Railroads, steam—miles, ——; assessed value	$4,527,540
Railroads, electric—miles, 10½; assessed value	$17,000
Electric power plants—3; assessed value	$8,600
Electric power lines—miles, 3; assessed value	......
Number of acres irrigated....	26,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	12,500	5,825	$172,800
Barley	52,800	20,145	564,060
Oats	500	185	7,800
Corn	100	80	2,650
Total cereals..	65,900	26,235	$747,310
Alfalfa hay	8,515	54,000	$594,000
Grain hay	80,000	77,500	775,000
Total hay	88,515	131,500	$1,369,000

Dairy Industry.

	No.	Production.	Value.
Creameries	7	....	....
Skimming stations	3	....	....
Butter, pounds....	..	459,250	$150,000
Condensed milk, gallons	..	51,000	25,500
Cream	..	....	12,710

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.
Apple	4,000	......
Apricot	42,134	......
Cherry	1,330	......
Fig	154	......
Lemon	95,078	27,392
Olive	48,084	......
Orange	1,272,377	98,917
Peach	41,485	......
Pear	9,123	......
Plum	600	......
Prunes	14,875	......
Almond	5,000	......
Walnut	7,225	......
Grapevines, acres......	3,740	......
Berries, acres	35	......

Livestock Industry.

	Number.	Value.
Cattle—Beef	15,800	$320,000
Dairy cows—Graded..	379	20,000
Common	3,502	150,000
Calves	4,000	32,000
Swine	5,900	59,000
Horses—		
Standard-bred	19	....
Common	5,690	569,000
Colts	700	45,000
Jacks and jennies.....	16	1,500
Mules	714	90,000
Sheep	12,500	62,500
Common goats........	100	300
Wool, pounds	125,000	14,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	4,500	$22,500
Ducks	100	500
Geese	70	840
Turkeys	340	7,000
Eggs	380,000	115,000
Total value		$145,840

Forest Products.

	Amount.	Value.
Fuel, wood, cords.....	4,000	$25,000

STATISTICS OF RIVERSIDE COUNTY, 1906-7—Continued.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry and sweet wines	315,000	$200,000
Brandy	60,200	60,000

Number of wineries, 4; distilleries, 1.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	3	....	$57,500
Carriages and wagons	..	....	8,000
Cigars	4	....	15,000
Foundries and iron works	2	....	100,000
Lime	2	....	50,000
Olive oil	..	....	18,000
Sewer pipe	..	....	160,000
Planing mills	3	....	150,000
Granite	2	....	200,000
Tiling	..	....	100,000
Miscellaneous	..	....	25,000
Ice	2	....	45,000

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	100,000	$2,000
Apricots	1,777,500	45,000
Blackberries, crates	3,400	5,000
Cabbage	440,000	4,000
Grapes	8,000,000	67,000
Lemons, boxes	268,088	804,268
Loganberries	1,200	2,000
Onions, crates	27,715	27,715
Oranges, boxes	2,254,054	4,508,108
Olives	1,935,200	36,200
Pears	705,875	$14,117
Peaches	1,129,800	22,600
Cucumbers	....	6.000
Plums	187,000	1.870
Irish potatoes	1,380,000	27,600
Sweet potatoes	287,700	7,200
Prunes	110,300	2.206
Strawberries, crates	4,000	7,000
Tomatoes	....	24,000
Cantaloupes, crates	63,011	78,763
Watermelons	....	7,000
Miscellaneous	....	25,000
Total		$5,724,647

Dried—	*Pounds.*	*Value.*
Almonds	100,000	$13,000
Apricots	195,000	29,000
Peaches	4,500	4.500
Prunes	728,500	29,140
Raisins	100,000	4.500
Walnuts	42,000	5.000
Total		$85,140

Manufactured Output.

	Quantity.
Brick	4,000,000
Cigars	400,000
Lime, barrels	33,000
Olive oil, gallons	7,000
Pickles, gallons	1,200

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 12,745	.....	$60,000
Beeswax	1,600	400
Honey	730,000	43,000
Alfalfa seed	17,000	2,890

SACRAMENTO COUNTY.

Sacramento County is among the largest in the Sacramento Valley. It was organized by the first Legislature; within its confines is the seat of State government; the annual fairs of the State Agricultural Society are held in and near Sacramento City.

Its cities and towns are: Sacramento, Folsom, Galt, Elk Grove, Florin, Oak Park, Walnut Grove, Isleton, Franklin, Cosumnes.

The area is almost all a rich alluvial plain from 30 to 75 feet above sea level, gradually rising from the rivers to meet the low rolling foothills of the Sierra Nevada Mountains; these foothills commence at the extreme eastern part, and are from 6 to 8 miles wide. There are no mountains, and aside from this foothill belt the surface has only gentle undulations.

The Sacramento River traverses the western boundary tortuously for about 90 miles across the rich bottoms, cutting them up at the lower part into numerous small and several large islands. The Sacramento is the longest and largest river in the State, and is navigable from Red Bluff to San Francisco Bay.

The American River rises in the upper Sierras, and enters the county at the northeast corner, among the low foothills. It flows in a southwest direction through the entire width, a distance of some 35 miles, and empties into the Sacramento just north of Sacramento City.

Geological indications prove that in remote ages the entire Sacramento Valley and a section of the foothills to an altitude of several hundred feet were portions of the bed of a vast inland sea or lake, and that into this lake the washings of the surrounding mountains were poured to form the present soils, which are made up of all the fertile mineral and vegetable elements in almost inexhaustible quantities. Many analyses have been made of these soils from the alluvial valleys, the upper lands, and the foothills; these analyses have demonstrated that the soils of this valley are unexcelled for fertility.

In addition to the numerous rivers and streams there is, underlying the entire area of the county, an inexhaustible supply of pure and excellent water for domestic and irrigating purposes. Throughout the greater portion this subterranean supply is easily appropriated by means of a light lifting power.

The first venture in agriculture in the Sacramento Valley was by General John A. Sutter in 1839. He received a concession of a large tract of land from the Mexican Government, and located his fort near the junction of the American with the Sacramento River. His first wheat field was a portion of the land now covered by Sacramento City.

He planted the first grapevines and fruit trees, and practically demonstrated the unsurpassed fertility of the soil of the great valley in the north.

Thousands of acres along the river bottoms and on the islands are used for the production of all kinds of vegetables, which are shipped

East by the carload and at times by the trainload. A great deal of this product is disposed of to the canneries in this and other counties.

Alfalfa grows luxuriantly without irrigation on all the rich bottom lands, producing from four to eight tons to the acre.

Fruits of all kinds are produced on any of the lands of the county, and particularly on the river bottoms and the islands.

The winter fruits are oranges, lemons, pomegranates, olives, and persimmons, which all ripen in November, December, and January. The Japanese persimmons grow to the size of apples. Olives are very profitable, both for pickling and for oil.

The spring fruits that mature and are marketed in April, May, and June embrace strawberries, raspberries, blackberries, and cherries.

At Florin, on the western division of the Southern Pacific Railroad, 9⅓ miles south of Sacramento City, is the most productive strawberry belt in the State. Its product has a reputation for excellence all over the Western States. Tokay grapes from this district are shipped to Eastern markets through the local associations.

Apricots ripen early, and of all countries in the world California is the only one that has made a thorough success of that fruit, and in this county it reaches its very finest development in size, flavor and productiveness.

A large number of varieties of pears are grown, chief among them the renowned Bartlett.

Plums are very profitable. They grow to large size, and are shipped in vast quantities to the Eastern and home markets.

Nectarines do well, and are cultivated to a considerable extent.

In the fall the fruit products are apples, pears, grapes, quinces, prunes, and peaches.

Sacramento County is preëminently the home of the grape, and on the red lands of the plains it reaches its highest perfection, particularly with irrigation. The table varieties include the Tokay, Muscat, Black Prince, Morocco, Emperor, and Cornichon. They always bring first-class prices for shipment to the Eastern markets. The wineries of the State handle quantities of some of these varieties.

French, or petite, prunes are a leading fruit. They are remarkably prolific, and when cured excel the imported article, and bring a much higher price in the markets of the world.

Figs grow in any part of the county, but on the river bottoms they reach great size and are remarkably prolific. The Smyrna, or "fig of commerce," has been introduced and successfully grown.

Raisins are easily cured, the climate being peculiarly favorable.

Almonds have long been found a reliable and profitable crop. They can be grown in any part of the county.

The English soft-shell walnut has been demonstrated to be a profitable crop. Black walnut trees are extensively grown for shade and ornament.

Broomcorn is grown, as is also Egyptian corn—the latter making an excellent and cheap food for stock.

Hundreds of tons of beans of all kinds are produced on the river and island lands. The interior of Grand and Tyler islands is to a great degree devoted to their production.

Potatoes, both sweet and Irish, are grown in large quantities on the

bottom lands; of the latter, the average yield per acre is from 100 to 150 sacks.

Sacramento City, by reason of natural advantages, geographical relation to various producing sections, and admirable transportation facilities, deservedly bears the reputation of being the largest fruit and vegetable shipping point in the State. It is the recognized outlet for the products of the Sacramento Valley.

The dry atmosphere is specially suited for the drying of fruits, and the article so produced is regarded as first class in the markets of the world.

The California Fruit Canners' Association possesses at Sacramento one of the largest and most modern fruit and vegetable canneries in the world. This cannery is in operation during more months each year than any other in the State, beginning on asparagus the latter part of March, and running steadily for the succeeding eight months, ending the latter part of November on tomatoes and beans.

Sacramento County presents great opportunities to the livestock breeder and the dairyman. The climate is so even, temperate, and mild that animals remain in the open air, practically unsheltered, the year round without hardship. The soil, because of its richness, is peculiarly adapted to the growth of forage crops, especially alfalfa, which is at the same time one of the best and the cheapest of stock feeds. There are quite a number of creameries. The average character of the dairy stock is fair, and is being constantly improved by the introduction of well-bred animals.

Hogs are raised generally by the farmers, and several breed pedigreed Poland-China, Berkshire, and Essex swine quite extensively. The breeding of pedigreed hogs has been very profitable.

The poultry business has steadily increased in importance in the last few years. Elk Grove, 15 miles south of Sacramento City, on the line of the railroad, and but 5 miles east of the Sacramento River, is the principal poultry district.

Near Sacramento City the raising of poultry is made a specialty by many, and with profit.

Along the Sacramento, American, and Cosumnes rivers are the most productive hop fields in the United States. Hop culture on this coast dates back to 1858. It was early demonstrated that the soil and climate of Sacramento County are unsurpassed for hop culture, and that it is the only place known where a crop of from 1,000 to 2,000 pounds per acre can be grown the first year the roots are planted. It is a common occurrence to grow 2,000 or 3,000 pounds on an acre of ground, and in some instances 4,000.

There are quite a number of wineries in the county. The output is shipped all over the world, and is principally disposed of in the United States, Central America and the Islands. The port is not heavy in body nor dark in color, but is rather more delicate and lighter, having great character, and resembling closely the light, high-grade ports of Portugal. The county has a great reputation for fine sherry.

Few counties contain a greater mileage of railroads than does Sacramento. From the capital city the Central Pacific leads eastward across the continent; the California & Oregon passes to the north into Oregon, and from thence to Washington, and also to the Eastern States.

At Galt a branch line runs up into the county of Amador; the California Pacific runs on the west of the Sacramento River to Oakland; and the Sacramento & Placerville passes along the American River through Folsom, and thence into the county of El Dorado. From most all of these roads branches extend into the various counties of the Sacramento Valley. The Western Pacific, a new transcontinental line, now being constructed, will run through Sacramento from north to south. From its geographical position Sacramento City is the natural railroad center of the central and northern portions of the State.

The Southern Pacific Company operates two steamboats that make daily trips between Sacramento and San Francisco, touching at the various towns and farm landings to receive and discharge freight. The Sacramento Transportation Company operates eight steamboats and twenty-five barges that are run between Red Bluff and San Francisco. They touch at all landings, and move a great part of the grain that is produced in the up-river counties, as well as all other kinds of freight. The Farmers' Transportation Company is controlled by an association of farmers. Its steamboats run between Colusa and San Francisco, making weekly trips.

Sacramento City, being the center and metropolis of a rich portion of the State, the heart of a vast railroad system, the point from which steamers pass to the north and to the south, and with unlimited water and electrical power at her very doors, presents advantages in manufactures excelled by no other city on the coast. Here are located the extensive shops of the Southern Pacific Company. For years the great power of the swift-flowing American was allowed to go to waste, but in 1888, at the Folsom State Prison, 22 miles from Sacramento City and in the county, a mighty granite dam was constructed across the river. At that point solid bluffs of rock rise on either side, affording a splendid site. The natural fall of the American gives as great a force as any other stream west of the Rocky Mountains, and the artificial assistance rendered by the dam creates added power. From the canal the water falls upon turbine wheels. Five generators produce the electric power, and it is transmitted to Sacramento City by four circuits on two sets of poles, so as to guard against breakages and accidents. The distance of the generators from Sacramento is 22.4 miles. The Sacramento Electric, Gas and Railway Company receives and controls this power. Each of the five generators produces 1,000 horsepower. In addition, the company receives current at 40,000 volts from the Bay Counties Company's power plant that is located on the North Yuba, 35 miles above Marysville. This power is transmitted to Sacramento over a circuit 64.2 miles in length. With the combined power so received the street car lines of the company in Sacramento City and suburbs are operated. The lighting of the city is from this source. It also furnishes an aggregate of over 3,000 horsepower for manufacturing purposes in and about the city.

The Central California Electric Company derives its power from abrupt drops in the canals of the South Yuba Water Company, located in Placer and Nevada counties. The water company has an immense storage system for municipal supply, irrigation, and water power, and maintains twenty reservoirs on the divide, or in the upper foothills, thirteen distributing reservoirs in the lower foothills, and four hundred miles of canal.

The natural fish in the rivers are salmon, sturgeon, pike, perch, hardheads, and dace. Those planted are striped bass, black bass, shad, and three kinds of catfish. The only fish propagated is the salmon, in the headwaters of the Sacramento. All of the planted fish have multiplied satisfactorily. In the open season large numbers of salmon and other fish are taken and sold in the local and San Francisco markets.

In the line of game, there are geese, ducks, quail, curlew, doves, and larks. All but the geese are protected. The ducks are mostly migratory. Of the non-migratory species are the mallard, spoonbill, and wood duck.

One can drive in any direction at any time of the year, with no inconvenience, over roads that favorably compare with the streets in many towns elsewhere in the State. All of the bridges and roads are free for travel.

On the American River, in what is called the Folsom District, dredge mining is being carried on. The area of gravel so far acquired for dredge purposes is about 5,000 acres. These mining operations are in the hands of people with plenty of capital and skilled engineers.

Sacramento City, the capital of California and the county seat of Sacramento County, is situated on the east bank of the Sacramento River. The distance by rail from San Francisco is 90 miles. The imposing State capitol building, that cost about $3,000,000, is one of the finest of its kind in the United States. It stands in the middle of a park of thirty-eight acres, almost in the heart of the city. At the east side of the park is located the Exposition Pavilion of the State Agricultural Society and also the State Printing Office and Bindery. The Federal building, of red sandstone, costing $150,000, accommodates the postoffice, the revenue and land offices, and the weather bureau station. The waterworks are the property of the city. The natural gas wells in the city yield an abundance of gas for domestic purposes—heating and cooking.

STATISTICS OF SACRAMENTO COUNTY, 1906-7.

Dairy Industry.

	No.	*Production.*
Creameries	9	....
Skimming stations	21	....
Butter, pounds	..	1,767,822
Cheese, pounds	10	650,250

Livestock Industry.

	Number.
Cattle—Beef	30,251
Dairy cows—Graded	11,300
Calves	8,000
Swine	42,005
Horses—Thoroughbred	1,000
Standard-bred	1,750
Common	15,525
Colts	3,500
Mules	2,780
Sheep	80,000
Lambs	16,800
Common goats	200
Wool, pounds	250,350

Fish Industry.

	Pounds.
Salmon	985,245
Other kinds	1,096,470
Total	2,082,715

Wines, Brandies, Etc.

	Gallons.
Dry wines	1,481,595
Sweet wines	1,132,125
Beer, barrels	154,720
Brandy	401,475
Cider, barrels	200
Vinegar, barrels	220

Number of wineries, 8; distilleries, 8; breweries, 2.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	250,500	$1,002,000
Ducks	400	2,400
Geese	200	2,400
Turkeys	1,500	37,000
Eggs	945,250	189,050
Total value		$1,232,850

Forest Products.

	Amount.	*Value.*
Sawmills	......	$12,600
Charcoal, sacks	31,500	240,800
Fuel, wood, cords	34,400	....
Total value		$253,400

STATISTICS OF SACRAMENTO COUNTY, 1906-7—Continued.

General Statistics.

Area, 987.66 square miles, or acres.	632,108
Number of farms	1,750
Number of acres assessed	609,600
Value of country real estate	$19,450,130
Of improvements thereon	$1,804,210
Of city and town lots	$17,912,160
Of improvements thereon	$10,534,660
Of personal property	$2,896,180
*Total value of all property	$52,597,340
Expended on roads, last fiscal year	$79,857
Expended for bridges, last fiscal year	$36,625
Number of miles of public roads	1,160
Road levy per $100, 1907	30½c
Value of county buildings	$520,465
Irrigating ditches—miles, 38; cost	$114,000
Railroads, steam—miles, 90.25; assessed value	$2,239,746
Railroads, electric—miles, 30.5; assessed value	$80,000
Electric power plants—2; assessed value	$325,000
Electric power lines; assessed value	$100,000
Number of acres irrigated	38,500

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*Does not include valuation of railroads amounting to $2,239,746 assessed by State Board of Equalization.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.
Wheat	45,000	18,250
Barley	14,100	7,050
Oats	96,600	19,320
Corn	880	525
Total cereals	155,580	45,145
Alfalfa hay	7,000	46,000
Grain hay	80,000	86,000
Total hay	87,000	132,000

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 1,800	.....	$5,400
Beeswax	1,700	425
Flowers and plants, acres	30	.....
Honey	60,500	4,840
Hops, 29,325 bales	5,571,750	.....

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*
Apples	413,800
Apricots	2,445,400
Asparagus	20,000,000
Blackberries	91,600
Beans	197,827,000
Beets	153,520
Cabbage	2,770,000
Celery	240,000
Corn	95,000
Currants	239,000
Cherries	100,000
Grapes	20,500,000
Lemons, boxes	3,500
Nectarines	15,000
Onions	30,000,000
Oranges, boxes	26,000
Pears	7,950,000
Peaches	12,500,000
Peas	280,000
Plums and prunes	13,700,500
Irish potatoes	100,000,000
Sweet potatoes	350.000
Strawberries	26,500,000
Tomatoes	6,222,500
Canned—	*Cases.*
Apples	850
Apricots	30,000
Blackberries	1,500
Beans	300
Cherries	1.500
Grapes	9,500
Pears	57,500
Peaches	125,000
Plums	3,500
Strawberries	1,900
Tomatoes	41,240

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	29,228	1,450	30,678
Apricot	100,241	33,000	133,241
Cherry	22,422	9,500	31,922
Fig	1,500	3,200	4,700
Lemon	3,300	1,000	4.300
Olive	13,750	6,900	20.650
Orange	3,900	23,650	62,650
Peach	378,140	33,000	411.140
Pear	316,514	51,000	367,514
Plum and prune	360,440	96,000	456.440
Other kinds	20,390	1,600	21,990
Total fruit	1,284,925	260,300	1,545,225
Almond	72,125	33,000	105,125
Walnut	1,900	2,000	3,900
Total nut	74,025	35,000	109,025
Grapevines	20,000	*10,000	30.000
Berries, acres	1,500	......	......

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*Under four years old.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	2	12	....
Paper boxes	1	4	....
Carriages and wagons	4	80	....
Confectionery	8	124	$90,000
Cooper shops	2	10	22,000
Crackers	1	20	90,000
Flouring mills	4	130	750,000
Foundries and iron works	3	37	55,000
Furniture	2	34	60,000
Machinery	11	190	500,000
Malt	5	20	135,000
Meat products—			
Hides	..	...	65,000
Meat packed	3	60	190,000
Tallow	..	...	17,200
Pickles	2	8	18,340
Pickled olives	..	...	16,225
Iron pipe	1	40	225,975
Sewer pipe	1	5	13,240
Planing mills	7	140	390,000
Potteries	3	23	12.000
Artificial stone	6	40	125,000

Manufactured Output.

	No.	*No. of Employes.*	*Quantity.*
Brick, thousand	1	75	20,500
Brooms, dozen	2	8	5,000
Cigars	17	97	3,690,000

SAN BENITO COUNTY.

San Benito is larger in area than Rhode Island, with its population of half a million; this county has a population of about 6,000.

San Benito County is 95 miles south of San Francisco. It lies 25 miles inland east of the quaint old town of Monterey, and 15 miles east of Moss Landing, on Monterey Bay. The average precipitation is 12 inches annually, which all falls between November and April. In some of the valleys the rainfall is never less than 18 to 20 inches.

The county is 70 miles in length, and averages about 21 miles in width. From Tres Pinos south, the county opens out like a fan, stretching away for miles, following the course of the Tres Pinos Creek and the San Benito River. It is inclosed on two sides by mountains: on the east by the Mount Diablo or Mount Hamilton range, and on the west by the Gabilan range. From these ranges the surface slopes to the valley of the San Benito River, which flows northwesterly through the middle of the county and empties into the Pajaro River, which in turn empties into Monterey Bay, winding through a gap that gives to the county the refreshing ocean breezes.

Hollister, the county seat, is a beautiful town. It is well laid out with cement walks, graded streets, and magnificent shade trees; it has a sewer system, gravity system of water works, and electric light and gas works. The town is well supplied with schools and religious facilities. All the standard fraternal orders are represented by lodge meetings in fine lodge rooms supported by the town.

San Benito County has many elements vitally necessary to be considered in the selection of a home or place of business. Climate is one of its chief attractions. Proximity to the coast makes it a pleasant one, and the fact that is not right on the coast renders it suitable for those who can not live too near the ocean. Sufferers from asthma, lung trouble or catarrh can here find a climate that will at least benefit, if not cure. Mineral springs of different kinds abound, and beautiful mountain scenery can be enjoyed from every front door.

The soil of San Benito County is chiefly sediment, light and loamy. The soil in the valleys is mostly a rich, deep sediment or alluvium. This is particularly true around Hollister, in the San Juan Valley, and at San Felipe. Good public highways lead in and out of Hollister to the west, to the north, to the south, to the southeast, and to the east. These roads are all hard, well graded, and in good condition the year round.

In the southern part of the county are situated the famous New Idria quicksilver mines, the largest producer in the world.

In the way of gorgeous mountain scenery the county presents the Vancouver Pinnacles, the largest conglomerate mass of bowlders in the world, covering seven sections of land and rivaling in beauty the famous Yosemite Valley or the Grand Cañon of the Colorado.

In the Hollister and San Juan valleys poultry raising has become one of the leading industries, and it is successful beyond anticipation by reason of climatic conditions. The capital required for a start in the poultry business is infinitesimal. Newcomers, even though not experienced, have no difficulty in meeting with success.

The climate is peculiarly adapted to the successful raising of poultry. The trade winds reach the valley after passing over the distance from the coast shorn of their chill, yet cooling the heat of summer so that it is free from extremes, fog and winds. A person can take five acres in the San Juan or Hollister valley, embark in the raising of poultry, give the business intelligent attention, and be in possession of a cash income three months after he has finished his improvements.

Hay is the main export. Hollister is the largest single shipping point in the State, the average shipments amounting to 25,000 tons annually. Hollister hay is shipped east to Chicago, New York, St. Louis, Cincinnati, Memphis, Lexington, and other points. The fine quality is due to superior climatic conditions—absence of fogs, extreme heat or cold, making a perfect sun-cured hay. The largest hay warehouses in the world are at the Hollister station, furnishing steady employment to several crews the year round.

Large quantities of grain are shipped, in addition to the large quantities retained at home for use as poultry food. Barley and oats are among the principal products.

There is also shipped a large amount of fruit, consisting principally of prunes, apricots and pears. Walnuts and almonds are receiving some attention.

Other shipments are wine, hogs, cattle, horses, poultry, and eggs.

With San Benito recognized as the section preëminent for successful poultry raising, the already large business is bound to increase. The demand for incubators, brooders, and other appliances will justify the establishment of a factory here. The poultry business is a demonstrated success.

A thousand acres can profitably be set out in strawberries and other small fruits to fill the demand from nearby markets. For the vineyardist there is land at a low figure. Land can be rented on shares, the renter only taking the risk of labor and seed. Many of our prosperous farmers to-day secured their start by renting land.

The San Benito River furnishes winter irrigation to about 3,000 acres in Hollister Valley. This water is used in orchards and on dairy farms; one flooding generally suffices for the former, and two floodings generally keep the pastures green late into the summer. Where land can not be irrigated from the river, pumping from wells is resorted to. The average cost of pumping irrigation can be figured at $1.25 per acre. In almost every section a supply of water can be reached at an average depth of 80 feet. Fifteen miles south of Hollister is the site of an immense storage reservoir. This reservoir, catching and holding the flood water of the San Benito River, will furnish sufficient for summer irrigation.

In the foothills there is room for a hundred thousand beehives. The sagebrush bloom and countless varieties of wild flowers furnish nectar the greater part of the year.

Thousands of acres in the Hollister and San Juan valleys are suitable for seed farms. The seed farms now under cultivation in the vicinity of Hollister show conclusively that the industry is practicable and successful.

Orchards are fast supplanting the hay and grain fields, and adding materially to the wealth of the county. Orchardists are making money wherever they give attention to the business. The San Juan Valley has 10,000 acres especially adapted to the raising of apples, with a market at every man's door. Apricots, prunes, peaches, walnuts, almonds, in fact every fruit, save tropical, can be grown with profit in any section that can be reached with water.

Among the varied industries of the county, that of dairying is rapidly forging to the front, adding to the wealth of the community generally, and making the dairymen independent. The standard feed is alfalfa, which grows to perfection. Underground streams of water are abundant in all sections of the county, and to the extension of the pumping system is largely due the development of the dairy business.

Scattered all through the county are innumerable cheese factories, some of them worked upon the coöperative plan, but others are individual enterprises. All are meeting with success. In one of the suburbs of Hollister there has recently been established the Alpine Evaporated Cream Factory. This installation requires many tons of milk daily to meet the demand for its product.

A careful estimate is given of the number of cows that can be kept upon an acre of alfalfa. Where the growth is vigorous and constant, a cow and a half to the acre will give the animal plenty of feed and allow of storing for winter, but the average is one cow to the acre. The best cows will net a profit of from $4 to $5 per month, or $50 a year upon the average. The climate of the county is ideal for this business.

Vegetable growing for markets outside the State is an assured and popular occupation. All varieties of vegetables are grown to perfection with and without irrigation. The green vegetable shipments are principally cabbage, cauliflower, celery, onions, and potatoes. Truck gardeners plant and harvest every month in the year.

The raising of beets has met with success. It is one of the most important branches of agriculture, and gives promise of still greater development. The advantages are: early maturity of the beets, earlier opening of the campaign, longer season for harvesting, longer run of the factory, greater yield per acre, greater per cent of saccharine, immunity from frost and rain at critical periods. The sale of beets is contracted for at the time of planting. The tops are sold to dairymen.

In the artesian belt hop growing is quite an important industry, and the business is profitable. In the same section tobacco has been successfully grown.

The county produces quicksilver, lime, antimony, hematite, manganese, gypsum, coal, asbestos, and copper. Traces of gold and silver have been found in the mountain ranges. Within three miles of Hollister is an immense bed of pottery clay. In the eastern range ledges of copper have been found which have been pronounced by experts to be another Iron Mountain.

The Southern Pacific Company runs passenger trains daily between San Francisco and Hollister, also one freight.

Tres Pinos, 6 miles south of Hollister, is reached by two trains daily on the Southern Pacific. It is one of the most important shipping points of the county, being the depot for the product of the New Idria quicksilver mines, and the Cienega limekilns. It is the site of immense hay and grain warehouses. The shipments also include livestock, poultry, fruit and general merchandise.

STATISTICS OF SAN BENITO COUNTY, 1906-7.

General Statistics.

Area, 1,056 square miles, or 676,000 acres.

Number of farms	1,150
Number of acres assessed	576,008
Value of country real estate	$3,960,240
Of improvements thereon	$647,960
Of city and town lots	$336,000
Of improvements thereon	$449,330
Of personal property	$1,368,565
Total value of all property	$6,762,095
Expended on roads, last fiscal year	$18,781
Expended for bridges, last fiscal year	$2,000
Number of miles of public roads	414
Road levy per $100, 1907	33c
Value of county buildings	$68,000
Irrigating ditches—miles, 32; cost	$60,000
Railroads, steam—miles, 17.65; assessed value	$388,474
Electric power plants—1; assessed value	$15,125
Number of acres irrigated	3,500
Pullman cars; assessed value	1,188

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	5,300	422	$14,348
Barley	15,340	4,600	137,902
Oats	2,635	.....	....
Corn	200	.....	....
Total cereals	23,475	5,022	$152,250
Alfalfa hay	2,000	8,000	$64,000
Grain hay	.....	45,000	495,000
Total hay	.....	53,000	$559,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	17,000	.....	......
Apricot	35,610	.....	......
Cherry	2,200	.....	......
Peach	9,000	4,500	13,500
Pear	8,500	600	9,100
Prunes	122,300	2,000	124,300
Total fruit trees	194,610	7,100	201,710
Almond	4,675	.....	......
Walnut	405	.....	......
Total nut trees	5,080	.....	......
Grapevines, acres	145	.....	......
Berries, acres	78	.....	......

Wines, Brandies, Etc.

	Gallons.	*Value.*
Sweet wines	78,000	$24,400
Beer, barrels	1,800	13,500
Brandy	1,000	1,600

Number of wineries, 1; distilleries, 1; breweries, 1.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	......	....
Skimming stations	3	......	....
Butter, pounds	..	25,000	$6,250
Cheese, pounds	..	1,000,000	160,000
Condensed milk, cases	..	3,000	10,000
Evaporated cream, cases	..	50,000	225,000

Livestock Industry.

	Number.	*Value.*
Cattle—Stock	14,415	$230,640
Dairy cows—Graded	2,314	57,840
Calves	8,399	71,375
Swine	2,703	9,640
Horses—		
Standard-bred	34	7,450
Common	4,065	184,685
Colts	1,481	36,570
Jacks and jennies	2	300
Mules	41	1,713
Sheep	12,848	32,120
Lambs	7,360	7,360
Common goats, ¾	520	1,290
Total stock all kinds	54,182	$640,983
Wool, pounds	77.088	$9,250

Poultry and Eggs.

(Shipped.)

	Dozen.	*Value.*
Chickens	5,000	$20,000
Ducks	312	1,560
Geese	40	480
Turkeys	60	1,800
Eggs	1,000,000	250,000
Total value		$273,840

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	4,000	$40,000

Power used for mills and manufactories in county—Steam, 10; electrical, 1; water, 1; gas and gasoline, 30.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 250	......	......
Honey	10,000	$1,200
Hops	12,000	1,200
Grass seed	75,000	55,000
Sugar beets, tons	5,500	23,300

Manufactured Output.

	Quantity.
Cigars	160,000
Lime, barrels	18,200
Malt, tons	100
Hides, pounds	52,000
Lard, pounds	52,000
Tallow, barrels	25

STATISTICS OF SAN BENITO COUNTY, 1906-7—Continued.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	2	5	$70,000
Confectionery	3	6	3,500
Lime	1	15	36,400
Machinery	1	1	6,000
Meat products—			
Hides	..	...	6,000
Lard	..	...	7,000
Tallow	..	...	120
Planing mills	1	2	6,000

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	2,000,000	$20,000
Apricots	500,000	22,500
Blackberries	22,000	1,000
Beans	3,500	105
Beets	6,000	80
Cabbage	180,000	1,800
Celery	20,000	400
Corn	150,000	3,000
Currants	20,000	$1,000
Cherries	80,000	5,600
Gooseberries	2,000	110
Grapes	350,000	5,200
Loganberries	25,000	1,100
Pears	1,000,000	21,000
Peaches	1,200,000	36,000
Plums	40,000	8,000
Irish potatoes	600,000	9,000
Raspberries	5,000	250
Strawberries	100,000	5,000
Tomatoes	100,000	1,350
Totals	6,403,500	$142,495

Dried—	*Pounds.*	*Value.*
Almonds	50,000	$6,000
Apricots	60,000	15,000
Onions	20,000	300
Peaches	40,000	4,000
Plums	80,000	7,200
Prunes	4,800,000	216,000
Walnuts	24,000	2,880
Totals	5,038,000	$251,380

SAN BERNARDINO COUNTY.

San Bernardino is not only the largest county in California, but it is the largest in the United States. It is larger than New Hampshire, Vermont, and Rhode Island combined; larger than New Jersey, Delaware, Massachusetts, and Rhode Island combined; very nearly as large as Massachusetts, Connecticut, and New Jersey. There are eight states whose area is less than that of this county.

San Bernardino County is in the southeastern part of the State. The greater portion is desert. In the north is the Mojave Desert. and in the east, the northern end of the Colorado Desert; the arable portion being confined to the southwestern part—the San Bernardino Valley. This valley forms an almost perfect amphitheatre, encircled by mountains and hills, open only on the west, allowing the sea breeze from the ocean to sweep its entire length.

Mount San Gorgonio is perpetually snowcapped, and from it is derived much of the water used for irrigation in the summer in the valley below, the remainder coming from the mountain range, giving a bountiful supply for irrigators. The combined waters of the streams, springs and artesian wells make this valley one of the best watered in southern California.

The forests on the mountain ranges furnish the supply of lumber and timber used in the valley.

Mount San Bernardino, from its distinctive cone, has been adopted by the United States surveyors as the initial point for land surveys in southern California, both base and meridian starting from its peak.

The northern and eastern parts of the county are almost absolutely sterile. Yet, along the Mojave River where it debouches from the mountains to the desert, and for many miles, the land on both sides is fertile, easily worked, and produces abundantly as long as the water supply is available.

The soil of San Bernardino Valley varies greatly with locality. In the eastern part it is a sharp gravel or sand, with a large admixture of alluvial deposits. West the soil changes to a heavy, dark loam, with occasional patches of adobe. Still farther west, the soil is of a lighter character, and possesses much more of the soda and potash constituents. Immediately about the City of San Bernardino the soil is a strong adobe, with appearances here and there of soda salts. Along the river bottoms the soil is a heavy clay, and in some places a black adobe. It is cold and damp, and not as suitable for fruit culture as for grazing and the growing of hay.

The rainfall varies a great deal, as does the climate. Passing from the lower levels to the high altitudes the rainfall increases. On the north and east of the mountain ranges, on the Mojave and Colorado deserts, the larger portion of the rainfall comes in July and August, with no rains during the winter. The rains are short, sharp, and heavy, frequently accompanied by thunder and lightning, which latter is almost unknown south of the mountains.

In the number and character of irrigation enterprises, the county stands in the front rank. It has been justly called the "Mother of Irrigation," because here was dug the first irrigation ditch in the State, and here were raised the first crops by irrigation. It is over a hundred years since the mission fathers of San Gabriel established an outlying post, or sub-mission, just west of Redlands, and employed Indian labor to dig what is known as the zanja. This ancient ditch is still in use and within the same banks that were first thrown up by Indian labor almost a century ago.

There are hundreds of miles of canals and pipe lines, with thousands of miles of laterals and individual pipe lines. In addition to this, hundreds and hundreds of wells have been bored, each producing a flowing stream without other or further expense, which volume is sufficient not only to irrigate many thousands of acres, but also furnishes the magnificent supply which fructifies and renders fertile the great plain on which the city of Riverside stands.

Almost every variety of fruit can be produced in some part of this county. The only exceptions are those strictly tropical. In the mountain valleys and upon the upper plateaus, apples and cherries are grown. On the lower levels, all the deciduous fruits are produced. The production of oranges, lemons, and pomelos is large, these fruits being grown to perfection. The production of oranges has increased rapidly during the last few years. The first planting of orange trees were two set out by Anson Van Leuven in his dooryard in Old San Bernardino in the early sixties, and by M. H. Crafts at Crafton, at about the same time or a little later.

In the western part, in the Rialto, Etiwanda, and Cucamonga neighborhoods, there is produced a large quantity of raisins. Another section of the county especially adapted to the culture of grapes is that about Hesperia, which lies along the Mojave River.

In the southwest corner of the valley is located the Chino Ranch, on which is the third largest beet-sugar factory in the world. The acreage devoted to sugar-beet culture is in the neighborhood of 20,000. The factory has a capacity of about 12,000 tons of refined sugar annually. The culture of sugar beets has been a profitable industry for the farmers. On this ranch are fattened thousands of head of cattle upon the beet pulp, which is siloed for that purpose.

Along the slope of the mountains, and in the mountain valleys and cañons, are numerous bee ranches, from which is produced a large amount of honey.

The raising of cattle and sheep is carried on along the mountain ranges and in the upper mountain valleys. Several large bands of sheep are grazed on the ranges. Dairying is carried on in both the upper and lower valleys. Pure-bred or grades of high-class dairy cattle are in general use. A stock company for the breeding of the most desirable classes of horses has a large ranch at Victor to be devoted exclusively to their raising.

Wheat, oats, and barley are grown in considerable quantities, and alfalfa is raised with profit.

Vegetables of nearly all descriptions are raised, the yield being large, and a growing shipping trade to outside markets has been established.

The northern and eastern portions are heavily mineralized, and although prospecting has been carried on for fifty years new and greater finds are being made every year. Almost every known mineral has been discovered. Gold, silver, copper, iron, tin, lead, borax, soda, and nitrates are found in abundance and scattered over a wide area. Some of the richest silver mines in the State are in this county. Copper exists in great abundance. The high cost of freight; the scarcity of water, which renders the life of the prospector precarious as well as interfering with the working of the mines; the scarcity and high cost of fuel—all combined have limited prospecting and retarded mining development. The building of railroads across the desert has partially removed some of these obstacles, and mining recently has been prosecuted with more vigor.

STATISTICS OF SAN BERNARDINO COUNTY, 1906-7.

General Statistics.

Area, 20,160 square miles, or acres.	12,902,400
Number of farms	5,250
Number of acres assessed	632,358
Value of country real estate	$7,733,295
Of improvements thereon	$3,258,765
Of city and town lots	$1,997,965
Of improvements thereon	$3,161,825
Of personal property	$1,754,840
Total value of all property	$17,906,690
Expended on roads, last fiscal year	$100,050
Expended for bridges, last fiscal year	$7,825
Number of miles of public roads	2,000
Road levy per $100, 1907	50c
Value of county buildings	$450,000
Irrigating ditches—miles, 395; cost	$3,442,100
Railroads, steam—miles, 901; assessed value	$12,352,605
Railroads, electric—miles, 47½; assessed value	$79,405
Electric power plants—5, and electric power lines—miles, 165; assessed value	$419,435
Number of acres irrigated	43,525

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	1,000	270	$8,100
Barley	9,000	4,000	100,000
Oats	100	80	2,800
Corn	2,150	1,110	29,775
Total cereals	12,250	5,460	$140,675
Alfalfa hay	4,590	25,950	$410,450
Grain hay	19,025	22,830	271,120
Total hay	23,615	48,780	$681,570

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	1,376,700	$206,540
Sweet wines	659,000	184,520
Brandy	36,000	19,800
Vinegar	16,000	1,600
Grape juice	75,000	50,000

Number of wineries, 9.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	3	....	....
Butter, pounds	..	364,085	$109,225

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	16,050	1,250	17,300
Apricot	34,600	.....	34,600
Cherry	12,500	600	13,100
Fig	2,700	250	2,950
Lemon	210,100	15,600	225,700
Nectarine	2,300	375	2,675
Olive	53,000	425	53,425
Orange	2,475,400	650,000	3,125,400
Peach	14,150	.....	14,150
Pear	18,500	750	19,250
Plum	2,200	325	2,525
Prunes	2,700	450	3,150
Other kinds	8,600	1,325	9,925
Total fruit	2,852,800	671,350	3,524,150
Almond	1,200	350	1,550
Walnut	5,100	475	5,575
Total nut	6,300	825	7,125
Grapevines	12,000	4,000	16,000
Berries, acres	53	.....	53

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	7,800	$227,000
Stock	6,500	130,000
Dairy cows—Graded	1,650	66,000
Calves	1,600	16,000
Swine	4,300	43,000
Horses—		
Thoroughbred	60	60,000
Standard-bred	200	45,000
Common	12,000	1,140,000
Colts	900	18,000
Mules	300	15,000
Sheep	10,000	40,000
Total stock all kinds	......	$1,800,000
Wool, pounds	30,000	$8,000

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 16,000	......	$48,000
Beeswax	12,000	3,000
Flowers and plants, acres	80	60,250
Honey	160,000	8,000
Sugar beets, tons	8,365	41,825
Gold	......	829,500
Silver	......	34,300
Borax	......	646,800
Crushed rock	......	20,000
Plaster	......	35,000

STATISTICS OF SAN BERNARDINO COUNTY, 1906-7—Continued.

Manufactories.

	No.	No. of Employes.	Value of Product.
Wood boxes	3	52	$170,500
Brick	2	7	16,230
Cement	1	150	247,000
Cigars	3	8	16,250
Clothing	8	29	56,500
Confectionery	7	18	52,500
Electrical suppl's	1	150	180,000
Flouring mills	1	15	375,000
Foundries and iron works	7	55	163,500
Leather goods	4	9	24,500
Lime	3	125	224,250
Machinery	..	670	624,845
Meat products—			
Hides	..	...	69,800
Lard	..	...	15,900
Meat packed	..	...	7,280
Tallow	..	...	17,000
Olive oil	4	...	42,000
Pickled olives	3	...	62,500
Sewer pipe	5	13	16,000
Planing mills	8	41	160,500
Potteries	1	2	3,000
Soap	1	1	500
Artificial stone	4	6	15,800
Granite	1	...	2,500
Marble	1	25	40,000
Sandstone	1	...	3,000
Sugar, beet	1	325	577,500
Syrups and extracts	1	...	2,500
Tanneries	1	3	4,000
Tin and galvanized iron	14	36	81,500
Miscellaneous	..	...	76,000
Feed mill	1	15	475,600
Ice	8	25	407,160
Fertilizer	3	40	375,000

Manufactured Output.

	Quantity.
Brick	2,164,000
Cement, tons	27,700
Cigars	325,000
Flour, barrels	75,000
Lime, barrels	195,000
Hides, pounds	578,000
Lard, pounds	1,196,000
Meat packed, pounds	52,000
Tallow, barrels	850
Olive oil, gallons	21,000
Pickled olives, gallons	90,000
Soap, pounds	24,000

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,742,000	$43,090
Apricots	2,820,000	98,900
Blackberries	70,000	6,770
Cherries	250,000	15,000
Figs	21,500	2,200
Grapes	77,628,000	677,850
Grape fruit	1,404,270	49,875
Lemons, boxes	326,890	1,062,340
Loganberries	15,500	$1,550
Nectarines	8,000	240
Onions	400,000	8,000
Oranges, boxes	3,551,418	7,120,595
Olives	1,600,000	48,000
Pears	100,000	3,000
Peaches	10,336,000	195,515
Plums	156,000	4,120
Irish potatoes	3,795,500	58,225
Sweet potatoes	24,000	500
Prunes	1,200,000	14,500
Raspberries	13,500	1,350
Strawberries	120,000	10,170
Tomatoes	5,080,000	22,200
Melons	1,160,000	6,550
Total		$9,450,540

Dried—	*Pounds.*	*Value.*
Apricots	228,000	$41,300
Figs	4,500	620
Nectarines	2,000	250
Onions	290,000	5,800
Peaches	234,000	20,475
Prunes	400,000	16,000
Raisins	3,200,000	155,350
Walnuts	20,000	2,800
Total		$242,595

Canned—	*Cases.*	*Value.*
Apricots	25,956	$44,085
Grapes	6,000	10,895
Peaches	127,416	222,840
Plums	3,000	7,000
Tomatoes	16,000	27,200
Marmalade	12,000	20,000
Total		$332,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	6,500	$28,800
Ducks	75	375
Geese	25	250
Turkeys	400	6,000
Eggs	650,000	162,500
Total value		$197,925

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	287,000	......
Cedar, acres	28,000	......
Pine, acres	259,000	......
Sawmills, number	3	$50,000
Charcoal, sacks	2,350	990
Fuel, wood, cords	6,495	27,380
Lumber, feet	9,140,000	183,860
Sash and door factories, number	1	18,000
Total value		$280,230

Power used for mills and manufactories in county—Steam, 35; electrical, 11; water, 5; gasoline, 5.

SAN DIEGO COUNTY.

San Diego County occupies the southern part of the State, and has an area slightly larger than Massachusetts. The Pacific Ocean washes its shores for upward of 75 miles. The land rises gently from the ocean for a distance of about 50 miles to a chain of peaks forming the backbone of the county, descending again quite rapidly to the Colorado River Valley, the greater part of which is below sea level.

The arable portion of the western slope is divided into a series of irregular terraces or plateaus. The lower or coast terrace comprises a number of valleys with the intervening mesas. This large acreage is practically frostless. Next come a series of higher valleys, Poway Valley, varying in elevation from 400 to 500 feet. The third terrace, the altitude of which ranges from 1,000 to 2,500 feet, comprises the foothill region, with numerous smaller intervening valleys, nooks and glens. Next comes the mountain region. The area of tillable land in these valleys and mesas is approximately 600,000 acres, a still larger area being suited to pasturage and grazing. The elevation of the mountain valleys varies from 2,500 to 4,500 feet. They are chiefly devoted to stock raising, but many of them are well adapted to the growing of small fruits and vegetables and to diversified farming.

The arable soil of the county may be classed under two heads: granitic and adobe; though there is often a mixture of both, resembling adobe.

To the east of the mountains, in the delta of the Colorado, is the famous Imperial Valley. After many months of labor, and a large expenditure of money, a generous share of the flow of the Colorado River has been diverted into this great valley, the first delivery of water for irrigation being made in June, 1901, and so rapidly have the main canals and laterals been extended that many thousands of acres are now under cultivation, this rapid development affording employment and resulting in the building of homes for thousands of settlers, thus adding millions to the wealth of the county. The center of this wonderfully fertile section is reached by a spur from the main line of the Southern Pacific Railroad. The central town is Imperial. There is a good hotel, an ice factory, creamery, and other evidences of prosperity. What until recently was described in our geographies as the dreaded Colorado Desert bids fair to soon become the leading stock and dairy section of the great Southwest.

The intermountain region, the hills and valleys between the plains of Imperial and the western slope of the county, is rich in minerals, and affords excellent pasturage for several thousand cattle. The mineral wealth of San Diego County, though known to be great, is largely undeveloped, and offers an excellent field for the prospector and capitalist. Lepidolite and amblygonite, containing lithia and other valuable products, exist in greater quantities than in any other known deposit in the world. San Diego is producing the finest tourmaline in the United States. The crystals are of exceptional hardness, possess exquisite delicacy of coloring, and when cut form gem-stones of great brilliancy. Kunzite, a new gem, not found in any other part of the world, was recently discovered at Pala, and is attracting a great deal of attention. Gem experts are manifesting a deep interest in the remarkable crystallizations found in San Diego County.

According to a bulletin on the ''Climatology of California,'' recently published by the U. S. Department of Agriculture, San Diego County has the heaviest and most reliable rainfall of any part of southern California. The rainfall increases, and greater extremes of temperature occur, as you leave the coast, the higher mountain peaks being often covered with snow to quite a depth during a part of the winter.

Water is impounded mainly for the citrus orchards of the coast section, the higher valleys requiring but little or no irrigation for their crops of cereals, deciduous fruits, olives, vegetables, etc.

As an evidence that education keeps pace with the population, there are more than one hundred and fifty school houses distributed through the county, the instruction in which is up to the usual high standard found throughout California.

The Board of Supervisors has done and is doing good work in the way of road building, the most distant and mountainous places being readily reached over excellent highways.

The orange, lemon, and pomelo, or grape-fruit, do well. The largest single lemon grove contains about 800 acres.

Raisin grapes are a profitable crop, and the industry has a bright future. The wine industry is large and growing.

Olive growers are making money. An olive grove, to be a commercial success, should be set out with a view to supplying pickling fruit, oil olives being treated as a by-product. The demand for pickled ripe olives is already in excess of the supply, and steadily growing.

Peaches, apricots, pears, quinces, plums, cherries, and other deciduous fruits do well. The mountain region around Julian has attained a special reputation for the crisp, finely flavored apples.

A good walnut orchard, properly located with reference to soil and water, is a safe investment. Small areas well suited to this crop may be found in different parts of the county—notably in the Tia Juana Valley. Almonds do well, and there are some thriving orchards.

San Diego County is celebrated for its deliciously perfumed and fine-flavored honey, which always finds a ready market at top prices. The apiaries are located for the most part among the hills and valleys back from the coast.

There is reason to believe that the cultivation of the silkworm may hold a most important part in the industrial development of San Diego County—the climatic conditions are so perfectly adapted to the delicate constitution of the worm, and the foliage of the mulberry may be had in such wholesome condition practically during the entire year. Many acres have been set out to mulberry trees, and those interested feel greatly encouraged over the outlook.

The dairy industry has shown a healthy growth, having trebled in the past four years.

The modern city of San Diego was founded by A. E. Horton, in 1867. The situation is not only sanitary and attractive, but it is also admirably adapted for a large ocean commerce. Numerous wharves extend into deep water, and in their neighborhood may be found lumber yards, planing mills, warehouses, foundries, etc. The electric street railway system is equipped with modern cars and complete in every respect. Water is provided in abundance, the supply and distribution being controlled by the municipality. The streets of the city are well lighted by electricity. The schools, private and public, have an excellent reputation. A fine, large opera house, perfect in its appointments, is on the circuit of the very best theatrical and operatic companies. There are also several smaller theatres. The different religious organizations worship in attractive edifices; secret societies and benevolent associations have their lodge rooms, and numerous musical and literary clubs are supported by an active membership. There are several strong banking institutions. The hotel accommodations are excellent, and there are a number of sunny modern lodging houses. San Diego is thrown into special prominence as being the first port of call on the Pacific Coast of the United States north of Panama, and the magnificent bay, around the shores of which the city is built, will soon become an important naval rendezvous. The Government has concluded arrangements for the erection of a large coaling station here, and is fast completing the building of a modern military post at Fort Rosecrans, the big guns of which command the entrance to the bay.

Just across the bay from San Diego, ten minutes by ferry, is the peninsular city of Coronado, with its world-famous Hotel del Coronado and many beautiful homes.

National City, the second largest city, is situated on the southeast shore of the bay. The land here rises gently from the water front, and is admirably suited for the location of manufacturing establishments or other plants requiring a comparatively large area of level ground with good water frontage. There are a number of attractive homes within the city limits and nestling among the lemon and orange groves in the fertile valleys near by. The church and school facilities of the place are excellent. A large manufactory of citrus products is in successful operation, turning out citric acid, oil of lemon, lemon extracts, etc. There is also an olive oil factory, and its product is equal to the best.

Passing through Old Town, you come to Pacific Beach, a very attractive suburb of San Diego. The land is quite level near the ocean, affording one of the widest, smoothest, hardest and most attractive beaches along the coast.

Escondido is some 35 miles northeast of San Diego, being connected by spur with the main line of the Southern California Railway. A large area of productive country is tributary to Escondido, from which are made shipments of hay, grain, cattle, hogs, oranges, lemons, raisins, wine, honey, chickens, eggs, butter, etc. The school and church accommodations of the place are excellent.

STATISTICS OF SAN DIEGO, COUNTY, 1906-7.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	300,000	$90,000
Sweet wines	150,000	75,000
Beer, barrels	31.197	249,576
Brandy	4,000	8.000
Vinegar	1,500	975

Number of wineries, 4: distilleries, 4; breweries, 1.

Fish Industry.

	Pounds.	*Value.*
Various kinds	1,596,640	$63.865
Turtles	7,485	375
Lobsters	66,000	11,550
Salt fish	750,000	30.000
Pickled fish	92,500	2,775
Totals	2,512,625	$108.565

STATISTICS OF SAN DIEGO COUNTY, 1906-7—Continued.

General Statistics.

Area, 4,876.77 square miles, or 3,121,132 acres.	
Number of farms	5,539
Number of acres assessed	1,421,891
Value of country real estate	$5,514,211
Of improvements thereon	$1,113,440
Of city and town lots	$10,549,411
Of improvements thereon	$5,007,839
Of personal property	$4,037,434
Total value of all property	$26,222,335
Expended on roads, last fiscal year	$51,645
Expended for bridges, last fiscal year	$15,402
Number of miles of public roads	5,000
Road levy per $100, 1907	60c
Value of county buildings	$426,000
Irrigating ditches (estimate) and flumes—miles, 126.65; cost	$3,278,000
Railroads, steam—miles, 192.97; assessed value	$2,453,977
Railroads, electric—miles, 26¾; assessed value	$113,375
Electric power plants—4; assessed value	$40,600
Electric power lines—miles, 69; assessed value	$45,100
Number of acres irrigated	12,200

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	12,000	4,000	$144,000
Barley	20,000	7,700	269,500
Oats	4,000	1,000	39,000
Corn	3,000	900	28,800
Total cereals	39,000	13,600	$481,300
Alfalfa hay	1,100	4,400	$66,000
Grain hay	40,000	40,000	560,000
Grass hay	3,500	4,000	28,000
Total hay	44,600	48,400	$654,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	61,360	25,840	87,200
Apricot	47,106	3,200	50,306
Cherry	5,745	700	6,445
Fig	15,600	2,200	17,800
Lemon	265,000	33,110	298,110
Olive	227,600	21,500	249,100
Orange	106,950	4,000	110,950
Peach	90,260	43,000	133,260
Pear	17,820	10,000	27,820
Plum	10,720	10,000	20,720
Pomelo	16,000	1,325	17,325
Prunes	82,359	2,000	84,359
Total fruit	946,520	156,875	1,103,395
Almond	8,274	1,100	9,374
Walnut	8,000	2,700	10,700
Total nut	16,274	3,800	20,070
Grapevines	2,288,000	549,500	2,837,500
Berries, acres	280,000	41,600	321,600

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	4	....	....
Skimming stations	4	6,500	$6,500
Butter, pounds	..	520,000	171,600
Dairies	195	....	....

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	9,060	$398,640
Stock	23,906	717,180
Dairy cows—Graded	625	31,250
Angus	75	7,500
Ayrshire	10,659	373,065
Calves	10,872	86,976
Swine	12,860	180,000
Horses—		
Thoroughbred	69	13,800
Standard-bred	1,800	270,000
Common	8,500	510,000
Colts	1,500	45,000
Jacks and jennies	25	2,000
Mules	950	118,750
Sheep	10,280	56,540
Lambs	4,000	13,000
Common goats	1,280	3,200
Total stock all kinds		$2,807,901
Wool, pounds	500,000	$50,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	35,500	$168,625
Ducks	1,750	8,750
Geese	500	4,250
Turkeys	1,250	31,250
Eggs	1,420,000	426,000
Total value		$638,875

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	2	10	$9,800
Boat builder	1	6	36,000
Brick	2	40	94,500
Brooms	1	4	15,356
Barley mills	5	20	94,500
Cigars	3	63	168,625
Tobacco	..	...	4,200
Coffee, spices, etc.	2	15	125,000
Confectionery	2	36	70,000
Foundries and iron works	6	134	127,800
Furniture	5	26	55,200
Jewelry	3	12	19,400
Gasoline and hoist engine	..	24	65,000
Marine and hoist engine	1	14	45,000
Meat products—			
Hides	5	16	70,560
Lard	8	...	6,600
Tallow	..	10	43,200
Olive oil	4	50	28,925
Pickled olives	..	...	2,520
Planing mills	5	151	423,000
Salt	2	54	90,000
Soap	1	10	20,625
Artificial stone and crushed rock	3	106	124,070
Stoves	1	12	12,000
Granite and marble	2	35	80,800
Onyx	1	10	40,000
Onyx, in rough	..	...	125,000
Tin and galvanized iron	2	17	46,000
Insect powder	1	...	2,700
Sal soda	1	...	9,900
Washing powder	1	...	16,500
Lapidaries, carats	7	16	107,260
Gems in rough sent out county	..	...	52,000

STATISTICS OF SAN DIEGO COUNTY, 1906-7—Continued.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 75,000	......	$225,000
Beeswax	60,000	18,000
Honey	1,082,400	66,000
Alfalfa seed	30,000	5,100
Mineral water, cases	5,500	44,000
Gem output in the rough for this year amounts — cut in San Diego	700	70,000
Sent out county, rough	520	52,000

Manufactured Output.

	Quantity.
Brick	10,500,000
Brooms, dozen	4,735
Smoking tobacco, pounds	11,000
Cigars	3,305,000
Confectionery, pounds	325,000
Crushed barley, tons	3,000
Marine engines, number	10
Gasoline engines, number	125
Hides, pounds	480,000
Lard, pounds	55,000
Tallow, barrels	1,800
Olive oil, gallons	12,450
Olives, cases	10,149
Pickled olives, bulk	4,200
Salt, tons	9,000
Soap, pounds	343,750
Washing powder, pounds	330,000
Sal soda, pounds	5,500
Insect powder, pounds	660,000
Lapidaries, carats	22,470
Gems in rough, pounds	520
Marble onyx, cubic feet	700
Marble onyx in the rough	10,000
Planing mills, feet	14,000,000

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	3,000,000	$70,000
Apricots	750,000	37,500
Blackberries	250,000	12,500
Beans	600,000	15,000
Beets	200,000	2,000
Cabbage	360,000	5,400
Cauliflower	144,000	8,640
Corn	1,500,000	$30,000
Cherries	67,500	4,050
Figs	16,400	400
Grapes	1,960,000	49,000
Grape fruit	3,465,000	12,600
Lemons, boxes	375,960	845,910
Onions	12,500	2,500
Oranges, boxes	107,380	214,760
Olives	2,700,000	67,500
Pears	2,500	3,750
Peaches	350,000	14,000
Peas	300,000	16,500
Plums	240,000	7,200
Irish potatoes	4,800,000	72,000
Sweet potatoes	2,400,000	4,200
Prunes	60,000	10,500
Strawberries	2,500,000	21,250
Tomatoes	4,800,000	4,800
Total	....	$1,531,960
Dried—	*Pounds.*	*Value.*
Almonds	40,000	$6,400
Apricots	125,000	18,750
Bean	1,000,000	43,925
Peaches	200,000	17,000
Prunes	210,000	12,600
Raisins	2,400,000	120,000
Walnuts	800,000	10,800
Totals	4,055,000	$229,475
Canned—	*Cases.*	*Value.*
Olives, 5 gals.	48	$144
“ gals.	1,807	17,587
“ 24 qts.	4,336	24,434
“ 48 pts.	3,898	25,065
“ 96 ½ pts.	60	648
Totals	10,149	$67,878

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	30,000	....
Pine, acres	22,000	$330,000
Redwood, acres	8,000	120,000
Total value		$450,000

Power used for mills and manufactories in county—Steam, 110; electrical, 50; gasoline, 45.

SAN FRANCISCO COUNTY.

The County of San Francisco is consolidated with the city of the same name, and comprises a peninsula embraced by the waters of the Pacific Ocean on the west, and by the Bay of San Francisco on the north and east. San Mateo County adjoins it on the south. Topographically it is a succession of hills, the highest of which is about 1,000 feet.

It has a population of approximately 400,000, and its industries are chiefly commercial and manufacturing. There is no production of raw products to speak of.

STATISTICS OF SAN FRANCISCO COUNTY, 1906-7.

General Statistics.

Value of city and town lots	$260,689,806
Of improvements thereon	$66,815,201
Of personal property	$102,361,602
Total value of all property	$429,866,609
Railroads, electric; assessed value	$18,192,460
Electric power plants—2; assessed value	$6,403,977

SAN JOAQUIN COUNTY.

San Joaquin is gateway county to the San Joaquin Valley, being wedged in between the Coast Range of mountains and the Sierra Nevadas. It is almost entirely a level plain, having no waste land except such as is usurped by its numerous water courses. It embraces a great variety of soils, and is thus adapted to diversified farming. It includes the major portion of the San Joaquin Delta, and consequently has over 200,000 acres of reclaimed land, consisting of peat and sediment. This body of land is very productive, yielding extraordinary crops of vegetables and grain. San Joaquin County lies very advantageously for transportation, having several hundred miles of navigable waterways, and is traversed by four transcontinental railroads. Its facilities for moving produce are thus among the best on the Pacific Coast, and the rates are always comparatively low. Only a few years ago San Joaquin County was devoted almost exclusively to the production of grain and hay. But during the past seven years the process of intensification has been so rapid that the number of farmers cultivating less than 100 acres each has increased fourfold since the Federal census was taken. It now leads every other county in the State in the production of barley, potatoes, onions, table grapes, olives, asparagus, and garden truck, and ranks among the leading counties in the production of wine grapes, almonds, melons, beans, and hay. The fruit, vegetable, and alfalfa acreage is being rapidly expanded. The resourcefulness of San Joaquin County was exhibited in a marked degree the present season, for with fully one half of its uplands idle because of the extremely wet winter, and with 130,000 acres of its reclaimed lands submerged by the floods, it still increased its agricultural output to upwards of $13,000,000, and converted a year of disaster into a record-breaking season of prosperity. Stockton, the county seat, has a population of 25,000 and is situated in the center of the county, and commercially is the headquarters of the San Joaquin Valley. It is connected with Lodi, the only other city in the county, by a modern electric line.

STATISTICS OF SAN JOAQUIN COUNTY, 1906-7.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	6,132	$183,960
Stock	24,510	490,200
Dairy cows—Graded	11,740	468,200
Holsteins	160	16,000
Calves	6,542	45,794
Swine	35,400	70,800
Horses—		
Standard-bred	13,491	1,349,100
Common	5,480	328,800
Colts	3,510	70,200
Jacks and jennies	.....	1,100
Mules	5,530	638,300
Sheep	45,680	131,100
Lambs	1,620	1,500
Common goats	400	800
Total stock all kinds	.....	$3,795,954
Wool, pounds	163,250	$25,300

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	3	....	....
Skimming stations	40	....	....
Butter, pounds	..	2,000,000	$565,000
do farm, pounds	..	200,000	57,500
Fresh milk and cream, gals	..	910,000	180,000
Total value			$802,500

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	23,963	$143,778
Ducks	250	2,500
Geese	230	2,760
Turkeys	1,340	20,100
Eggs	......	578,750
Total value		$747,888

STATISTICS OF SAN JOAQUIN COUNTY, 1906-7—Continued.

General Statistics.

Area, 1,365 square miles, or 873,600 acres.

Number of farms	4,184
Number of acres assessed	871,568
Value of country real estate	$16,112,144
Of improvements thereon	$2,630,593
Of city and town lots	$7,269,728
Of improvements thereon	$6,294,945
Of personal property	$5,902,394
Total value of all property	$38,209,804
Number of miles of public roads	1,100
Road levy per $100, 1907	40c
Value of county buildings	$747,000
Irrigating ditches—miles, 68½; cost	$140,384
Railroads assessed by state	$4,217,531
Railroads, steam—miles, 200.93; assessed value, county	$675,242
Railroads, electric—miles, 13; assessed value	$205,556
Electric power plants—1; assessed value	$253,050
Electric power lines—miles, 69; assessed value	$42,162
Number of acres irrigated	180,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	50,400	12,240	$367,200
Barley	96,700	44,843	1,255,618
Oats	24,226	5,250	157,500
Rye	4,000	1,683	42,075
Corn	1,716	2,574	72,072
Total cereals	177,042	66,590	$1,894,465
Alfalfa hay	24,226	84,791	$847,910
Grain hay	118,700	178,050	1,602,450
Grass hay	2,000	3,000	25,000
Total hay	144,926	265,841	$2,475,360

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	12,703	2,168	14,871
Apricot	79,287	4,753	84,040
Cherry	31,463	10,763	42,226
Fig	6,754	1,292	8,046
Lemon	1,640	158	1,798
Nectarine	1,113	922	2,035
Olive	47,681	5,633	53,314
Orange	9,206	3,362	12,568
Peach	194,838	36,119	230,957
Pear	26,524	2,993	29,517
Plum	23,264	3,044	26,308
Prunes	46,736	10,328	57,064
Quince	3,118	791	3,909
Other kinds	1,000	500	1,500
Total fruit trees	485,327	82,826	568,153
Almond	152,306	12,743	165,049
Chestnut	103	50	153
Pecan	112	84	196
Walnut	4,730	5,943	10,673
Other nuts	87	14	101
Total nut trees	157,338	18,834	176,172
Grapevines, acres	18,385	17,034	35,419

	Acres.
Blackberries	175
Currants	2
Gooseberries	4
Loganberries	61
Raspberries	25
Strawberries	75

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Art goods	2	10	$9,000
Bookbinderies and printers	6	129	235,421
Awnings	1	15	25,000
Bakeries	7	63	167,340
Boats	4	54	146,000
Brick	3	221	470,000
Boilers	1	5	5,000
Brooms	1	4	7,000
Bags	1	12	120,000
Carriages and wagons	8	77	176,500
Concrete block	3	52	53,000
Chicory	1	17	24,000
Cigars	3	8	13,200
Clothing	14	40	85,000
Gloves	2	58	67,200
Confectionery	5	23	48,750
Dredges	1	55	75,000
Gas engines	4	143	255,000
Ice	1	7	22,500
Flouring and feed mills	6	234	4,739,000
Foundries and iron works	4	168	408,670
Fence wire	1	20	35,000
Furniture	5	20	53,050
Insecticide (buhach)	1	7	30,000
Jewelry	2	6	14,732
Mineral water	1	4	11,400
Leather goods	5	27	50,200
Ladders	1	4	6,000
Machinery	8	370	1,573,000
Macaroni	3	11	50,800
Mealfalfa	1	5	35,000
Medicines	3	15	41,000
Meat products	6	50	154,630
Olive oil	4	38	20,500
Patterns	1	2	4,200
Pickled olives	2	...	11,200
Scrapers	1	8	2,000
Planing mills	12	224	528,500
Paints and oils	2	8	41,906
Saratoga chips	1	3	2,800
Soda water	1	2	4,000
Soap	1	7	40,000
Tanneries	1	74	460,000
Trusses	1	1	1,000
Tents, bags, etc.	1	75	85,000
Tin and galvanized iron	2	21	11,000
Window glass	1	225	900,000
Windmills	1	15	45,000
Woolen mills	1	160	150,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry and sweet wines	3,835,000	$492,500
Beer	1,300,000	322,400
Brandy	100,000	50,000
Cider	3,000	240
Vinegar, barrels	500	450
Total value		$865,590

Number of wineries, 26; distilleries, 2; breweries, 2.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 2,432	.....	$4,864
Beeswax	2,500	300
Chicory, 120 acres	1,200,000	24,000
Flax, 160 acres	.....	2,500
Flowers and plants, 6 acres	.....	5,400
Honey	60,800	3,040

STATISTICS OF SAN JOAQUIN COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	736,200	$9,200
Apricots	....	13,000
Asparagus	....	330,000
Blackberries	....	23,750
Beans	14,400,000	450,000
Beets	....	10,000
Cabbage	....	22,000
Celery	....	19,042
Cauliflower	....	13,000
Corn	....	16,400
Currants	....	500
Cherries	....	171,500
Figs	....	15,000
Gooseberries	....	400
Grapes—		
Wine, tons	35,000	920,000
Table, cars	1,200	
Lemons, boxes	1,561	2,230
Loganberries	....	5,318
Nectarines	....	500
Onions	37,800,000	643,500
Oranges, boxes	....	14,528
Olives	....	58,554
Pears	....	22,032
Peaches	....	251,500
Peas	....	24,063
Plums	....	11,040
Irish potatoes, sacks	1,750,000	2,187,500
Sweet potatoes	....	13,500
Prunes	....	67,500
Quinces	....	3,500
Raspberries	....	2,300
Strawberries	....	13,800
Tomatoes	5,920,000	20,720
Melons	....	40,000
Total	....	$6,395,877

Fruit, Vegetables, Etc.—Continued.

Dried—	*Pounds.*	*Value.*
Almonds	....	$32,400
Beans	....	445,000
Chestnuts	....	515
Figs	....	11,000
Onions	....	620,000
Peaches	....	24,300
Peanuts	....	4,000
Prunes	....	63,000
Walnuts	....	4,693
Total	....	$1,204,908

Canned—	*Cases.*	*Value.*
Figs	200	$1,000
Grapes	34,100	127,070
Pears	11,300	70,100
Peaches	55,900	273,830
Plums	4,700	19,600
Tomatoes	25,000	50,000
Squash	2,800	8,400
Asparagus	11,111	65,000
Totals	145,111	$615,000

Manufactured Output.

	Quantity.
Brick	53,250,000
Brooms, dozen	2,500
Cigars	274,000
Flour, barrels	985,000.
Olive oil, gallons	13,750
Soap, pounds	750,000

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	6,000	$36,000

Power used for mills and manufactories in county—Steam, 23; electrical, 59; natural gas, 9; gasoline, 8.

SAN MATEO COUNTY.

San Mateo County adjoins San Francisco on the south, and being on the peninsula, is the natural outlet for San Francisco's surplus population. During the past three years 357 tracts have been subdivided into lots, and thousands of homes erected, both in the Santa Clara Valley on the east of the mountains, and on the ocean or coast side of the county.

Two suburban railroads are now in course of construction through the entire length of the county. These railroads will open up to commerce large fertile sections of the county. The Bay Shore cut-off on the Southern Pacific is completed, which shortens the time thirty minutes to and from San Francisco and all points south of the cut-off. The Dumbarton Bridge and cut-off across San Francisco Bay, east of Redwood City, is nearly completed. This will greatly facilitate the handling of railroad traffic into and out of San Francisco.

Several factories are established along the bay line of the county. Factory sites, ideal locations, are plentiful and many are soon to be utilized.

This county furnishes most of the vegetables, milk and dairy products used in San Francisco.

San Mateo County's tide lands produce the finest oysters, and are utilized by a large oyster company.

The Alaska Codfish Company has a large establishment on the shore line of the bay, where codfish are cured and packed for market.

STATISTICS OF SAN MATEO COUNTY, 1906-7.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	3	11	$17,435
Confectionery	4	7	5,900
Foundries and iron works	1	125	....
Meat products	1	...	....
Hides	..	...	220,000
Lard	..	...	450,000
Meat packed, 2,500 tons	...	...	....
Tallow	..	...	150,000
Olive oil	..	...	200
Planing mills	8	78	2,118,000
Potteries	1	125	1,315,000
Salt	2	20	....
Tanneries	2	274	1,430,000
Fuse works	1	40	100,000
Paint works	1	175	....

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	....	....
Skimming stations	..	424,448	$84,889
Butter, pounds	..	644,150	96,623
Milk, gals	..	1,390,000	278,000
Cream, gals	..	10,000	6,000

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	1,200	$36,000
Stock	3,120	79,000
Dairy cows—Graded	12,220	305,500
Holsteins	680	27,200
Jersey	300	12,000
Shorthorns	400	20,000
Calves	6,820	34,100
Swine	7,485	44,910
Horses—		
Thoroughbred	252	126,000
Common	2,026	121,560
Colts	300	6,000
Mules	50	3,000
Sheep	2,000	10,000
Lambs	350	700
Common goats	150	750
Total stock all kinds	37,353	....
Wool, pounds	8,000	$1,600

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	50,000	$11,500

Number of wineries, 6.

STATISTICS OF SAN MATEO COUNTY, 1906-7—Continued.

General Statistics.

Area, 477 square miles, or 305,280 acres.	
Number of farms	524
Number of acres assessed	294,976
Value of country real estate	$10,908,940
Of improvements thereon	$3,133,005
Of city and town lots	$4,413,410
Of improvements thereon	$1,612,215
Solvent credits and cash	$548,965
Of personal property	$2,932,105
Total value of all property	$23,548,640
Expended on roads, last fiscal year	$87,639
Expended for bridges, last fiscal year	$10,033
Number of miles of public roads	750
Road levy per $100, 1907	50c
Value of county buildings	$23,000
Railroads, steam—miles, 25.10; assessed value	$565,700
Railroads, electric—miles, 14; assessed value	$158,500
Electric power plants—3; assessed value	$244,000
Electric power lines—miles, 61; assessed value	$33,750

Miscellaneous Products.

	Pounds.	Value.
Flowers and plants, acres 200		$90,000

Manufactured Output.

	Quantity.
Brick	2,120,000
Cigars	433,500
Hides, pounds	8,160,000
Lard, pounds	6,500,000
Meat packed, tons	2,500
Tallow, barrels	8,000
Olive oil, gallons	100
Salt, tons	15,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	38,150	5,000	43,150
Apricot	2,600	.....	2,600
Cherry	200	.....	200
Fig	100	.....	100
Olive	9,830	.....	9,830
Orange	150	.....	150
Peach	1,055	.....	1,055
Pear	1,000	.....	1,000
Plum	135	.....	135
Prunes	12,480	1,700	14,180
Total fruit trees	65,700	6,700	72,400
Almond	500	.....	500
Walnut	800	.....	800
Total nut trees	1,300	.....	1,300
Grapevines	182,400	1,000	183,400
Berries, acres	165	.....	165

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	1,200	960	$33,600
Barley	1,600	1,411	46,563
Oats	12,000	7,976	302,088
Corn	30	16	......
Total cereals	14,830	10,363	$382,251
Grain hay	2,700	21,550	$323,250

Fruit, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples	1,375,000	$25,000
Apricots	1,000	500
Blackberries	1,200	96
Beans	300,000	15,000
Beets	200,000	1,000
Cabbage	18,000,000	180,000
Celery	300,000	18,000
Cauliflower	7,000,000	70,000
Corn	100,000	1,500
Grapes	40,000	800
Onions	200,000	4,000
Peas	300,000	15,000
Irish potatoes	3,200,000	32,000
Strawberries, cases	150	1,200
Tomatoes	80,000	800
Total	....	$364,896

Dried—	Pounds.	Value.
Beans	1,119,900	$33,597
Onions	100,000	3,000
Prunes	60,000	3,000
Walnuts	8,000	1,200
Total	....	$40,797

Poultry and Eggs.

	Dozen.	Value.
Chickens	5,930	$23,720
Ducks	150	675
Geese	50	600
Turkeys	75	1,050
Eggs	177,900	35,580
Total value		$61,625

Forest Products.

	Amount.	Value.
Area of timber lands, acres	25,000	$1,250,000
Redwood, acres	25,000	1,250,000
Sawmills, number	5	75,000
Fuel, wood, cords	2,000	10,000
Lumber, feet	10,000,000	200,000
Shingles	7,500,000	15,000
Total value		$2,800,000

Power used for mills and manufactories in county—Steam, 22; electrical, 11.

SANTA BARBARA COUNTY.

Santa Barbara County, to borrow a local expression, is set like a ectangular parallelogram in that angle of the California coast where he shore line bends at Point Concepcion. It is thus, on its entire outhern and western borders, bounded by the Pacific Ocean. Its northrn line is marked by the Santa Maria River, and Rincon Creek and a ine projected northerly from its source separates it from Ventura ounty, its neighbor on the east. The greater part of its area is mounainous, and the eastern section has been formed into the Santa Barbara ational Forest Reserve, and is under the control of the Federal Govrnment. No navigable streams drain the county, but the Santa Maria nd Santa Ynez rivers flow clear across its territory from east to west. mountain range, the Santa Ynez, traverses the county from east to est, dividing it into two great sections, the northern and southern. he first contains four large valleys. In two of these, the Santa Ynez nd Los Alamos valleys, cereals are the principal product. Another, the ompoc Valley, is very fertile, and raises large quantities of varied gricultural products. It is also the location of a new industry—the anufacture of a building material known as diatomous earth. The ourth valley, the Santa Maria, is much the largest and most populous. esides being an agricultural section it possesses a sugar factory located t Betteravia, and on its southern border are the great Santa Maria oil ells. This field last year produced 7,000,000 barrels of oil, and is as et only in its infancy. South of the Santa Ynez range live two thirds f the county's population. The city of Santa Barbara, the county eat, has a population of about 12,000. It possesses a good harbor and xcellent climatic advantages, and is a popular resort. Thirty miles rom the southern coast line are located the Santa Barbara Islands, at resent used for grazing purposes mainly.

STATISTICS OF SANTA BARBARA COUNTY, 1906-7.

General Statistics.

rea, 2,630 square miles.

umber of farms	1,100
umber of acres assessed	1,079,122
alue of country real estate	$8,860,525
f improvements thereon	$1,161,700
f city and towns lots	$4,059,480
f improvements thereon	$3,495,490
f personal property	$3,623,870
otal value of all property	$21,201,065
xpended on roads, last fiscal year	$83,359
xpended for bridges, last fiscal year	$30,000
umber of miles of public roads	1,000
oad levy per $100, 1907	40c
alue of county buildings	$80,000
ailroads, steam—miles, 154; assessed value	$2,885,905
ailroads, electric—miles, 6; assessed value	$35,500
lectric power plants—3 (one assessed)	$84,750

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	21,410	2,110	23,520
Apricot	2,480	1,215	3,695
Cherry	627	400	1,027
Fig	250	100	350
Lemon	96,420	33,840	130,260
Nectarine	100	.....	100
Olive	23,450	9,180	32,630
Orange	880	370	1,250
Peach	6,945	1,280	8,225
Pear	1,380	360	1,740
Plum	100	200	300
Prunes	1,260	240	1,500
Quince	200	100	300
Other kinds	500	500	1,000
Total fruit trees	156,002	49,895	205,897
Walnut	26,460	17,120	43,580
Grapevines	25	......	25
Berries, acres	50	10	60

STATISTICS OF SANTA BARBARA COUNTY, 1906-7—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	17,340	11,132	$278,300
Barley	32,180	26,538	689,988
Oats	11,960	7,894	146,000
Corn	960	400	4,000
Total cereals	62,440	45,964	$1,118,288
Grain hay	28,190	28,190	$281,900

Fruit, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples	745,000	$7,450
Blackberries	112,000	6,500
Beans	15,000,000	500,000
Beets	160,000,000	1,000,000
Corn	800,000	4,000
Cherries	25,000	1,750
Grapes	40,000	1,000
Grape fruit, boxes	500	400
Lemons, boxes	75,000	200,000
Onions	1,500,000	22,500
Oranges, boxes	3,000	4,000
Olives	5,628,000	112,560
Persimmons	700,000	3,000
Irish potatoes	18,750,000	250,000
Strawberries	112,000	9,000
Total	....	$2,122,060

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 1,000	......	$10,000
Flowers and plants, 90 acres	......	25,000
Honey	72,000	5,000
Sugar beets, tons	80,000	1,000,000

Livestock Industry.

	Number.	Value.
Cattle—Stock	25,480	$364,285
Dairy cows—Graded	7,065	139,205
Ayrshire	50	4,000
Jersey	110	4,950
Calves	2,610	15,235
Swine	6,710	55,010
Horses—		
Standard-bred	35	5,000
Common	6,212	266,720
Colts	816	18,895
Jacks and jennies	12	700
Mules	1,642	73,405
Sheep	56,280	112,560
Total stock all kinds	107,022	$1,059,965

Dairy Industry.

	No.	Production.	Value.
Creameries	3	....	....
Skimming stations	2	....	....
Butter, pounds	..	356,000	$106,800

Dried—	Pounds.	Value.
Apricots	5,000	$7,500
Walnuts	3,000,000	450,000
Mustard	3,000,000	90,000
Totals	6,050,000	$547,500

Fish Industry.

	Pounds.	Value.
Various kinds	500,000	$35,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	5,860	$11,740
Ducks	100	500
Turkeys	50	1,000
Eggs	773,520	230,000
Total value		$243,240

Power used for mills and manufactories in county—Steam, 20; electrical, 10.

Manufactories.

	No.	No. of Employes.	Value of Product.
Bookbinderies	1	3	$2,500
Brick	3	28	21,000
Carriages and wagons	7	26	20,000
Cigars	2	8	9,000
Clothing (tailors)	5	30	45,000
Confectionery	5	10	20,000
Electrical suppl's	3	10	5,000
Flouring mills	1	3	6,000
Foundries and iron works	2	15	40,000
Jewelry	4	6	4,500
Leather goods	6	12	10,000
Lard and tallow	6	30	110,000
Olive oil	1	30	40,000
Planing mills	3	45	140,000
Sugar, beet	1	600	1,000,000
Bamboo ware	1	2	500
Diatomous earth	1	20	20,000

Manufactured Output.

	Quantity.
Brick	1,850,000
Cigars	125,000
Lard, pounds	930,000
Tallow, barrels	500
Olive oil, gallons	10,000

SANTA CLARA COUNTY.

Santa Clara County is situated on the south arm of San Francisco Bay, and is separated from the Pacific Ocean by one tier of counties. The county seat is San José, and is distant 50 miles from San Francisco. The county is 47 miles wide from north to south, and through the center runs the favored Santa Clara Valley with an average width of 15 miles. The country from the valley slopes upward through rolling hills to the summit of the Mount Diablo range of mountains on the east, and to the summit of the Santa Cruz Mountains on the west. Its peculiar location with reference to prevailing winds and ocean currents has a marked effect on the climate, rendering it pleasantly cool in summer and not too cold in winter. The average winter temperature is about 40° and in summer 70°. It is preëminently the horticultural county of California. The statistics accompanying this report show the variety and quantity of its products.

Its roads are excellent and make all points easily accessible. More than 300 miles of these roads are sprinkled during the summer months. Three lines of railroads connect it with the outside world. Its population is 70,000. San José, the county seat, has a population of 31,000. Many flourishing towns and valleys are within its borders.

Educational interests are represented by the Leland Stanford Junior University, the Santa Clara College, the University of the Pacific, the College of Notre Dame, and the State Normal School, together with numerous private seminaries and institutions for special educational work. In the public school system there are 8 high schools and 104 grammar and primary schools. The annual expenditure for public schools is $311,500. This is in addition to the municipal expenditures by cities and towns for this purpose. The value of school property is $910,832.

The valley is drained by a number of streams. In summer their water courses greatly diminish and the smaller ones wholly disappear. Having their sources in the surrounding hills and sinking as they approach the valley, they augment the subterranean supply of the artesian wells. These are all over the valley, usually from 60 to 100 feet in depth, though some find a larger and more permanent supply at a much greater depth.

The extent and value of agricultural, horticultural, and industrial interests can be gathered from the accompanying statistics.

STATISTICS OF SANTA CLARA COUNTY, 1906-7.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	24,200	$72,600
Ducks	2,860	11,440
Geese	275	3,300
Turkeys	275	4,950
Eggs	90,200	20,240
Total value		$112,530

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	1,000,000	$250,000
Sweet wines	24,000	24,000
Champagne	278,000	278,000
Brandy	28,500	42,700
Alcohol	1,500,000	1,950,000

Number of wineries, 49; distilleries, 11; breweries, 6.

STATISTICS OF SANTA CLARA COUNTY, 1906-7—Continued.

General Statistics.

Area, 1,355 square miles, or 867,200 acres.

Number of farms	23,403
Number of acres assessed	727,906
Value of country real estate	$22,485,775
Of improvements thereon	$7,587,140
Of city and town lots	$13,436,595
Of improvements thereon	$9,176,575
Of personal property	$5,577,910
Total value of all property	$58,308,545
Expended on roads, last fiscal year	$171,634
Expended for bridges, last fiscal year	$18,091
Number of miles of public roads	976
Road levy per $100, 1907	40c
Value of county buildings	$962,000
Irrigating ditches; cost	$15,000
Railroads, steam—miles, ...; assessed value	$1,870,170
Railroads, electric—miles, ——; assessed value	$481,915
Electric power plants; assessed value	$203,000
Electric power lines; assessed value	$48,215
Number of acres irrigated	125,000

Manufactories.

	No.	No. of Employes.	Value of Product.
Bookbinderies	2	62	$115,000
Wood boxes	3	37	90,000
Brick	4	180	455,000
Brooms	1	2	3,750
Carriages and wagons	13	120	139,650
Coffee, spices, etc.	2	13	135,000
Confectionery	18	37	116,165
Cooper shops	3	21	39,500
Foundries and iron works	13	115	347,000
Furniture	6	14	20,000
Jewelry	2	5	7,800
Leather goods	17	25	81,600
Meat products	..	...	136,000
Hides	..	...	87,500
Lard	..	...	2,900
Tallow	..	...	1,525
Olive oil	..	...	49,500
Pickled olives	..	...	26,900
Planing mills	..	800	2,000,000
Potteries	..	19	33,000
Soap	..	4	3,800
Artificial stone	..	27	132,000
Granite	6	71	$336,950
Tanneries	2	130	395,000
Tin and galvanized iron	6	83	182,780
Wood turning and carving	1	1	2,500
Miscellaneous	93	847	4,802,300

Forest Products.

	Amount.	Value.
Area of timber lands, acres	60,000	$300,000
Oak, acres	50,000	500,000
Redwood, acres	10,000	30,000
Fuel, wood, cords	2,500	....
Sash and door factories, number	6	100,000
Shingles, thousand	2,500	5,775
Total value		$935,775

Power used for mills and manufactories in county—Steam, 207; electrical, 58; water, 2.

Dairy Industry.

	Production.	Value.
Butter, pounds	328,000	$84,000
Cheese, pounds	878,000	175,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	2,185	$81,180
Stock	18,500	386,000
Dairy cows—Graded	6,300	203,750
Herefords	76	3,800
Holsteins	85	6,275
Jersey	57	2,850
Shorthorns	211	10,550
Calves	5,400	41,500
Swine	4,980	48,000
Horses—		
Thoroughbred	113	28,250
Standard-bred	260	39,000
Common	12,410	476,500
Colts	2,200	33,000
Mules	160	3,200
Sheep	865	1,800
Lambs	200	400
Angora goats	125	625
Common goats	410	410
Total stock all kinds	54,537	$1,367,090

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	50	35	$1,120
Barley	1,750	2,015	56,420
Oats	60	60	2,160
Total cereals	1,860	2,110	$59,700
Alfalfa hay	500	2,500	$35,000
Grain hay	25,000	40,000	520,000
Total hay	25,500	42,500	$555,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	16,290	36,000	52,290
Apricot	538,020	10,740	548,760
Cherry	131,000	23,100	154,100
Fig	1,420	530	1,950
Lemon	420	580	1,000
Nectarine	740	475	1,215
Olive	10,120	4,600	14,720
Orange	985	805	1,790
Peach	587,000	41,070	628,070
Pear	120,940	15,720	136,660
Plum	272,000	18,990	290,990
Prunes	3,995,100	362,120	4,357,220
Quince	2,300	295	2,595
Other kinds	56,000	36,140	92,140
Total fruit	5,732,335	551,165	6,283,500
Almond	16,155	4,755	20,910
Walnut	10,055	2,920	12,975
Total nut	26,210	7,675	33,885
Grapevines	855,000	2,544,000	4,399,000

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 370	....	$370
Flowers and plants, acres	136	80,000
Garden seed	3,750,000	695,000
Sugar beets, tons	53,000	160,000

STATISTICS OF SANTA CLARA COUNTY, 1906-7—Continued.

Manufactured Output.

	Quantity.
Brick	43,000,000
Brooms, dozen	800
Cigars	1,897,000
Hides, pounds	763,000
Lard, pounds	35,000
Tallow, barrels	280
Olive oil, gallons	24,750
Soap, pounds	380,000

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	350,000	$77,500
Apricots	2,500,000	97,250
Asparagus	5,000,000	250,000
Blackberries	1,400,000	56,000
Beans	160,000	4,000
Beets	250,000	5,000
Cabbage	300,000	2,000
Celery	100,000	3,000
Cauliflower	120,000	3,600
Corn	1,000,000	20,000
Cherries	1,600,000	100,000
Figs	100,000	4,000
Grapes, table	1,250,000	70,000
Lemons, boxes	1,250	1,000
Loganberries	200,000	9,000
Oranges, boxes	2,500	1,300
Olives	522,500	15,675
Pears	2,000,000	55,000
Peaches	25,000,000	625,000
Peas	960,000	$24,000
Plums	360,000	10,500
Irish potatoes	900,000	16,875
Prunes	45,000,000	900,000
Quinces	200,000	4,000
Raspberries	600,000	36,000
Strawberries	1,000,000	55,000
Tomatoes	20,000,000	100,000
Total		$2,545,700

Dried—	*Pounds.*	*Value.*
Almonds	24,000	$9,600
Apricots	300,000	60,000
Beans	190,000	5,225
Onions	1,200,000	27,000
Pears	30,000	4,250
Peaches	400,000	36,000
Prunes	22,000,000	1,100,000
Walnuts	440,000	15,000
Totals	24,584,000	$1,257,075

Canned—	*Cases.*	*Value.*
Apples	30,000	$60,000
Apricots	50,000	125,000
Cherries	1,500	6,000
Grapes	20,000	50,000
Pears	80,000	240,000
Peaches	70,000	210,000
Peas	25,000	52,500
Plums	20,000	45,000
Tomatoes	250,000	500,000
Totals	546,500	$1,288,500

SANTA CRUZ COUNTY.

Santa Cruz County fronts its entire length on the Pacific Ocean. It lies midway between Oregon and Lower California, and is in the heart of Central California. It is separated from San Mateo and Santa Clara counties by the Santa Cruz Mountains, and from Monterey County by the Pajaro River. It is one of the smallest counties, and comprises a narrow strip of mountainous land about 40 miles long and 18 broad, forming a vast amphitheatre, sloping from the summits of the Santa Cruz Range (whose highest elevation, Loma Prieta, is 4,000 feet) southward and westward to the bay of Monterey.

The curving line of shore and the corresponding curve of the mountain line inclose an irregular, crescent-shaped tract of country, with an average width of 20 miles, which for grandeur, beauty, and variety of scenery equals any expanse of similar size in the world. The sides of the mountains are closely set with forests of pine, redwood, madrone and other trees, the redwoods having, in many cases, attained gigantic growth. A number of streams rise in these hills, and bring down the rich, alluvial loam into the valleys, which, in their normal condition, teem with native grasses and flowers, and when cultivated yield phenomenal results. These streams are, agriculturally as well as topographically, an important feature, watering as they do every section of land. Besides these, natural springs are innumerable. Nearing the coast, there are many interesting topographical features. The leagues of wide, high, grassy plateaus which form remarkable grazing and dairy lands; the succession of chalk terraces; the broad amphitheatrical valley of the Pajaro; the salt lagunas, picturesque in configuration and surrounded by parklike groves of live oaks; the high sandstone cliffs along the shore; the magnificent ocean drives—all are materials for pleasant investigation.

Along the coast line, a series of raised benches form a strip of elevated land. This widens to the south of the city of Santa Cruz, and affords a large area of fruitful soil, which has been brought into a high state of cultivation. From Santa Cruz City south the soil consists of light loam, abounding in lime, potash, and phosphoric acid. In the Pajaro Valley there is a great variety, from the rich sedimentary alluvial wash to the light sandy soil of the foothills. In the lower part of the valley a clayey loam predominates. This is followed by a heavy adobe higher up, and then the dark, reddish loam of the plains. The latter is the favorite with fruit growers, and it is here that flourish the best orchards.

The average annual rainfall, taken from a record of thirty-two consecutive years, is 25.26 inches, showing that this is a well-watered district.

The charm of Santa Cruz is her infinite variety. In lumber products she ranks third in the State. Her butter, cheese and cream might well win her a place in the dairy districts. Hay, grain, potatoes, and the whole range of cereals and vegetables give enormous yields. In the Department of Agriculture at Washington, D. C., there is a record of 130 bushels of wheat per acre raised in the Pajaro Valley, and while she does not claim to wear the "citrus belt," yet oranges are raised for home consumption and the cultivation of the lemon is a profitable business; but her deciduous fruits, large and small, her table and wine grapes, and her fine wines, are winning renown. From the summit of the range, more than 2,000 feet above the sea, down to the wide and fruitful valleys along the coast, grow and flourish delicious fruits. Prunes, pears, apricots, peaches, cherries, Japanese and native plums, figs, walnuts, persimmons, olives and nectarines thrive, but the crop of the largest profit is that of apples, their quality and size being astonishing and their yield as much so. From bellflowers in September to Newtown pippins in December the supply is steady, and in a late season from two depots there were shipped to Eastern points, exclusive of other sales, 420,000 boxes of apples, weighing 21,000,000 pounds. The market for apples extends to England and the continent, Germany being a large buyer. The especial home of the apple, as well as that of the strawberry, is the fertile valley of the Pajaro River, and the flavor and color of the foothill apples are renowned. The exhibition of apples at the Pajaro Valley Fair, during October, 1907, was, according to the best authorities on the subject, never equaled in California either in quality or quantity. This exhibit contained over two carloads of apples, representing over 50 varieties, but the standards of the valley, Bellflowers, Newtowns, Langford's Seedlings, Pearmains and Missouri Pippins predominated. The general excellence of the pack, which was largely commercial (few of the apples having been packed in a fancy manner for exhibition purposes), gained the admiration of experienced apple men. The saying, "Our farmers are our capitalists" is no idle boast in the Pajaro Valley, and one is soon convinced of this fact if a ride is taken over its well-kept roads through miles of orchards and cultivated farms. Watsonville, the trading center of this fertile valley, is the third station in the matter of shipments on the coast division of the Southern Pacific Railroad, and the volume of business is increasing every year. There is now a movement under way to afford this section water transportation through the Pajaro River to Monterey Bay, which will place the producers of this vicinity on an equal footing with any other section of the State.

There were used in the canneries, driers, and vinegar plant 9,103 tons of apples, the output of the same was 16,900 cases of canned apples, 54 cars of evaporated apples, and 315,000 gallons of vinegar. These industries, together with 37 packing houses, furnished employment for over 1,100 persons.

Of the small fruits, the strawberry is the most widely grown and furnishes a practically continuous crop.

In the southern part of the county a large acreage is devoted to the profitable growth of sugar beets, potatoes, beans and onions, and the yield is enormous. Market gardening is profitable.

A great deal of asparagus and rhubarb are grown for outside markets.

Seeds, bulbs, plants, and cut flowers contribute largely to the supply for metropolitan markets.

Dairying is a profitable industry, and thousands of acres of grazing land support well-selected herds of stock.

Poultry raising is profitable, the climate and conditions being well adapted for such industry.

Considerable capital is invested in the deep sea fisheries.

During the fall and winter months, 5,000,000 or 6,000,000 salmon eggs will be hatched and the fry liberated in the bay. Steelhead and rainbow trout abound in all the thirty odd streams.

The forest-covered mountains are a retreat for quail and deer, and the many lagoons and the four beautiful lakes in the Pajaro Valley, in fall and winter, are feeding places for all varieties of wild ducks.

At Santa Cruz the tent city, pavilion, casino and baths, representing an expenditure of $225,000, were opened last season, and this beautiful summer resort had practically the greatest concourse of pleasure seekers on the coast.

Capitola, four miles east of Santa Cruz, can be reached by both steam and electric railroad. This is another beautiful summer resort.

There are two Carnegie libraries in the county, well stocked with the latest works.

The public schools throughout the county are of a high standard, as are also the private schools and colleges. The many fine churches throughout the county represent many of the denominations.

There are many fraternal societies, and a large number of them hold meetings in fine lodge rooms in large buildings of their own.

There are five banks in the county—all sound banking institutions.

The Supervisors have done and are doing good work in road building, and the most mountainous places can now be reached by easy grades.

Santa Cruz, Watsonville, Boulder Creek, Soquel, Aptos, Ben Lomond, Brookdale, Felton, Capitola, Davenport, and Glenwood are the principal cities and towns.

STATISTICS OF SANTA CRUZ COUNTY, 1906-7.

General Statistics.

Area, 500 square miles, or 320,000 acres.

Number of farms	1,765
Number of acres assessed	258,926
Value of country real estate	$4,495,970
Of improvements thereon	$1,678,320
Of city and town lots	$3,915,025
Of improvements thereon	$2,569,340
Of personal property	$1,750,180
Total value of all property	$14,408,835
Expended on roads, last fiscal year	$33,018
Expended for bridges and culverts, last fiscal year	$16,530
Number of miles of public roads	458
Road levy per $100, 1907	60c
Value of county buildings	$162,500
Railroads, steam—miles, 77.09; assessed value	$801,021
Railroads, electric—miles, 12.20; assessed value	$53,045
Electric power plants—2; assessed value	$52,085
Electric power lines—miles, 70; assessed value	$18,500
Number of acres irrigated	1,218

Dairy Industry.

	Production.	*Value.*
Butter, pounds	245,716	$76,171
Cheese, pounds	461,360	46,136
Cream, gals.	10,179	15,260

Number of dairies, 19.

Products Shipped Out of State.

	Quantity.
Apples, fresh, boxes	955,116
Dried, pounds	1,954,000
Canned, cases	16,900
Apricots, dried, pounds	50,000
Blackberries, fresh, pounds	1,012,500
Canned, cases	1,598
Mammoth blackberries, pounds	67,500
Cucumbers, hothouse, pounds	15,000
Cherries, fresh, pounds	321,824
Grapes, fresh, pounds	6,251,026
Loganberries, fresh, pounds	450,000
Onions, dried, pounds	1,400,000
Pears, fresh, pounds	385,700
Peaches, fresh, pounds	2,633,800
Canned, cases	393
Plums, fresh, pounds	505,590
Irish potatoes, pounds	8,000,000
Raspberries, fresh, pounds	153,300
Strawberries, fresh, pounds	300,000
Tomatoes, canned, cases	500
Beans, dried, pounds	3,000,000
Horse beans, pounds	200,000
Prunes, dried, pounds	700,000
Wines, gallons	454,800
Vinegar, cider, barrels	6,300
Cheese, pounds	415,224
Hops, pounds	100,000
Bituminous rock, tons	32,130
Cement, barrels	2,190,000
Lime, barrels	270,767
Powder, kegs	500,000
Leather goods, sides	50,000
Glue, pounds	72,000

STATISTICS OF SANTA CRUZ COUNTY, 1906-7—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	259	195	$6,630
Barley	317	238	7,140
Oats	1,442	1,080	43,200
Corn	425	531	15,930
Total cereals	2,443	2,044	$72,900
Alfalfa hay	225	1,012	$10,120
Grain hay	5,000	9,625	134,750
Total hay	5,225	10,637	$144,870

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	584,548	112,758	697,306
Apricot	57,357	19,429	76,786
Cherry	21,197	5,885	27,082
Fig	205	159	364
Lemon	83	91	174
Olive	494	192	686
Orange	142	70	212
Peach	14,459	889	15,348
Pear	15,428	1,579	17,007
Plum	16,853	3,179	20,032
Prunes, French	121,496	6,050	127,546
Quince	134	.....	134
Other kinds	4,085	.....	4,085
Total fruit trees	836,481	150,281	986,762
Almond	355	70	425
Walnut	5,301	3,832	9,133
Total nut trees	5,656	3,902	9,558
Grapes, acres—			
Table	660	335	995
Wine	745	954	1,699
Total	1,405	1,289	2,694
Strawberries, acres	330	.....	330
Raspberries "	24	.....	24
Loganberries "	40	23	63
Blackberries "	90	25	115
do. Mammoth "	9	.....	9
Dewberries "	2	.....	2
Total acres	495	48	543

Forest Products.

	Amount.	*Value.*
Sawmills, number	9	....
Fuel, wood, cords	72,811	$364,055
Lumber, feet	14,380,000	431,400
Pickets, pieces	4,450,190	186,907
Piles	1,500	9,000
Posts, pieces	1,569,150	219,681
Railroad ties, pieces	15,040	9,024
Shakes	9 638,000	173,493
Shingles	101,214,000	253,035
Tanbark, cords	5,600	89,600
Grapestakes	3,081,050	92,431
Total value		$1,828,626

Power used for mills and manufactories in county—Steam, 25; electric, 4; water, 1.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	7,183	$43,098
Ducks	145	725
Geese	125	1,500
Turkeys	185	3,700
Eggs	783,600	195,800
Total value		$244,823

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	1,000	$19,000
Dairy cows—Common	4,329	103,715
Oxen	82	1,910
Calves	1,299	7,794
Swine	2,933	14,625
Horses—		
Thoroughbred	14	5,600
Standard-bred	94	14,400
Common	4,953	123,825
Colts	280	5,600
Mules	143	8,540
Angora goats	797	3,985
Sheep—Imp. or fine	15	150
Graded	245	1,225
Common	1,740	5,220
Lambs	700	1,400
Total stock all kinds	18,624	$316,989

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 1,350	......	$2,700
Flowers, plants, and bulbs, acres	15	15,000
Honey	20,250	2,025
Hops	100,000	8,000
Bituminous rock, tons	32,130	96,390
Horse beans, lbs.	200,000	5,500
Pumpkins, tons	500	1,500
Pelts, number	6,622	2,648

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	1	...	......
Berry baskets	..	...	$3,390
Wood boxes	2	...	7,500
Boxes, shooks	..	...	7,680
Berry drawers	..	...	1,452
Carriages and wagons	4	10	18,645
Cement	1	500	3,832,500
Cigars	2	16	28,350
Berry chests	1	...	3,600
Confectionery	5	22	45,175
Lime barrels	2	6	13,538
Foundries and iron works	1	6	13,824
Leather goods, harness, etc.	6	9	30,000
Lime	3	325	317,041
Meat products	12	57	......
Hides	..	...	37,141
Lard	..	...	19,269
Meat packed	..	...	10,375
Tallow	..	...	6,682
Powder kegs	1	160	800,000
Planing mills	5	121	509,000
Soap	2	5	18,900
Tanneries	1	50	300,000
Ice, tons	1	10	20,000
Glue	1	3	8,640

Manufactured Output.

	Quantity.
Cement, barrels	2,190,000
Cigars	630,000
Lime, barrels	270,767
Hides, pounds	309,510
Lard, pounds	192,690
Meat packed, pounds	83,000
Tallow, barrels	439
Soap, pounds	378,000
Powder kegs	500,000
Leather goods, sides	50,000
Glue, pounds	72,000
Ice, tons	3,650

STATISTICS OF SANTA CRUZ COUNTY, 1906-7—Continued.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Claret	454,800	$90,960
Riesling	35,000	12,250
Beer, barrels	14,920	115,520
Cider, bottled	3,650	2,190
Vinegar	315,000	31,500

Number of wineries, 12; breweries, 3.

Fish Industry.

	Pounds.	*Value.*
Various kinds	1,576,814	$47,304

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	65,961,850	$791,542
Apricots	250,000	8,750
Asparagus	3,250	406
Blackberries	1,012,500	33,750
Beets, sugar	10,000,000	25,000
Cucumbers, hothouse	15,000	1,125
Cherries	321,824	22,527
Figs	41,000	5,125
Grapes	6,251,026	125,020
Loganberries	450,000	18,000
Onions	1,400,000	21,000
Pears	385,700	$3,857
Peaches	2,633,800	39,507
Plums	505,590	7.587
Irish potatoes	8,000,000	120.000
Quinces	13,450	269
Raspberries	153,300	12,264
Strawberries	3,300,000	231,000
Tomatoes	60,000	1,200
Mammoth blackberries	67,500	4,050
Dewberries	5,900	472
Totals	100,831,690	$1,472,451
Dried—	*Pounds.*	*Value.*
Almonds	7,100	$1,065
Apples	1,594,000	151,430
Apricots	50,000	10,000
Beans	3,000,000	90,000
Prunes	700.000	35,000
Walnuts	106,020	13,252
Totals	5,457,120	$300,747
Canned—	*12-gal. Cases.*	*Value.*
Apples	16,900	$63,912
Blackberries, gals.	19,167	6,000
Peaches	393	2.361
Tomatoes, cases	500	850
Total	......	$73,123

SHASTA COUNTY.

Shasta County is at the head of the Sacramento Valley. Its greatest length from east to west is 90 miles, and its greatest breadth from north to south is 60 miles.

The mountains of the Sierra Nevada and Coast Range cover a large portion of the county on all sides except the south. They are rugged and lofty, rising more than 5,000 feet above the sea. On the east there are four peaks of special prominence. Lassen Peak, altitude of 10,577 feet, is timbered for two thirds of the way up; the others are bald, and usually covered with snow. Other peaks and buttes are numerous, and all indicate volcanic origin, as shown by extinct craters, cones, sulphur deposits, beds of lava, etc. Hot and boiling springs are of frequent occurrence. In the southern portion is a foothill region, half circular, forming the northern end of the Sacramento Valley proper, and embracing about 500,000 acres, the altitude of which is from 500 to 2,500 feet above sea level. The southwestern portion of this region is a succession of rounded hills, varying in height from 50 to 200 feet, and the central and southern portion consists of table-lands, varying in altitude from 500 to 700 feet. It has many narrow valleys.

Shasta is noted for the number and beauty of its streams. First in importance is the Sacramento River, flowing through the county from north to south; all but 20 miles is through a rocky cañon. The McCloud River, bursting from Mount Shasta's side, rushes through the mountains of the north in a southerly direction and empties into Pitt River. The most beautiful stream of the northeast is Fall River. In its meanderings it is 40 miles in length, and empties into the Pitt. Besides these larger streams there are a score of tributaries, while springs abound in the foothills and mountains.

The soil of the valleys is an alluvium, a rich sedimentary deposit, largely intermixed with disintegrated rock, and in some parts with a gravel. The usual color is light red or reddish brown. It is very fertile, and excellent for plums, prunes, pears, figs, and small fruits. The mesa lands bordering the valleys are of a sandy loam, with a large percentage of clay, and carrying in many portions, especially in the higher parts, considerable gravel and bowlders. Fruit does well on these mesa lands. On the foothills is a red loam or clay, productive and adapted to berries. On the elevated plateaus of the north and northwest the soil varies from a black, sandy loam to a red loam or clay, while to the southwest the soil is generally adobe, productive of grain and rich in natural grasses.

Irrigation is unnecessary for most crops, as the rainfall is sufficient. The rainy season begins in September and extends, at intervals of two or three weeks, from that time until May. During this time the ground is thoroughly saturated with moisture, and the rainy period covers the entire growing season. At the end of the wet season grains, grasses, etc., are ready for the harvest, and fruits, grapes, etc., are beginning to ripen.

Beautiful resorts and health-giving springs abound. The high mountains are heavily timbered with sugar pine, cedar, fir, and other valuable timbers. There are some large valleys and extensive plateaus, mostly devoted to general farming, stock raising, and wool growing. The foothills are more or less timbered with oak and pine, and their higher portions yield all kinds of minerals and stone—gold, silver, copper, iron, platinum, quicksilver, lead, marble, sandstone, limestone, coal, onyx, etc.—affording also opportunities for lovely homes to the small farmer, fruit grower, stock raiser, poultryman and gardener. The climate is pleasant, not extremely hot in summer nor cold in winter. The valleys are fertile and capable of producing all things grown in the temperate or semi-tropical regions. At certain altitudes, crisp and luscious apples are produced, and the quantity and quality can not be surpassed.

Shasta orchards are a success, producing heavy crops and of the best quality. The prune, peach, pear, plum, apple, apricot, almond, fig, lemon, orange, and olive thrive. Grapes of wine, table, and raisin varieties have proven a success in the valley portions, and many gallons of wine are made and shipped to different parts of the country; so with raisins. Wheat, grass, and alfalfa are grown successfully. The markets are the best, as there is home consumption for everything produced except fruit, and hundreds of carloads in addition to the products raised here are shipped in annually, consisting mostly of grain, hay, butter, eggs, and vegetables. The home seeker will find land adapted to grain growing, hay making, poultry raising, or gardening at less prices than in the older settled portions of the State.

Stock raising is an important factor. The mild winters in the lower altitude obviate the necessity of feeding, while the summer ranges in the mountains make it possible for the stock raiser to keep his herd upon green feed the greater portion of the year.

The sawmills annually distribute thousands of dollars for labor. The Terry Lumber Company's mills are the largest in the county. They are connected with Bella Vista by flume, and there have planing mills, yards and dryhouses, and a railway to the main line at Anderson. The wood camp is in the big bend of the Pitt, and has been sending thousands of cords of wood annually down the Pitt to the smelters. In the Shingletown country there are several large sawmills, and there have been graded about twenty-five miles of road for traction-engine work. Over this road, with engines, they transport their lumber to the railroad. At or near Whitmore there are also a number of sawmills. There are some large flouring mills.

The resorts are numerous and easy of access.

Redding, the county seat, is one of the most beautifully located places on the Pacific Slope, commanding a view of both the Sierra and Coast ranges, with their lofty, snowclad peaks, and an equally beautiful view of the Sacramento south and cañon north.

The next town of importance is Keswick, at the smelters of the Iron Mountain Company, six miles from Redding.

Shasta, once the county seat, is famous the State over for its former glory.

Anderson, on the California & Oregon Railroad, 12 miles south from Redding, is the chief shipping point for the fruit industry of the county. The country surrounding the town is largely valley land, and thousands of acres of bearing orchards are tributary to it.

While Shasta's preëminence in mineral production is largely due to the development in copper, her output in the more precious metals is very large, and the production of these metals as a by-product of the copper sulphide ores will, with the extension of the industry, exceed the present output many times.

Statistics showing the "Mineral Productions" of Shasta County for the last preceding year are included herein. These items are important to the county and State, as a vast amount of revenue is derived therefrom.

The production of copper in Shasta County, although a great and growing industry, is yet in its infancy, having almost doubled in the past year.

In an agricultural way, Shasta County has, besides her vast output of grain, fruit, and stock, important possibilities yet in their experimental stage. A great many crops that can be grown at immense profit have only been tested, the large land holdings being occupied in raising less profitable crops that admit of greater investment.

Irrigation is receiving more notice than ever before, and as our choicest lands, of which the acreage is large, lie along the numerous streams of the county, where water in abundance is easily and cheaply accessible, together with the fact that our climate is such as to admit of the successful growth of semi-tropical vegetation, this feature is destined to become an important one.

STATISTICS OF SHASTA COUNTY, 1906-7.

General Statistics.

Area, 4,050 square miles, or acres.	2,590,000
Number of farms	1,000
Number of acres assessed	1,360,928
Value of country real estate	$7,194,210
Of improvements thereon	$1,723,164
Of city and town lots	$725,715
Of improvements thereon	$1,117,710
Of personal property	$146,400
Total value of all property	$14,589,917
Expended on roads, last fiscal year	$37,228
Expended for bridges, last fiscal year	$22,000
Number of miles of public roads	1,000
Road levy per $100, 1907	35c
Value of county buildings	$110,000
Irrigating ditches—miles, 83; cost	$5,750
Railroads, steam—miles, 119; assessed value	$2,408,612
Railroads, electric—miles, 4½; assessed value	$13,500
Electric power plants—3; assessed value	$233,225
Electric power lines — miles, 183¾; assessed value	$94,500
Number of acres irrigated	3,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	3,600	2,300	$75,900
Barley	2,800	2,000	66,000
Oats	400	200	7,000
Total cereals	6,800	4,500	$148,900
Alfalfa hay		5,000	$60,000
Grain hay		3,500	42,000
Grass hay		7,500	45,000
Total hay		16,000	$147,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	2	60	$30,800
Cigars	3	5	10,150
Confectionery	3	5	3,600
Flouring mills	1	4	15,000
Foundries and iron works	1	35	70,000
Lime	2	35	11,200
Meat products—			
Hides	..	...	22,000
Lard	..	...	5,160
Tallow	..	...	2,250
Planing mills	3	60	.....

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	300	$1,350
Ducks	40	320
Geese	25	250
Turkeys	550	13,200
Eggs	...	1,125
Total value		$16,195

Manufactured Output.

	Quantity.
Brick	3,850,000
Cigars	203,000
Flour, barrels	3,000
Lime, barrels	11,500
Hides, pounds	244,800
Lard, pounds	43,050
Tallow, pounds	50,000

Miscellaneous Products.

	Pounds.	*Value.*
Hops	70,000	$7,000

STATISTICS OF SHASTA COUNTY, 1906-7—Continued.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	350,000	....
Sawmills, number	10	$38,000
Charcoal, sacks	18,000	....
Fuel, wood, cords	2,250	11,250
Laths	100,000	300
Lumber, feet	25,750,000	500,000
Posts, pieces	12,000	12,000
Shakes	1,000,000	8,000
Total value		$569,550

Power used for mills and manufactories in county—Steam, 10; electrical, 1.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	15,000	1,000	16,000
Apricot	500	.....	500
Cherry	500	.....	500
Fig	800	.....	800
Lemon	250	.....	250
Olive	9,000	.....	9,000
Orange	800	.....	800
Peach	25,000	3,000	28,000
Pear	20,000	.....	20,000
Plum	1,000	.....	1,000
Prunes	70,000	2,000	72,000
Other kinds	6,500	.....	6,500
Total fruit trees	149,350	6,000	155,350
Almond	3,500	.....	3,500
Walnut	250	.....	250
Total nut trees	3,750	.....	3,750
Grapevines, acres	40	.....	40
Berries, acres	80	.....	80

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	110,500	$2,100
Apricots	14,000	300
Blackberries	34,000	1,500
Cabbage	50,000	1,000
Cherries	9,000	450
Figs	75,000	750
Grapes	350,000	3,500
Loganberries	5,500	210
Onions	20,000	400
Olives	87,000	4,000
Pears	2,410,000	72,300
Peaches	3,940,000	98,500
Plums	40,000	$600
Irish potatoes	210,000	3,400
Sweet potatoes	10,500	325
Prunes	7,968,000	.....
Strawberries	35,000	2,000
Tomatoes	92,000	1,380
Totals	15,460,500	$192,715
Dried—	*Pounds.*	*Value.*
Almonds	18,000	$1,800
Apples	7,000	250
Apricots	1,000	100
Beans	26,000	1,000
Figs	4,000	250
Onions	10,000	200
Pears	2,500,000	20,000
Peaches	672,000	80,640
Prunes	5,050,000	202,000
Totals	8,138,000	$306,240

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	3,500	$87,500
Stock	21,500	322,500
Dairy cows—Graded	300	1,500
Herefords	50	3,000
Holsteins	3	375
Shorthorns	100	6,000
Calves	4,500	45,000
Swine	9,000	45,000
Horses—		
Thoroughbred	3	2,500
Standard-bred	40	8,000
Common	3,500	175,000
Colts	625	18,700
Mules	275	3,750
Sheep	20,000	90,000
Lambs	5,500	16,500
Common goats	9,846	16,962
Total stock all kinds	78,742	$844,287
Wool, pounds	160,000	$12,000
Mohair, pounds	39,384	9,846

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry and sweet wines, and champagne	1,200	$600

Dairy Industry.

	Production.	*Value.*
Butter, pounds	40,000	$12,000

SIERRA COUNTY.

Sierra County has an area practically all mountainous. The altitude ranges from 2,000 to 8,600 feet, the highest elevation being that of the Sierra Buttes; but the greater portion has an elevation of from 4,000 to 5,000 feet.

The main ridge of the Sierra Nevadas crosses the eastern part from south to north. Several spurs traverse the county from east to west, forming the watersheds of the four principal streams which make the drainage system of the western part. These streams consist of the Middle Yuba River on the south, the North Yuba near the center, and Cañon Creek and Slate Creek on the north; and in the eastern end the many streams that form the headwaters of the Feather and Truckee rivers. Of the peculiar topographical features are the expansive valleys and lakes lying among the loftiest peaks of the Sierras. The lakes vary from one eighth of a mile to three or four miles in length, most of them circular, and, considering their small size, remarkable for their depth.

The important body of agricultural land is Sierra Valley. It extends over the boundary line into Plumas County, and is the largest and the most elevated of the valleys of the Sierras, being 4,750 feet above sea level. It is 30 miles in length and 10 in width. This valley is particularly adapted to stock raising and dairy purposes, and a fine quality of timothy and alfalfa hay is raised. There are several creameries in the valley, and a superior quality of butter is made, of which almost all is shipped to the outside. Considerable beef cattle are fattened for San Francisco and other markets, besides large shipments of sheep. The soil is a deep, black loam, largely admixed with rich vegetable mold, the result of ages of forest growth.

Since 1849 the principal industry has been gold mining. One hundred and ninety millions of dollars have been taken from its rivers, gravel deposits and quartz veins.

The greater portion is practically covered with a virgin belt of soft timber. The lumber cut runs into many millions of feet. The Floriston Paper Mill Company owns timber lands, and uses a large amount of Sierra County timber.

Population, according to census of 1900, was 4,017.

Average temperature winter 47°, summer 72°, summer nights are pleasantly cool.

Annual rainfall, about 60 inches.

Character of agricultural soil: black loam, very rich.

The principal towns are: Downieville, Forest City, Sierraville, Loyalton, Sierra City.

Natural products: white, yellow, and sugar pine, fir, spruce, and cedar, livestock, fruit, berries, and garden truck.

Manufactured products: lumber, boxes, sashes, doors, etc., creamery butter.

Minerals: gold, iron, copper, asbestos, and lime.

Irrigation and power facilities are unlimited.

Transportation facilities: Boca & Loyalton Railroad, Central Pacific Railway, Nevada-California-Oregon Railway, and Hobart-Mills Railroad. Communication facilities: Sunset Telephone Company, Western Union Telegraph Company, and Sierra Valley Telegraph Company.

Educational facilities: first-class common and grammar schools.

Health resorts: Campbell's Hot Springs, Webber, Independence, and Gold lakes.

Hunting and fishing abundant—trout, mountain quail, grouse, duck, snipe, deer, and bear.

STATISTICS OF SIERRA COUNTY, 1906-7.

General Statistics.

Area, 1,000 square miles, or 640,000 acres.

Number of farms	105
Number of acres assessed	320,422
Value of country real estate	$1,203,185
Of improvements thereon	$183,505
Of city and town lots	$63,860
Of improvements thereon	$322,950
Of personal property	$256,910
Total value of all property	$2,030,410
Expended on roads, last fiscal year	$11,410
Expended for bridges, last fiscal year	$4,077
Number of miles of public roads	300
Road levy per $100, 1907	50c
Value of county buildings	$14,000
Railroads, steam—miles, 29.48; assessed value	$278,480
Electric power plants—5; assessed value	$9,500
Number of acres irrigated	20,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	243	114	$3,990
Barley	311	218	6,540
Oats	208	79	2,528
Rye	40	12	360
Total cereals	702	423	$13,418
Alfalfa hay	1,217	2,145	$16,086
Grain hay	1,153	1,257	8,799
Grass hay	14,471	15,638	117,285
Total hay	16,841	......	$142,170

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	5,738	342	6,080
Cherry	155	24	179
Peach	382	50	432
Pear	384	32	416
Plum	356	75	431
Quince	20	...	20
Total fruit trees	7,035	523	7,558
Chestnut	30	10	40
Walnut	25	20	45
Total nut trees	55	30	85

Wines, Brandies, Etc.

	Barrels.	Value.
Beer	286	$3,432

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 150	.....	$1,200
Honey	4,000	600

Livestock Industry.

	Number.	Value.
Cattle—Beef	3,050	$91,500
Stock	4,600	92,000
Dairy cows—Graded	1,900	76,000
Herefords	75	4,500
Shorthorns	75	4,500
Calves	1,500	12,000
Swine	815	4,890
Horses—		
Standard-bred	3	1,500
Common	1,050	84,000
Colts	183	5,490
Mules	47	3,760
Sheep	1,556	6,224
Lambs	830	3,220
Common goats	100	200
Total stock all kinds	15,784	$389,784
Wool, pounds	6,450	$1,290
Mohair, pounds	200	40

Fruit, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples	285,000	$5,700
Cabbage	30,000	600
Cherries	3,000	1,500
Onions	7,000	140
Plums	4,000	80
Irish potatoes	366,000	8,550
Totals	727,000	$16,680

Forest Products.

	Amount.	Value.
Area of timber lands, acres	200,000	$600,000
Sawmills, number	13	89,500
Fuel, wood, cords	22,400	36,000
Laths	1,300,000	3,150
Lumber, feet	40,000	698,000
Railroad ties, pieces	15,500	4,960
Sash and door factories, number	1	2,000
Shingles	800,000	2,400
Total value		$1,436,010

Power used for mills and manufactories in county—Steam, 10; water, 6.

Manufactories.

	No.	No. of Employes.	Value of Product.
Wood boxes	4	120	$85,000
Foundries and iron works	1	2	2,000
	No.	Pounds.	Value.
Meat products	10	.....	.....
Hides	..	1,950	$7,800
Lard	..	6,900	690
Tallow	..	29,000	1,160

Dairy Industry.

	Pounds.	Value.
Butter	286,600	$71,650

SISKIYOU COUNTY.

Siskiyou is one of the northern counties of the State, adjoining Oregon on the north for 80 miles. Of its area of 6,048 square miles 1,500 are valley, and the remainder mountainous. Among the mountains are many farms and stock ranches well watered and wooded. It contains large areas of farming, mining, desert, swamp and timber lands. The so-called desert lands are very fertile, and when water is applied produce abundant crops. The swamp lands when drained are also exceedingly fertile. The Federal Government is at present engaged in a comprehensive plan of drainage and reclamation in the northeastern portion of this county and southern Oregon, which contemplates the drainage of the swamp lands and the use of the waters in the irrigation of the desert lands; this will make homes for thousands of settlers.

The mining section comprises the west half of the county, and produces nearly $1,000,000 in gold annually. A system of immense ledges of copper ore has recently been discovered, which when more fully developed will add much to the mineral output. There are large deposits of iron ore, limestone, granite, marble of the finest quality, and sandstone that owing to the absence of lime is regarded as the best on the coast. The only jade mine in the United States is located in the western portion of the county.

The agricultural lands are chiefly comprised in Scott Valley in the western portion of the county, Shasta Valley, and Little Shasta in the central portion, and McCloud and Butte Creek valleys in the eastern portion. At the different elevations all fruits and vegetables common to the temperate zone thrive.

Timber is everywhere. There are thousands of sections that will cut from 10,000,000 to 20,000,000 feet of yellow and sugar pine, besides large quantities of red fir and cedar.

The Sierra Nevada and Coast Range mountains meet here, the altitude ranging from 2,000 feet in the valleys to 14,500 on the mountain peaks. There are localities where snow seldom falls and regions of perpetual snow, these conditions making it one of the most scenic of the counties.

Many of the swift mountain streams and waterfalls have been harnessed for electrical power, and chief among these is the Siskiyou Electric Power plant at Fall Creek, which is the third largest in the State and supplies cheap and abundant power to all parts of the county. Power sufficient to run the machinery of the entire State can be developed from the abundant water power.

The principal river is the Klamath, which with its tributaries drains almost the entire county. This stream is not navigable and furnishes a natural dumping ground for the placer mines, its swift current carrying the tailings out to the ocean.

The Southern Pacific Railroad passes through the county from north to south, entering near Dunsmuir, where are located its roundhouse and machine shops, and leaving it at Coles at the base of the Siskiyou Mountains.

The scenic beauty and health-giving springs abounding in all portions of the county make this the Mecca of the summer tourist and health seeker. Chief among the noted resorts are Shasta Springs, Neys Springs, Shasta Retreat and Upper Soda Springs, all situated in the Sacramento Cañon; Sisson at the base of Mount Shasta, Garretsons Springs in the Siskiyou Mountains, and Klamath Hot Springs on the Klamath River.

In all portions of the county fish and game abound, making it an ideal field for the sportsman.

Some of the largest pine lumber mills on the coast are located here, chief among which are the McCloud and Weed lumber plants. Vast areas of the timber lands after the removal of the timber make valuable farms.

Lumbering is the leading industry, with mining and livestock a close second and third.

The mountain region furnishes splendid range during the summer season for thousands of horses and cattle. New gold mines are being discovered, and old ones continue with depth.

Yreka, the county seat, is the principal town. The courthouse, jail, hospital, and county high school are splendid buildings. Two electric plants furnish light and power. The city owns its own water system; water is obtained from the adjacent mountains, and being filtered through gravel beds is as pure as any in the State.

The county is entirely out of debt, and has the lowest tax rate in the State.

All this, added to our present prosperity, our temperate climate and natural advantages, assures for Siskiyou County a bright future.

STATISTICS OF SISKIYOU COUNTY, 1906-7.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	140,000	75,000	$2,250,000
Barley	4,000	2,400	72,000
Oats	2,000	1,500	45,000
Total cereals	146,000	78,900	$2,367,000
Alfalfa hay	.....	75,000	$600,000
Grain hay	.....	10,000	100,000
Grass hay	.....	25,000	250,000
Total hay	.....	110,000	$950,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	15,350	3,000	18,350
Apricot	600	.....	600
Cherry	1,000	150	1,150
Nectarine	200	.....	200
Peach	4,500	1,000	5,500
Pear	2,600	500	3,100
Plum	3,000	600	3,600
Prunes	3,000	600	3,600
Total fruit trees	30,250	5,850	36,100
Walnut	300	.....	......
Berries. acres	25	.....	......

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	7,500,000	$150.000
Apricots	60,000	1,800
Beans	10,000	400
Beets	100,000	1.500
Cabbage	190,000	3.800
Onions	60,000	1,200
Pears	430,000	8.600
Peaches	290,000	11,600
Plums	300,000	6.000
Irish potatoes	5,000,000	100.000
Prunes	200,000	8.000
Strawberries	15,000	1.500
Tomatoes	200,000	5.000
Totals	14,355,000	$290.400

Forest Products.

Area of timber lands. 2,000,000 acres, valued at $3,000,000,000; sawmills. 40: lumber, 160,000,000 feet.

Miscellaneous Products.

	Pounds.	*Value.*
Bees. hives, 2,000	......	$5,000
Honey	100,000	10,000

STATISTICS OF SISKIYOU COUNTY, 1906-7—Continued.

General Statistics.

Area, 6,048 square miles, or acres.	3,870,720
Number of farms	950
Number of acres assessed	1,841,976
Value of country real estate	$8,564,550
Of improvements thereon	$1,269,970
Of city and town lots	$288,600
Of improvements thereon	$802,150
Of personal property	$1,996,553
Total value of all property	$12,921,823
Expended on roads, last fiscal year	$43,915
Expended for bridges, last fiscal year	$7,735
Number of miles of public roads	1,000
Road levy per $100, 1907	40c
Value of county buildings	$100,000
Irrigating ditches—miles, 250; cost	....
Railroads, steam—miles, 150; assessed value	....
Electric power plants—1; assessed value	$21,000
Electric power lines—miles, 80; assessed value	$30,000
Number of acres irrigated	16,250

Poultry and Eggs.

	Dozen.	Value.
Chickens	6,000	$30,000
Eggs	300,000	100,000
Total value		$130,000

Livestock Industry.

	Number.	Value.
Cattle—Beef	6,000	$240,000
Stock	30,000	600,000
Dairy cows—Graded	3,500	105,000
Calves	6,000	60,000
Swine	8,000	100,000
Horses—		
Standard-bred	10	15,000
Common	6,000	900,000
Colts	1,500	75,000
Jacks and jennies	6	6,000
Mules	500	75,000
Sheep	12,000	60,000
Angora goats	600	3,000
Total stock all kinds	74,116	$2,239,000
Wool, pounds	60,000	$12,000
Mohair, pounds	1,500	750

Manufactories.

	No.	No. of Employes.	Value of Product.
Wood boxes	6	400	$1,000,000
Cigars	3	10	20,000
Flouring mills	3	10	100,000

Manufactured Output.

	Quantity.
Cigars	300,000
Flour, pounds	5,000,000

SOLANO COUNTY.

Solano County is midway between the northern and southern extremities of the State. It is not exactly square, but about 40 miles from north to south, and averages almost as much east to west.

Swamp lands border on the Sacramento River and on Suisun and San Pablo bays. A large portion of the county—about two thirds—is valley, the remainder being foothills. The slopes and smaller valleys are noted for their early production of fruit and vegetables.

The soil varies from red gravel to black sandy loam; from barren patches of alkali to rich alluvium; and all classes of soil may be found. That of the swamp and overflowed lands is largely composed of decayed vegetable matter, admixed with sedimentary deposits. In the trough of Vaca Valley the soil varies from a sandy to a clayey loam, and sometimes to adobe. Throughout the hilly land to the east and northeast of Ulattis Creek it varies from sandy to clayey, according to the character of the parent formation. Experience has proved that the heavier soils are the best for pears, and the more sandy for peaches and apricots. In wells dug in this district the surface soil varies from 1 to 10 feet in depth, beneath which sandstone, interstratified with shale, exists to a depth of about 200 feet.

Solano ranks among the leading horticultural counties, and during the past ten years has made wonderful strides. In climate and soil Solano is eminently adapted to horticultural pursuits, and the earliness and superiority of her fruit products have given her a national reputation. In Vaca Valley fruit and vegetables ripen and find their way to market in the early season. This valley is 12 miles long and 2 wide, and owes its advantages to elevation, location, and surroundings—the encircling hills protecting it from chilling winds, and the slopes giving to it the full benefit of the spring sunshine, while the deep, rich, fertile soil gives all the required constituents for plant life. Fruit trains leave daily during the season for the East. The earliness with which fruits ripen in the Vaca and Pleasant valleys is attested by the fact that cherries are shipped early in April, and apricots early in May, with all others proportionately. Vegetables are grown in large quantities, and find a ready sale in the San Francisco market.

The chief fruit sections are Suisun, Vacaville, and Laguna, and the principal varieties of fruits grown are apricots, peaches, pears, plums, prunes, and table grapes. A large proportion of the crop is shipped green for table use.

The livestock and dairying interests are extensive and profitable.

Poultry interests are quite large and increasing every year, and a profitable field is open to this industry.

The tule land itself is but the richest soil in process of slow formation, and throughout its broad area, particularly along its border, may be found some of the best dairying sections of the State. But in the wheat ranches of the Montezuma Hills may be found a part of the

45,000 acres which go to make up eastern Solano, and which are about evenly divided into lowland and upland. Here the yield is large, and the production certain.

The grain sections of the county are rich by nature's gifts, and by the accumulations of her people. It is not every locality which can boast millionaires whose lives have been devoted to wheat growing, but they can be found in this county.

In manufacturing Solano County is prominent, with the location of the navy yard at Mare Island, opposite Vallejo. In Benicia, in addition to the Government arsenal, there is an extensive manufactory of agricultural implements, also extensive tanneries, which are continually being enlarged. The Bay Counties power line, which traverses Solano County transversely from the northeast to the southwest, furnishes Dixon, Elmira, Vacaville, Suisun, Fairfield, Cordelia, Benicia, and Vallejo a potentiality that surpasses Holyoke or Fall River as manufacturing centers. It is being taken advantage of north of Suisun by an extensive plant for making cement. Benicia is a former State capital, as was Vallejo, has a population of several thousand, a climate that is cool and exhilarating, and is an attractive residence location tributary to San Francisco.

Vallejo is the metropolis of the county. It is a money city. It is a progressive city. Its people are up and doing. They have abundant faith in public utilities, and they practice it as well. The spirit of self-reliance predominates. It is coming to be a city of homes. Located on a magnificent waterway, and built on hills that lend grandeur to the view; with a climate that is balmy with the rigor of sea air, equable in its character, and practically free from fogs, Vallejo is an ideal residence city. There is an air of stability in its physical makeup. Ever since the Mare Island Navy Yard, its chief dependence, was taken from a political and placed upon a civil-service basis, thus insuring retention of employés regardless of changes in national administrations, Vallejo has been advancing. One good thing has led to another as the result of this policy, and not the least meritorious is the confidence it gives the people to engage in business for themselves. It owns and operates its own water works. The system is a gravitation one, the water being brought to the city from the mountains 15 miles distant in a direct line. No city in the State has better results or better water. In the meantime, the city has constructed a most perfect sewer system, put down substantial sidewalks, has bituminized streets, and has many hundreds of new and modern cottages that make for attractiveness. Its latest move is to secure the construction of electric railroads that are to connect Benicia, in this county, and Napa and St. Helena, in Napa County. The large plant at Mare Island is to-day equipped with the finest machinery for the construction of men-of-war.

STATISTICS OF SOLANO COUNTY, 1906-7.

Cereal Products and Hay.

	Acres.
Wheat	125,400
Barley	46,500
Oats	7,900
Corn	850
Beans	200
Total	180.850
Grain hay	39,900

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	1,000,000	$230,000
Sweet wines	50,000	20,000
Beer, barrels	13,840	69,200
Brandy	6,006	3,000

Number of wineries, 3; distilleries, 3; breweries, 3.

STATISTICS OF SOLANO COUNTY, 1906-7—Continued.

General Statistics.

Area, 94 square miles, or 583,000 acres.	
Number of farms	3,250
Number of acres assessed	526,914
Value of country real estate	$10,020,525
Of improvements thereon	$1,849,491
Of city and town lots	$1,467,265
Of improvements thereon	$2,881,056
Of personal property	$2,412,724
Total value of all property	$18,656,161
Number of miles of public roads	650
Road levy per $100, 1907	40c
Value of county buildings	$100,000
Railroads, steam—miles, 73.45; assessed value	$1,101,750
Railroads, electric—miles, 3.5; assessed value	$8,000
Electric power plants—6; assessed value	$1,250,000
Electric power lines — miles, 117½; assessed value	$95,850

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	2,400	......	......
Apricot	30,640	......	......
Cherry	39,760	......	......
Fig	5,700	......	......
Lemon	2,540	......	......
Nectarine	2,500	......	......
Olive	2,900	......	......
Orange	6,760	......	......
Peach	360,630	......	......
Pear	175,006	......	......
Plum	102,600	......	......
Prunes	291,700	......	......
Quince	700	......	......
Other kinds	105,600	......	......
Total fruit	1,129,430	......	......
Almond	94,050	......	......
Walnut	6,850	......	......
Total nut	100,900	......	......
Grapevines, acres	2,280	300	2,580

Fish Industry.

	Pounds.	*Value.*
Salmon	425,438	$16,687
Codfish	1,900,000	85,506
Totals	2,325,438	$102,183

Dairy Industry.

	Production.	*Value.*
Butter, pounds	2,115,383	$615,826
Condensed milk, cases	10,000	35,000

Number of creameries, 6.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apricots	3,000,000	$180,000
Cherries	1,200,000	120,000
Figs	125,000	2,500
Grapes	8,000,000	300,000
Nectarines	80,000	3,000
Pears	6,000,000	450,000
Peaches	1,200,000	60,000
Plums	600,000	36,000
Totals	20,205,000	$1,151,500
Dried—	*Pounds.*	*Value.*
Apricots	100,000	$8,000
Figs	20,000	1,000
Nectarines	20,000	2,000
Pears	40,000	4,000
Peaches	500,000	60,000
Plums	24,000	1,680
Prunes	6,000,000	480,000
Totals	6,704,000	$546,680
Canned—	*Cases.*	*Value.*
Asparagus	600	....
Miscellaneous	30,000	$100,000
Totals	30,600	$100,000

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	7,000	$140,000
Dairy cows—Graded	9,200	184,000
Holsteins	210	10,500
Jersey	100	5,000
Shorthorns	500	5,000
Calves	4,000	20,000
Swine	10,000	60,000
Horses—		
Thoroughbred	50	25,000
Standard-bred	100	6,000
Common	12,000	40,000
Colts	1,000	10,000
Sheep	80,000	520,000
Imported or fine	1,000	10,000
Lambs	40,000	80,000
Total stock all kinds	165,160	$1,115,500

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	1	...	$16,000
Cement	1	700	750,000
Flouring mills	2	110	2,078,000
Foundries and iron works	1	135	300,000
Salt, 195 tons	1	...	......
Tanneries	3	300	1,500,000

SONOMA COUNTY.

Sonoma County is bounded on the west by the Pacific Ocean, for more than 65 miles that boundary conforming to the irregularities of the shore, while on San Pablo Bay it has a frontage of 20 miles.

There is no sameness in the surface of the county. Variety is a leading characteristic. Valleys, and hills, and mountains appear to have been planned and distributed to give the best effect. The great central valley extends the entire length of the county from south to north, and commands attention by remarkable fertility. The area on which rough stone interferes with farming operations is small. Out of the area of land in the county at least 200,000 acres are valley land, the richest soil known, being a black loam; 200,000 acres are rolling or higher table land, of an exceedingly rich alluvial brown soil, with considerable sand. This is the best fruit land. We may class 200,000 acres as foothill lands, adapted to many kinds of agricultural and horticultural products and pasturage. At least 100,000 acres of mountain land are adapted to grazing, and about 80,000 acres are covered with redwood timber of a magnificent growth.

On the coast line are several small but valuable harbors, bays, and beaches.

Sonoma Valley is about 20 miles in length, with an average width of 8 miles. It lies parallel to Petaluma Valley, from which it is separated by a range of mountains.

The streams and water courses of Sonoma County are numerous. Russian River, the largest stream, enters on the north, flows in a southeasterly direction for 20 miles, turns at Fitch Mountain, and finds its way to the lowest depression in the Santa Rosa basin, from which it breaks through a gap in the Coast Range to the Pacific Ocean. This river gathers the waters from three fifths of the area of the county.

Sonoma County, besides her great wine, fruit, dairy, stock, and other large industries, produces as much poultry and eggs as all the balance of the State put together. The advantages of the poultry and egg industry are its nearness to a reliable market, quick cash returns, and length of season. The vicinity of Petaluma is largely devoted to this industry; possibly one half of the poultry and eggs shipped from the county are from there. On an acre of ground can be raised and kept successfully 400 laying hens, the year round. These chickens, with ordinary care and attention, such as an intelligent and industrious man would give to any business, will net the owner from $1 to $1.25 a hen clear profit a year, over and above the cost of feed, which is all purchased and paid for, except such as vegetables, kale, and feed raised in the garden. With a few acres well stocked with chickens a family can make a good, independent living. The poultry business is like the banking business—cash on the spot, and there is no surer road to success than along the chicken route in Sonoma County.

Cattle are raised on a large scale, principally for dairying purposes.

Our grazing land is unsurpassed. In the valley lands it requires about 5 acres per cow per year for dairying purposes; in the hill lands from 10 to 15 acres per cow. In the northern part of the county sheep raising forms an important industry. Much of the coast region is devoted to pasturage purposes.

The moisture that rises from the ocean near the coast is absorbed by the ground, and from this fact the pastures are kept green nearly the year round, making this section the ideal spot for the dairyman and stock raiser. The breeds of milch cows represented are mostly Jerseys, Holsteins, and Ayrshires, with some strains of Durhams, and fine American breeds. All milk used at the creameries is bought and sold by weight. In well-managed dairies the yield of butter per cow per annum is from 150 to 200 pounds.

The value of the growth of stock cattle is $10 per head per year, until the limit is reached, and this without other feed than that obtained by grazing upon lands valued at from $10 to $40 per acre.

In the production of hops Sonoma County leads the world. There is no other county that can produce the quality equal to a choice Sonoma. Nearly all other hop-raising sections, outside of a few counties in this State, are subject to crop failures, caused chiefly by vermin, mold, honey-dew, rust, red spider, or severe storms. Such calamities are unheard of in this county. During the hop harvest the growers are favored with bright, sunshiny days. The very best quality of soil—and there is plenty of it—together with an excellent climate, is required for a successful culture of hops. In New York state hops grow on elevated land, while in Sonoma County the rich, sandy loam of the river and creek bottoms is employed. The richness of the soil, together with the adaptable climate, assures an average crop of about 1,800 pounds of dried hops to the acre. Most of the hops are shipped to Eastern and European markets, but there is a growing demand for our product in Australia, New Zealand, and the Orient.

This county produces large quantities of wheat, oat, barley, and alfalfa hay. Good hay can be raised wherever one can plow. It is harvested in May and June.

The soil is particularly adapted to oats, which many consider the most profitable of our grain crops. However, wheat, barley, and corn are extensively cultivated in every locality at a splendid profit. Corn is grown mostly on river-bottom land, and yields on an average 65 bushels to the acre.

One of the chief industries is fruit growing. The estimated value of a fruit tree from the time it is planted to the time it comes into bearing is $1 per year. The right season for planting is during February and March. While many fruit driers are operated, many authorities prefer the sun-drying process, which involves no expense and can always be relied upon. The sun-dried product is of superior quality and flavor, and will bring a correspondingly higher price.

The peach is a great favorite, as the trees commence to bear the second year after planting. The soil best suited to them is a sandy loam, and they may be cultivated with equal success either on the hillsides or in the valleys. After the trees come into bearing the income will depend principally upon the care bestowed upon them. Peaches of standard size for the market are those that will fill a 2-inch hole. If larger they are called "extras," and if smaller, "seconds." The latter are mostly used for drying. All varieties of the peach thrive.

Prunes should have the best quality of soil, for the tree is a heavy bearer.

The growing of citrus fruits, though comparatively a recent industry, has gained a strong foothold, and present indications point to a steady increase in acreage.

While the olive requires a good, well-drained soil, there are many orchards that are planted around the rocky foothills. They come into bearing after five or six years. Olive culture is making rapid strides. The oil produced has established an excellent reputation, and is usually sold ahead of its production.

Sonoma County is the true home of the English walnut. It is only recently that the walnut has attracted the attention of growers in this county, but now that its possibilities as a money maker are becoming more widely known, the acreage devoted to its cultivation is rapidly increasing, and it promises to become one of our great industries.

Sonoma is the greatest blackberry county. The blackberry season begins in the latter part of June, and runs into September. Raspberries are harvested in May, June, July, and August.

Gooseberries are a valuable product, and here are raised the largest and finest varieties.

Many strawberries are not shipped, most of the supply being used for home consumption, but those raised are of the very best quality.

Sonoma grows vegetables throughout the year, and often raises from two to three crops annually. Potatoes are grown in almost every section, attain large size, and are of the finest quality. Asparagus is particularly adapted to the soil and climate. Tomatoes are produced in great quantities for canning. String beans are also grown extensively for this purpose. Sonoma watermelons are of large size and fine flavor.

Sonoma is the largest and most important grape- and wine-producing county in the State. Her wines are justly famed throughout the world, and took first premium at the Genoa Exposition in Italy in 1892. A gold medal was awarded at the World's Fair in Chicago in 1893, and also at the Midwinter Fair in San Francisco in 1894; and the grand prize, the highest award, was given her wines at the St. Louis World's Exposition by a jury composed of twenty-one members, most of whom were French and German experts. In order to accommodate the enormous yield of its own section alone, one wine company has erected a wine tank with a capacity of half a million gallons, the largest in the world.

Tobacco growing has made a fair start, and is one of the coming industries. The plant will thrive in almost every section, and is now quite extensively grown and manufactured in many localities, and the quality is excellent. David Hetzel has raised tobacco for many years near Guerneville.

The amount of lumber manufactured by the sawmills runs into millions of feet. A large amount of shingles, pickets, and shakes is made in the county.

John Schindler, near Melitta, has several hundred tea plants in his garden, and thinks he will be able to place his tea on the market in a year or so.

Labor commands good prices, especially competent and experienced farm hands.

Sonoma County has a large number of mineral springs.

The principal cities are: Santa Rosa, Sonoma, Petaluma, Healdsburg, Cloverdale, and Sebastopol.

The Japan current gives us unfailing rains, and regulates the temperature both summer and winter..

Compared with the East, our roads are more solid and permanent. This is due to the absence of excessive frosts, which crack and break up the hardest ground, of whatever material it is composed.

The many and varied health-giving mineral waters, fishing and hunting locations, and summer resorts, make this county a paradise for the pleasure seeker. Thousands of visitors spend the summer living in tents pitched along the many beautiful streams and in the numerous picturesque spots.

STATISTICS OF SONOMA COUNTY, 1906-7.

General Statistics.

Area. 1,500 square miles, or 960,000 acres.

Number of acres assessed	875,459
Value of country real estate	$14,374,650
Of improvements thereon	$4,513,435
Of city and town lots	$3,998,225
Of improvements thereon	$4,106,535
Of personal property	$4,182,060
Total value of all property	$31,174,904
Number of miles of public roads	1,500
Road levy per $100, 1907	35c
Value of county buildings	$39.000
Railroads, steam—miles, 174.54; assessed value per mile	$22,010
Railroads, electric — miles, 26.75; assessed value	....
Electric power plants—2; assessed value	$120,000
Electric power lines—miles, 40; assessed value	....

Cereal Products and Hay.

	Acres.
Wheat	2,480
Barley	1,480
Oats	5,740
Rye	1,480
Corn	810
Total cereals	11,990
Alfalfa hay	360
Grain hay	35,520
Total hay	35,880

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	13,480	$40,440
Ducks	700	....
Geese	500	....
Turkeys	700	....
Eggs	4,666,666	....

Dairy Industry.

	Pounds.	*Value.*
Butter	3,110,000	$466,500
Cheese	96,000	9,600

Number of creameries, 10; skimming stations, 250.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*
Apple	212,980	66,310
Apricot	20,450	19,980
Cherry	44,710	15,690
Fig	4,210	860
Lemon	790	130
Nectarine	880	30
Olive	62,870	39,120
Orange	9,240	1,390
Peach	24,920	68,450
Pear	78,410	18,860
Plum	6,380	1,030
Prunes, French	529,170	75,210
Quince	1,360	240
Prunes	46,320	3,430
Total fruit trees	1,042,690	310,730
Almond	7,690	2,110
Walnut	4,560	880
Total nut trees	12,250	2,990
Grapevines, acres	17,613	1,897

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	720	$21,600
Stock	9,080	181,600
Dairy cows—Graded	24,000	....
Ayrshire	20	1,000
Devon	30	1,500
Holsteins	30	1,500
Jersey	100	5,000
Red Polled	20	1,000
Shorthorns	320	16,000
Calves	5,210	52,100
Swine	2,240	6,720
Horses—		
Standard-bred	40	4,000
Common	12,920	41,400
Colts	1,410	21,150
Jacks and jennies	10	200
Mules	420	12,600
Sheep	26,630	53,205
Lambs	2,380	1,190
Angora goats	1,220	2,440
Common goats	1,340	2,010
Total stock all kinds	88,190	$433,715
Wool, pounds	150.000	$25,500

STATISTICS OF SONOMA COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

	Total Production. Pounds.
Green—	
Apples	17,000,000
Blackberries	3,200,000
Cherries	13,000,000
Grapes	150,000,000
Loganberries	210,000
Pears	5,200,000
Peaches	2,500,000
Plums	1,000,000
Prunes	18,750,000
Raspberries	200,000
Strawberries	20,000
Tomatoes	8,000,000
Mammoth berries	20,000
Total	219,100,000
Dried—	*Pounds.*
Apples	3,000,000
Pears	200,000
Prunes	7,500,000
Total	10,700,000
Canned—	*Cases.*
Apples	35,000
Blackberries	55,000
Cherries	35,000
Pears	56,667
Peaches	25,000
Plums	26,000
Raspberries	4,800
Tomatoes	66,667
Total	304,134

Miscellaneous Products.

Bees, 50 hives; hops, 31,500 bales; tobacco, 10 acres.

Forest Products.

	Amount.	*Value.*
Sawmills, number	10	$80,000
Charcoal, sacks	100,000	2,500
Fuel, wood, cords	500,000	1,000,000
Lumber, feet	1,420,000	28,400
Pickets, pieces	200,000	5,000
Piles	4,000	12,000
Posts, pieces	1,000,000	10,000
Railroad ties, pieces	50,000	15,000
Sash and door factories, number	7	......
Shakes	100,000	1,200
Shingles	1,500,000	37,500
Total value		$1,191,600

Power used for mills and manufactories in county—Nearly all steam; one electric lighting plant has water power; some planing mills.

Wines, Brandies, Etc.

	Gallons.
Dry and sweet wines	10,000,000

Number of wineries, 79; distilleries, 45; breweries, 5.

Manufactories.

Number of bookbinderies, 4; brick, 2; carriages and wagons, 12; cigars, 15; confectionery, 12, cooper shops, 4; flouring mills, 2; foundries and iron works, 4; leather goods, boot and shoe factory, 2; olive oil, 10; pickled olives, 4; sewer pipe, 2; planing mills, 12; potteries, 1; marble and granite, 3; tanneries, 6; tin and galvanized iron, 5; wood turning and carving, 12; woolen mills, 1; macaroni factory, 1; silk factory, 1.

STANISLAUS COUNTY.

Stanislaus County is near the geographical center of the State, and extends entirely across the northern end of the San Joaquin Valley, with its western edge at the summit of the Coast Range Mountains, and its eastern line extending along the foothills of the Sierra Nevadas.

The San Joaquin River, which drains the valley, traverses the county a little west of the center. Its two most important tributaries on the east are the Stanislaus and Tuolumne rivers, which, like the San Joaquin River, are navigable for the greater part of the year. The former, for some distance, forms the northern boundary of the county, while the latter flows nearly parallel to it through the center of the county. One or two small and unimportant streams find their way to the San Joaquin from the western hills.

The general nature of the land is that of a level plain, sloping gently from the foothills on the east and west, down to the San Joaquin. This condition not only assures good drainage, but also offers excellent facilities for irrigation, of which advantage has already been taken in several localities.

There are three separate irrigation systems in the county, the largest of which is comprised in the Modesto and Turlock joint districts. The former lies between the Stanislaus and Tuolumne rivers, and the latter between the Tuolumne and Merced rivers—both being on the eastern side of the San Joaquin River. Both of these districts receive their water supply from the Tuolumne River at the La Grange dam, which was built at the cost of $550,000, and they contain together over 260,000 acres of most excellent land. This water, coming from the Tuolumne River, which has the largest watershed of the San Joaquin's tributaries, is given in an endless supply by the melting of the eternal snows of the Sierra Nevadas. These districts were originated under the Wright law, by which the ownership of the water is vested in the land. Two privately owned irrigation systems are also to be found in the county. One of these lies along the Stanislaus River in the northern part of the county, and the other is on the west side of the San Joaquin River.

This great county, formerly devoted almost entirely to the production of grain, is now entering into an era of phenomenal horticultural development. This is due to the recently acquired irrigational advantages which have made possible the production of any form of vegetable life known to the temperate and semi-tropical zones. Alfalfa production and dairy industries have come to the front with surprising rapidity. At present, among the principal products of the county are sweet potatoes, nuts, grapes, oranges, lemons, and other fruits.

The county is traversed by four parallel railroads, three of which are the property of the Southern Pacific Railroad Company, the other being the transcontinental line of the Santa Fé Railroad. A fifth line, the Sierra Railroad, runs from Oakdale up into the Sierra Nevada Mountains, tapping the rich mining region of Tuolumne, and a short line, known as the Oakdale Western, connects this railroad with the Santa Fé at Riverbank.

The principal cities of the county are Modesto, the county seat, with an estimated population of 4,000, Oakdale on the eastern side of the county, and Newman on the west side of the San Joaquin River. The other towns are Turlock, Westley, Grayson, Salida, Ceres, Waterford, Montpellier, Knights Ferry, and La Grange—all centers of richly producing localities.

STATISTICS OF STANISLAUS COUNTY, 1906-7.

General Statistics.

Area, 1,486 square miles, or 965,900 acres.

Number of farms	3,315
Number of acres assessed	879,035
Value of country real estate	$8,404,065
Of improvements thereon	$1,031,040
Of city and town lots	$613,780
Of improvements thereon	$902,935
Of personal property	$2,407,500
Total value of all property	$13,359,320
Expended on roads, last fiscal year	$3,883,390
Expended for bridges, last fiscal year	$4,042,818
Number of miles of public roads	707
Road levy per $100, 1907	40c
Value of county buildings	$70,000
Irrigating ditches—miles, 300; cost	$587,900
Railroads, steam— miles, 126.33; assessed value	$2,721,501
Electric power plants—3; assessed value	$17,650
Electric power lines—miles, 64; assessed value	$18,665
Number of acres irrigated	69,862

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	39,342	$314,656
Lumber, feet	2,775,000	124,567
Total value		$439,223

Power used for mills and manufactories in county—Steam, 18; electric, 29; water, 1; gasoline, 5; gas, 1.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	18,460	3,205	21,665
Apricot	32,120	39,380	71,500
Cherry	8,735	3,075	11,810
Fig	55,160	180,520	185,680
Lemon	8,340	3,535	11,875
Limes	312	115	427
Nectarine	1,296	1,080	2,376
Olive	27,440	14,650	42,090
Orange	18,320	12,050	30,370
Peach	64,330	266,040	330,370
Pear	16,970	7,125	24,095
Plum	15,760	7,040	22,800
Prunes	24,372	4,300	28,672
Quince	2,890	2,390	5,280
Total fruit trees	294,505	494,505	789,010
Almond	28,965	52,060	81,025
Chestnut	3,613	1,367	4,980
Pecan, peanuts, etc.	433	112	545
Walnut	15,230	4,170	19,400
Total nut trees	48,241	57,709	105,950
Grapevines, acres	1,347	3,673	5,020
Berries, acres	195	.....	195

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	6,756	$162,144
Stock	20,303	223,333
Dairy cows—Graded	12,317	307,925
Dutch Belted	29	1,740
Guernsey	1	100
Herefords	35	2,100
Holsteins	43	2.150
Jersey	100	5,000
Red Polled	13	650
Shorthorns	7	700
Calves	21,692	108,460
Swine	36,235	217,410
Horses—		
Thoroughbred	11	16,500
Standard-bred	78	7,800
Common	6,199	350,243
Colts	2,413	48,260
Jacks and jennies	61	4,245
Mules	4,987	324,155
Mule colts	793	24,475
Sheep	30,765	76,812
Lambs	24,685	24,685
Angora goats	133	345
Common goats	1,133	2,266
Total stock all kinds	168,729	$1,911,498
Wool, pounds	415,670	$41,567

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	31,750	$152,400
Ducks	513	2,462
Geese	43	387
Turkeys	937	22,488
Eggs	723,115	180,778
Total value		$358,515

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 3,116	......	$3,116
Beeswax	12,464	124,640
Honey	218,120	10,906
Garden seed	1,500	275
Grass seed	1,250	31,250

Manufactured Output.

	No.	*No. of Employes.*	*Quantity.*
Brick	1	15	1,000,000
Cigars	2	4	170,000
Flour, barrels	1	15	25,000
Hides, pounds	14	...	787,040
Lard, pounds	14	...	871,315
Meat packed, pounds	1	12	22,500
Tallow, barrels	14	...	5,113
Olive oil, gals	3	13	2,415
Pickled olives, gallons	3	3	216

STATISTICS OF STANISLAUS COUNTY, 1906-7—Continued.

Dairy Industry.

	No.	Production.	Value.
Creameries	7	....	....
Skimming stations	10	8,672,945	$2,601,883
Butter, pounds	..	2,759,582	698,895
Cheese, pounds	..	31,640	4,746

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	179,956	60,666	$1,078,621
Barley	87,663	37,014	897,589
Oats	24,115	10,310	226,820
Rye	3,898	1,365	24,570
Corn	1,050	1,800	35,550
Tot. cereals	296,682	111,155	$2,263,150
Alfalfa hay	45,810	365,780	$1,828,900
Grain hay	......	891,067	5,691,935
Total hay	45,810	1,256,847	$7,520,835

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,130,261	$56,513
Apricots	1,319,216	26,384
Asparagus	6,687	334
Blackberries	22,419	2,241
Beans	41,612	2,080
Beets	79,000	1,975
Cabbage	76,350	1,527
Celery	14,250	1,425
Cauliflower	32,465	1,947
Cherries	576,213	28,810
Figs	186,117	9,305
Grapes	45,210,196	452,101
Grape fruit	350	100
Limes, boxes	213	639
Lemons, boxes	13,216	13,216
Loganberries	14,060	703
Nectarines	44,215	3,095
Onions	35,600	712
Oranges, boxes	85,450	85,450
Olives	10,976	219
Pears	593,210	11,864
Peaches	3,298,713	65,974
Peas	74,960	3,748
Persimmons	764	39
Plums	34,305	786
Irish potatoes	145,780	2,186
Sweet potatoes	8,987,613	134,814
Prunes	1,134,117	56,705
Quinces	376,216	18,110
Raspberries	67,819	3,390
Strawberries	203,415	10,170
Tomatoes	40,916,115	818,322
Total	....	$1,820,751

Dried—	*Pounds.*	*Value.*
Almonds	1,065,310	$106,531
Apples	59,613	5,961
Apricots	83,417	8,341
Beans	132,416	13,241
Figs	302,067	9,062
Grapes	256,908	12,845
Onions	4,378	437
Pears	5,950	595
Peaches	79,315	7,931
Peanuts	2,000	200
Prunes	541,219	54,121
Raisins	193,416	9,640
Walnuts	29,460	1,031
Totals	2,755,469	$229,936

Canned—	*Cases.*	*Value.*
Pears	2,000	$5,800
Peaches	8,000	22,400
Peas	37,000	61,050
Totals	52,000	$96,750

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines	54,100	$13,525
Sweet wines	19,150	1,819,250
Brandy	8,917	2,229,250
Cider	915	27,450
Vinegar	417	20,850

Number of wineries, 1; distilleries, 3.

Manufactories.

	No.	No. of Employes.	Value of Product.
Brick	1	15	$100,000
Cigars	2	4	6,800
Confectionery	4	9	223,437
Flouring mills	1	15	75,000
Leather goods	7	12	28,650
Meat products—			
Hides	14	...	78,704
Lard	14	...	87,131
Meat packed	1	12	45,000
Tallow	14	...	31,166
Olive oil	3	13	11,860
Pickled olives, gallons	3	3	353
Planing mills	5	17	96,000

SUTTER COUNTY.

Sutter County is the only county in the State that does not touch either of the principal mountain ranges, the greater portion of the county lying between the Feather River on the east and the Sacramento on the west. About one fourth of the county is "tule land," a large part of which is possible of reclamation. This land when reclaimed is of exceptional fertility. During the past season a new levee and reclamation system has been inaugurated in the western part of the county by which 15,000 acres of new land will be added to the producing area next year.

Sutter is a county that never has a "dry season," as the underground supply of moisture is always sufficient to furnish enough to produce crops.

Once a grain-growing community almost exclusively it is now changing very rapidly to a fruit and dairy section, and this year the value of those branches of agriculture exceeded that of the grain.

The winter of 1906-07 was noted as one of exceptional severity and the flood of March, 1907, as the greatest ever known in the county. At that time a very large part of the county was under water. In spite of this flood, in which not a life was lost, and only a few head of stock were drowned, the agricultural output of the county was unusually large. This was evidenced late in the season when financial affairs were bad in some parts; not a ripple was caused in our county, and the usual amount of tax money was paid in by the residents. Sutter, while the fifty-seventh in size, ranks twenty-second in assessed value, having the highest assessed per capita of any purely rural community in the State.

Sutter is most noted as being the only prohibition county in the State, having adopted prohibition in 1893 and since resolutely maintained the same.

STATISTICS OF SUTTER COUNTY, 1906-7.

General Statistics.

Area, 380,610 acres.	
Number of farms	1,063
Number of acres assessed	378,712
Value of country real estate	$4,357,090
Of improvements thereon	$765,990
Of city and town lots	$103,640
Of improvements thereon	$193,795
Of personal property	$891,350
Total value of all property	$6,211,865
Expended on roads, last fiscal year	$22,262
Expended for bridges, last fiscal year	$8,000
Number of miles of public roads	735
Road levy per $100, 1907	36c
Value of county buildings	$40,000
Irrigating ditches—miles, 8; cost	$10,000
Railroads, steam—miles, 36.63; assessed value	$862,091
Railroads, electric—miles, 14.09; assessed value	$47,861
Electric power lines — miles, 46.75; assessed value	$23,375

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	4,073	2,225	6,298
Apricot	9,252	.....	9,252
Cherry	1,980	.....	1,980
Fig	4,156	1,065	5,221
Lemon	610	.....	610
Olive	1,247	.....	1,247
Orange	4,860	.....	4,860
Peach	138,617	12,769	141,386
Pear	26,985	800	27,785
Plum	2,225	.....	2,225
Prunes	45,745	1,850	49,595
Total fruit trees	239,750	18,709	248,459
Almond	42,352	15,284	57,636
Walnut	210	100	300
Total nut trees	42,562	15,384	57,936
Grapevines	2,575	525	3,100
Berries, acres	15	.....	15

STATISTICS OF SUTTER COUNTY, 1906-7—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	25,000	6,120	$183,600
Barley	12,000	3,100	77,500
Oats	2,100	1,350	32,400
Corn	.....	3,300	69,000
Buckwheat	.....	220	5,720
Total cereals	39,100	11,090	$419,520
Alfalfa hay	2,100	9,000	$81,000
Grain hay	28,000	41,000	369,000
Grass hay	1,600	2,100	14,700
Total hay	31,700	52,100	$464,700

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	610,950	$9,164
Beans	3,880,000	97,000
Cabbage	42,000	420
Cherries	386,000	10,440
Grapes	4,600,000	42,000
Lemons, boxes	1,220	1,830
Oranges, boxes	4,680	4,680
Olives	280,575	2,805
Pears	3,047,700	76,192
Peaches	6,794,000	169,850
Plums	445,000	6,675
Irish potatoes	2,340,000	25,740
Tomatoes	570,000.	2,280
Total	....	$504,324
Dried—	*Pounds.*	*Value.*
Almonds	50,000	$6,500
Figs	277,060	9,002
Prunes	1,850,000	92,500
Raisins	2,708,850	162,480
Total	....	$270,482
Canned—	*Cases.*	*Value.*
Peaches	32,000	....

Dairy Industry.

	Production.	*Value.*
Butter, pounds	834,800	$199,352
Cheese, pounds	245,350	34,349

Number of creameries, 1; skimming stations, 2.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 1,507	....	$3,014
Broomcorn	540,000	......
Honey	226,050	20,344
Hops	135,000	10,800
Alfalfa seed	120,000	15,000

Fish Industry.

	Pounds.	*Value.*
Salmon	972,000	$44,860

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	2,440	$97,600
Stock	5,896	117,400
Dairy cows—Graded	4,875	150,785
Holsteins	12	600
Jersey	32	2,090
Shorthorns	61	3,050
Calves	4,682	42,138
Swine	4,629	69,435
Horses—		
Thoroughbred	9	4,450
Standard-bred	474	106,650
Common	2,580	270,900
Colts	1,562	117,820
Jacks and jennies	12	3,000
Mules	1,745	244,300
Sheep	59,357	207,692
Lambs	29,527	73,812
Total stock all kinds	117,893	$1,511,722
Wool, pounds	415,385	$68,903

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	10,877	$43,418
Turkeys	1,623	49,450
Eggs	477,708	106,095
Total value		$198,963

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Flouring mills	1	5	$101,000
Pickled olives	1	...	2,000
Canneries	2	300	160,000
Packing house	1	325	600,000

TEHAMA COUNTY.

Tehama County occupies the upper or northern portion of the Sacramento Valley. It is 200 miles north of San Francisco, and 120 miles north of Sacramento. Part of its eastern boundary follows the summit of the Sierra Nevada Mountains, and its western boundary lies along the summit of the Coast Range. Its greatest length is 78 miles; its width from north to south, 38 miles. Of its area, speaking roughly, 700,000 acres are agricultural lands, 800,000 grazing, and 500,000 timber.

Red Bluff is the county seat. It is a clean, modern little city, located upon an elevated plain, with superior drainage, and with the Sacramento River washing the foot of the bluffs at one side. Other towns are Corning, Tehama, Vina, Paskenta, and Kirkwood.

The county is easily reached, being on the line of the California and Oregon branch of the Southern Pacific Railroad. Two lines of this road converge at the town of Tehama, 12 miles below Red Bluff; one coming up the valley on the west side and the other on the east side of the Sacramento River. North of Tehama there is but one line of track. The Sacramento River is navigable to Red Bluff, and steamboats from San Francisco and Sacramento make weekly trips up and down during most of the year.

Telegraph and telephone lines follow the railroad, and several private lines are in operation.

The public school system is complete and excellent. A school is maintained wherever there is need of one.

The Sacramento River runs through the county from north to south. From this river there is a rise to the east and west until the summit of the mountain ranges is reached. South of Red Bluff and west of the river lie broad plains; beyond these rolling hills developing into the foothills of the mountains, and then the mountains themselves, which rise quite abruptly to a height of from 3,000 to 9,000 feet.

In the alluvial land along the river the soil is mainly a dark brown, almost black, sandy loam, rich and deep. The table-land to the east is so rocky as to be of no use except for stock ranges. On the west of the river the loamy lands merge into clayey loam second bottom; farther west is the sandier soil of the plains, gray, brown, and red in color; then the hills with reddish soil and gravelly loam. The creek bottoms have generally a yellowish soil. North of Red Bluff, in the hilly country, it is chiefly reddish clay and gravelly loam.

Tehama County is well watered. Numerous creeks carry streams from the mountain snows to the river. Wells can be dug anywhere to reach water at a moderate depth.

Irrigation is really not necessary, but experience has shown that plenty of water means an increase in product and variety. It is practiced to some extent, but mostly for the cultivation of alfalfa. There is a great deal of unappropriated water available for irrigation and the development of electric power, awaiting only the capital and energy to make it return a large profit.

The principal industries are horticulture, agriculture, stock raising, and lumbering. There is practically no mining. A large deposit of chrome ore to the west, valuable sulphur springs to the east, some indifferent placer claims to the north, and the story of mining is told.

The fruit industry gives employment to a large number of people, who can engage in healthful outdoor work in summer. Several thousand persons are directly or indirectly engaged in some branch of the fruit business.

Olives are fast coming into favor as a crop and as a food. The tree grows rapidly and yields abundantly. The fruit brings a good price, and the demand is constant and growing. The fruit is pickled green or ripe.

Oranges and lemons do well and bear abundantly. No attempts were made to plant them in quantity until within the past few years. There are in yards all over the county numberless trees that bear profusely. Several small orchards have been planted within the last few years, but they have not yet come into bearing. The trees are healthy and vigorous.

Almonds are being grown with success.

Raisin grapes, and indeed all grapes, grow remarkably well. The raisins can be cured in the sun during the long summer days.

An immense winery is located on the Stanford ranch in the southern part of the county.

Peaches are the principal fruit. They are shipped green, and are canned and dried. The bulk of the crop is dried.

Prunes are readily cultivated and yield abundantly.

The apricot is the third fruit in importance. All the apricots are dried. The pits are sold for fuel, or for extracting the oil, which is used by druggists and confectioners.

Pears do well. The fruit is nearly all shipped green. The Bartlett is the favorite.

Figs are attracting more attention since the procurement of blastophaga, the insect which fertilizes the Smyrna fig. A great many of these trees are now being planted, and no doubt this fruit will assume a larger place in the output of the county hereafter.

Apples are grown only in the foothills. The chief apple-producing region of the county is at Manton, 35 miles to the northeast of Red Bluff, where very fine apples are raised.

Berries and all small fruits do well. They come into market early and sell readily.

In agriculture there has been a gradual change from the growing of wheat to fruit or other grains.

Hay is made from a mixture of wild oats and wheat grown together and cut when just on the point of turning. It is cured on the ground and then stacked.

Alfalfa, where water can be obtained, is the best of all forage crops. It is a splendid feed for cattle, hogs, and horses.

Experiments are being made looking toward the cultivation of hops and sugar beets.

The stock business is carried on under conditions that differ from those of the Eastern States, and are differing from those of former years here. The owner of cattle, sheep, and goats finds it necessary to own or control two ranges: one in the valley for the winter months, and one in the mountains for the summer season. Considerable land has been withdrawn into temporary forest reserves. The number of men engaged in the stock business has greatly increased, and range land has been in greater demand as a consequence.

Sheep raising is easily the favorite branch of the stock business. This is the principal wool-producing county of northern California, and indeed of the State. Twice each year the buyers come here, and there is a busy time until the wool is sold. It is sometimes bought before the sheep are sheared. The favorite breeds of sheep are Spanish Merino, French Merino, Southdown, and Cotswold for wool, and Shropshire more particularly for mutton.

The cattle business is conducted in much the same general way as the sheep business, except that the animals do not require constant care and herding; there is a further difference, that nearly every farmer has at least a few head of cattle, while but few of them have any sheep. The favorite breeds of cattle are Holstein, Hereford, Jersey, and Durham.

Of late years Angora goats have come into greater favor. They are hardy animals, readily adapting themselves to a mountainous and hilly country which no other animal can occupy. They will eat almost anything, can protect themselves from wild animals, and their wool or mohair is in demand and brings a good price.

There is everywhere plenty of timber of various kinds for fuel, posts, etc., for immediate local use. Oaks are the principal trees of the valley, except along the streams, where willows, cottonwoods, and sycamores abound. Oak wood is the favorite fuel. But in the Sierras there is a magnificent belt of timber containing a great preponderance of sugar pine, which is one of the finest of timber trees. Several sawmills are located in this timber belt and most of the land, if not all, is now owned by private individuals or corporations.

The wool, lumber, stock, fruit, hay, grain, etc., can all be sold at Red Bluff. A market is always available at San Francisco; and in Red Bluff, the county seat, there are local individuals and firms ready and willing to buy all of these products that are offered. There are two large packing houses for fruit, warehouses for wool and grain, livery stables for hay, a flouring mill for wheat, and railroad and river means of transportation.

The large land holdings are being broken into smaller tracts to encourage immigration and settlement. The outlook is most hopeful.

STATISTICS OF TEHAMA COUNTY, 1906-7.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	2,134	$5,335
Ducks, geese, turkeys	3,157	16,535
Eggs	96,840	29,052
Total value		$50,922

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry and sweet wines, and champagne	1,858,000	$245,490
Brandy	34,600	8,650
Vinegar	25,000	3.375

Number of wineries, 1; distilleries, 1.

STATISTICS OF TEHAMA COUNTY, 1906-7—Continued.

General Statistics.

Area, 3,200 square miles, or acres.	2,048,000
Number of acres assessed	1,253,566
Value of country real estate	$6,630,500
Of improvements thereon	$971,900
Of city and town lots	$576,760
Of improvements thereon	$1,081,870
Of personal property	$2,416,180
Total value of all property	$11,677,210
Expended on roads, last fiscal year	$35,425
Expended for bridges, last fiscal year	$8,340
Number of miles of public roads	820
Road levy per $100, 1907	38c
Value of county buildings	$75,000
Irrigating ditches—miles, 350; cost	$52,500
Railroads, steam—miles, 57.83; assessed value	$1,499,328
Electric power lines — miles, 101; assessed value	$52,050
Number of acres irrigated	2,000
Telegraph lines—miles, 116	10,650
Telephone lines—miles, 115	8,810

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	28,900	5,200	$156,000
Barley	31,360	4,150	124,500
Oats	2,000	422	14,770
Hops	150	110	22,000
Corn	75	51	1,555
Potatoes	215	403	10,075
Beans	200	40	2,600
Totals	62,900	10,376	$331,500
Alfalfa hay	1,800	4,500	$56,250
Grain hay	.....	12,703	228,654
Total hay	1,800	17,203	$284,904

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	18,400	3,750	22,150
Apricot	63,410	1,000	64,410
Cherry	4,825	245	5,070
Fig	10,590	2,535	13,125
Lemon	615	170	785
Olive	60,200	7,260	67,460
Orange	9,240	3,540	12,780
Peach	655,650	113,750	769,400
Pear	59,300	3,750	63,050
Plum	7,000	.....	7,000
Prunes	205,080	7,820	212,900
Total fruit	1,094,310	143,820	1,238,130
Almond	34,845	350	35,195
Walnut	3,500	.....	3,500
Total nut	38,345	350	38,695
Grapevines, acres	2,775	.....	2,775
Berries, acres	60	.....	60

Manufactured Output.

	Quantity.
Brick	400,000
Brooms, dozen	90
Cigars	165,000
Flour, barrels	40,000
Hides, pounds	10,310
Lard, pounds	50,000
Meat packed, pounds	150,000
Tallow, barrels	200

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	943,720	$9,437
Apricots	152,300	7,615
Asparagus	15,000	750
Blackberries	204,000	12,240
Beans, string	35,000	1,750
Beets	20,000	900
Cabbage	105,000	2,100
Celery	25,000	2,500
Cauliflower	5,200	520
Corn	302,000	6,040
Sugar beets	106,400	530
Cherries	41,000	2,870
Figs	4,250	127
Grapes	18,000,000	450,000
Onions	150,000	7,500
Olives	1,310,000	81,875
Pears	600,000	18,000
Peas	20,000	1,200
Irish potatoes	806,000	12,090
Sweet potatoes	102,300	1,537
Strawberries	18,000	900
Tomatoes	4,000,000	40,000
Vegetables, ass'd	346,430	10,393
Melons	1,480,000	14,800
Fruit, ass'd	1,217,796	48,712
Totals	30,009,396	$734,386

Dried—	*Pounds.*	*Value.*
Almonds	470,000	$65,800
Beans	80,000	2,600
Chestnuts	805	85
Grapes	8,000	640
Onions	110,000	2,200
Pears	216,000	15,120
Peaches	2,532,000	253,200
Peanuts	24,100	1,205
Plums, pitted	180,000	18,000
Prunes	3,741,000	149,640
Walnuts	7,500	750
Corn	102,000	1,530
Nuts, ass'd	125,771	15,721
Fruit, ass'd	3,502,880	280,230
Totals	11,100,056	$806,721

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	20	$600
Stock	27,976	391,670
Dairy cows—		
Thoroughbred	252	13,520
Common	1,443	36,075
Swine	7,285	21,855
Horses—		
Thoroughbred	18	10,000
Standard-bred	2,398	128,040
Common	1,700	51,545
Colts	795	18,105
Jacks and jennies	37	3,770
Mules	982	65,735
Sheep	228,066	570,165
Bucks	2,014	10,070
Common goats	19,727	39,455
Thoroughbred bulls	25	1,550
Yearlings	56	1,220
Common bulls	45	1,150
Mule colts	212	6,105
Total stock all kinds	293,051	$1,370,630
Wool, pounds	3,946,784	$552,549
Mohair, pounds	169,596	30,527

Fish Industry.

	Pounds.	*Value.*
Salmon	197,199	$9,860

STATISTICS OF TEHAMA COUNTY, 1906-7—Continued.

Dairy Industry.

	No.	Production.	Value.
Creameries	7	......	$64,048
Butter, pounds	..	71,028	17,757
Cream, gals	..	46,291	46,291
Milk, gals	..	277,746	55,549

Forest Products.

	Amount.	Value.
Sawmills, number	2	....
Fuel, wood, cords	3,668	$22,008
Lumber, feet	16,164,000	258,624
Posts, pieces	24,300	3,645
Sash and door factories, number	1	170,400
Shakes	85,000	1,105
Total value		$455,782

Power used for mills and manufactories in county—Steam, 2.

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 375	.....	$375
Broomcorn, bales, 52	.....	320
Honey	3,000	300
Hops	220,000	22,000
Sugar beets	106,000	430

Manufactories.

	No.	No. of Employes.	Value of Product.
Wood boxes	1	30	$125,000
Brick	1	6	4,000
Brooms	1	2	450
Cigars	2	4	9,900
Confectionery	4	7	31,000
Flouring mills	2	11	160,000
Foundries and iron works	1	3	12,000
Furniture and picture frames	3	9	28,500
Gas	1	3	5,836
Leather goods	4	11	25,000
Planing mills	1	85	300,000
Tamales	5	...	5,000
Miscellaneous	..	...	6,225
Mineral salts	1	3	6,000
Soda water	2	8	5,000

	Amount.	Value.
Meat products—		
Hides, bundles	1,863	$9,315
Lard, pounds	50,000	5,000
Meat packed, tons	75	10,500
Tallow, barrels	200	3,200
Pickled olives, gals	163,750	81,875
Ice, tons	1,500	11,210
Sugar, beet, tons	53	430

TRINITY COUNTY.

Trinity County is situated in the northwestern part of California and is classed as one of the mountain counties of the Coast Range. It has no navigable streams. The Trinity River flows into the Klamath River, which empties into the Pacific Ocean. With an output of about $100,000,000 of gold since 1850, gold mining has been the principal industry of the county; and will continue to be so for many years to come, as there are hundreds of acres of auriferous gravel awaiting the necessary capital for exploitation and equipment. There are also many quartz veins that promise good results when properly developed. In addition to gold, copper, cinnabar, coal, iron, chrome, asbestos, platinum, tungsten, and molybdenum ores have been found in different parts of the county. With the exception of gold and cinnabar, none of these ores have been worked to any extent. Immense bodies of limestone are also found in the county. The farming interests of the county are rapidly coming to the front, showing that all kinds of grasses, grains, vegetables, fruits, and berries thrive and produce in abundance in all sections. With the building of the State highway through the county, many industries will spring up that are now unthought of. The southern part of the county is well adapted for farming, fruit raising, stock raising, and dairying. Lumbering is soon going to be a very important industry, and with a home market at the mines and mills for all farm and dairy produce Trinity County promises to be one of the best in the State for diversified industries. Mining, farming, fruit raising, dairying, lumbering, and stock raising, with the incidental industries connected therewith, will no doubt more than double the assessment roll within the next five years. There are many mineral springs, some of which have valuable curative qualities, in different sections of the county. While in the main Trinity is a mountain county it contains several small, but fertile valleys, and along the streams and throughout the hills are numerous spots of good farming and fruit lands with plenty of timber and water, and with a temperate climate neither extremely hot nor cold. Trinity County has mail routes and schoolhouses in every section, and as to wagon roads from other counties there are several different routes, to wit: from Siskiyou County by the Scotts mountain road, from Delta in Shasta County to Trinity Centre, and from Redding, also in Shasta County, via French Gulch to Weaverville, which is the county seat of Trinity. This is the established mail route for the northern part of the county and also connects with the Lewiston turnpike and Buckhorn roads, giving one the choice of three different routes. There is also another road from Ono, in Shasta County, passing over the mountain at the Bully Choop mine. From Red Bluff, in Tehama County, starts the Red Bluff and Hay Fork wagon road leading into the Hay Fork Valley, 28 miles by wagon road from Weaverville. The southern part of the county is reached by wagon road from Covelo, in Mendocino County; also by wagon roads from Bridgeville and Blocksburg, in Humboldt County, while the extreme southwestern part can be reached by wagon road from Korbel into the South Fork of Trinity—thus giving persons wishing to travel into the county the choice of the most available route to the part they wish to go to.

STATISTICS OF TRINITY COUNTY, 1906-7.

General Statistics.

Area, 3,000 square miles, or acres.	1,920,000
Number of farms	295
Number of acres assessed	587,586
Value of country real estate	$1,954,639
Of improvements thereon	$270,515
Of city and town lots	$28,131
Of improvements thereon	$82,454
Of personal property	$369,561
Total value of all property	$2,748,794
Expended on roads, last fiscal year	$7,464
Expended for bridges, last fiscal year	$8,454
Number of miles of public roads	472
Road levy per $100, 1907	40c
Value of county buildings	$20,000
Irrigating ditches—miles, 215; cost	$21,500
Railroads, steam—miles, ¾; assessed value	$500
Electric power plants—7; assessed value	$28,195
Electric power lines—miles, 30; assessed value	$3,000
Number of acres irrigated	9,640
Mining ditches—miles, 489; cost	978,000
Number of miles of public trail	606

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	2,700	1,350	$32,400
Barley	300	675	13,175
Oats	400	200	5,000
Rye	60	60	1,080
Corn	350	88	1,760
Total cereals	3,710	2,373	$53,415
Alfalfa hay	1,622	10,543	$168,688
Grain hay	7,115	14,789	295,600
Grass hay	4,731	7,569	151,380
Total hay	13,468	32,901	$615,668

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	1,300	$31,200
Stock	19,000	285,000
Dairy cows—Graded	475	19,000
Thoroughbred	50	5,000
Calves	2,300	11,500
Swine	2,500	12,500
Horses—		
Thoroughbred	3	750
Standard-bred	50	10,000
Common	2,500	125,000
Colts	350	3,500
Jacks and jennies	23	445
Mules	300	18,000
Sheep	3,600	12,600
Lambs	1,500	1,500
Common goats	375	750
Total stock all kinds	34,323	$536,745

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	5,000	2,000	7,000
Apricot	35	15	50
Cherry	500	150	650
Fig	15	25	40
Lemon	15	10	25
Nectarine	10	...	10
Olive	5	20	25
Orange	5	15	20
Peach	1,500	300	1,800
Pear	600	150	750
Plum	500	100	600
Prunes	876	82	958
Quince	50	10	60
Total fruit trees	9,111	2,877	11,988
Almond	15	10	25
Chestnut	50	10	60
Pecan	2	...	2
Walnut	200	56	256
Other nuts	...	3	3
Total nut trees	267	79	346
Grapevines, acres	...	...	35
Blackberries "	30	...	30
Currants "	2	...	2
Gooseberries "	3	...	3
Raspberries "	25	...	25
Strawberries "	50	...	50

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	1,106,880	$5,475,200
Cedar, acres	5,000	200,000
Pine, acres	400,000	2,400,000
Fir, acres	701,880	2,875,200
Sawmills, number	22	22,000
Fuel, wood, cords	20,000	80,000
Lumber, feet	4,025,000	80,500
Pickets, pieces	15,000	200
Posts, pieces	6,500	650
Shakes	30,000,000	300
Mine timbers, feet	35,000	8,170
Total value		$11,142,220

Power used for mills and manufactories in county—Steam, sawmills, 8; electrical, quartz mills, 2; water, sawmills, 14, and quartz mills, 16.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Beer, barrels	185	$1,110
Cider	5,000	2,500
Vinegar	7,000	2,100

Number of breweries, 1.

Dairy Industry.

	Pounds.	*Value.*
Butter	70,000	$21,000

STATISTICS OF TRINITY COUNTY, 1906-7—Continued.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,100	$4,400
Ducks	20	100
Geese	5	40
Turkeys	100	1,200
Eggs	100,000	20,000
Total value		$25,740

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,500,000	$30,000
Asparagus	1,000	50
Blackberries	32,000	2,560
Beans	140,000	3,500
Beets	60,000	1,200
Cabbage	80,000	1,600
Celery	1,500	75
Cauliflower	3,000	90
Corn	100,000	1,000
Cherries	15,000	900
Figs	600	30
Grapes	97,000	1,355
Onions	40,000	800
Pears	54,000	1,080
Peaches	98,000	$1,960
Peas	10,000	400
Plums	40,000	800
Irish potatoes	690,000	13,800
Sweet potatoes	1,500	45
Prunes	43,800	657
Quinces	3,000	60
Raspberries	16,000	1,280
Strawberries	....	2,500
Tomatoes	104,000	2,080
Totals	3,130,400	$67,822

Dried—	*Pounds.*	*Value.*
Apples	8,000	$560
Beans	12,000	360
Onions	20,000	500
Pears	2,000	140
Peaches	5,000	350
Plums	3,000	210
Prunes	2,000	100
Totals	52,000	$2,220

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 81	......	$162

TULARE COUNTY.

Tulare County, out of which three or four valley counties have been carved, is still one of the largest. It is about the size of Connecticut, and is almost square. It is remarkable for the height and beauty of its mountains, for its enormous groves of giant sequoia, for the fertility of its soils, for the abundance of watercourses, for the variety of products, for scenery that many declare to be superior to the Yosemite, for the highest mountain (Mount Whitney) in the United States on its eastern border, for the successful citrus territory, where are grown oranges that equal the finest produced, and for being the earliest section to be settled up and devoted to agricultural purposes. It is one of the greatest stock-raising counties. Cattle are raised for meat rather than for dairying, although the latter industry is keeping pace. The glory of Tulare is its deciduous fruit orchards, all along the channels of the Kaweah and Tule rivers. The soil is a deep alluvial loam, rich in nitrates and potash, and free from alkali.

Late frosts are rare. The spring is warm and early, which gives the fruit a perfect richness and sweetness.

While irrigation is general, at least to the extent of giving the trees one good drenching a year, there are many ranches where the under flow is only 6 to 12 feet from the surface, rising even higher in spring, and therefore no artificial watering is needed.

The principal town and the county seat is Visalia. It is the oldest city in the valley, having been founded in 1852 by the brothers Vice, for whom it was named. It is a modern, well-improved, prosperous city, with every prospect of continuous active growth. In the old days it was the starting point of the overland stage, and to-day it is said of Visalia that it represents more per capita wealth than any other city of like population. Visalia is midway between San Francisco and Los Angeles, but it was not until 1897 that it was connected with the main lines of the railroad. Electric power is supplied from a mountain watercourse.

Tulare City is the second in point of size; it is about 10 miles south of Visalia. The main line of the Southern Pacific, and the Tulare-Visalia line of the Santa Fé, pass through the city. In the surrounding country, cattle, hogs, and horses are raised, and there are flourishing orchards and broad wheat and alfalfa fields. It has substantial brick buildings, on broad, beautiful streets.

The famed citrus belt of Tulare lies about 12 miles east of Visalia, and includes a series of settlements, or districts, chief of which are Lindsay, Exeter, and Porterville. This land is practically frostless. The soil is known to contain in exact proportions the elements needed for the growth of citrus trees. Freedom from fog gives immunity from insect pests, which need moisture in the air to prosper. The long, warm summer brings the fruit to maturity earlier than is the case farther south, and as a result Tulare fruit reaches the Eastern market in November and the first weeks of December, in time for the Christmas trade.

Most of the district has a plentiful supply of water in the form of an underflow—a natural reservoir at a depth of from 50 to 75 feet. It is raised by pumping. Formerly the pumps were operated by gasoline, but electricity is now available at a reasonable price. Farm houses are lighted by electricity, and the cities of Visalia and Tulare and the towns of Exeter, Lindsay, and Porterville are supplied from the same plant.

The Porterville oranges have repeatedly carried off first prizes in the citrus fairs of the State.

In the Alta district, in the northwestern part, a considerable acreage is devoted to raisins, which do well in this county, although their cultivation has not been attempted on so extensive a scale as elsewhere.

Situated midway between the cities of Los Angeles and San Francisco, the dairyman is enabled to take advantage of varying market conditions to secure the highest prices. There has been a marked increase in the dairy interests. Another noticeable gain was made in horses and mules. There is a growing demand for draft-horses and large-boned, big-muscled mules, and these animals command good prices.

Soil and climate are generally adapted to diverse products. A crop of grain hay may be cut in May, and a harvest of potatoes, squashes, Indian or Egyptian corn taken from the same field in October. Alfalfa is one of the best honey plants. It supplies poultry with green feed the entire year. Its succulent shoots promote the rapid growth of young pigs and calves. The problem of meeting bills does not confront the diversified farmer. He has always something to sell. There is no waste. The hog gets what the reaper overlooks. The chicken in turn finds what the pig misses. A vast saving in labor is effected. With the aid of his family, daily tasks, trivial in themselves, accumulate in results that materially swell the income. Nor is there either drudgery or monotony on a farm of this kind. Varied interests and changing occupations give zest to life and rob labor of its burdens.

Alfalfa hay has a broad market for shipment. Squashes, onions, and beans command good prices. Honey has an unlimited market, it being shipped East in carload lots. Poultry and eggs are higher than in the East, and their production cheaper. Berries of all kinds thrive, and meet with a ready demand in the local market.

STATISTICS OF TULARE COUNTY, 1906-7.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	86,750	$26.000
Sweet wines	558,700	177,200
Brandy	62.000	46,500

Number of wineries, 7; distilleries, 3.

Dairy Industry.

	Production.	*Value.*
Butter, pounds	2,333,500	$707,000
Cheese, pounds	102,400	9,550
Cream	37,300	60,000

Number of creameries, 8.

Forest Products.

Power used for mills and manufactories in county—Steam, 1,170 horsepower; electrical, 1,850; water, 50; gasoline, 1,440.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	101,301	50,000	$1,398,656
Barley	26,773	12,517	311,483
Oats	2,087	1,000	23,875
Corn	5,617	6,100	101,900
Total cereals	135,778	69,617	$1,835,914
Alfalfa hay	31,647	74,168	$390,740
Grain hay	44,939	48,455	354,068
Total hay	76,586	122,623	$744,808

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 3,500	.....	......
Beeswax	3,000	$500
Honey	215,540	21,550
Alfalfa seed	260,000	26,000

STATISTICS OF TULARE COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,390,000	$18,160
Apricots	930,000	53,420
Blackberries	....	2,140
Beans	28,500	1,100
Beets	14,165,500	35,465
Cabbage	43,500	5,500
Corn	10,000	300
Cherries	2,850	210
Grapes	18,089,000	333,260
Grape fruit, boxes	9,545	22,530
Lemons, boxes	85,840	202,374
Loganberries	38,000	1,900
Nectarines	30,400	630
Onions	10,000	350
Oranges, boxes	899,795	805,890
Olives	779,300	17,360
Pears	128,750	3,055
Peaches	14,014,300	265,100
Peas	80,000	1,500
Plums	732,500	16,055
Irish potatoes	2,353,000	44,200
Sweet potatoes	57,500	2,140
Prunes	2,301,400	35,500
Raspberries	....	200
Strawberries	....	3,450
Tomatoes	95,500	4,350
Total	....	$1,876,139

Dried—	*Pounds.*	*Value.*
Almonds	13,400	$1,265
Apricots	219,050	43,440
Beans	135,800	4,570
Figs	774,000	23,760
Grapes	805,240	25,540
Nectarine	10,150	1,080
Onions	12,000	180
Pears	20,000	2,000
Peaches	2,541,000	249,300
Peas	3,750	180
Prunes	6,770,000	294,350
Raisins	9,145,300	487,000
Walnuts	11,050	1,250
Totals	20,460,740	$1,133,915

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	26,666	10,159	36,825
Apricot	85,350	10,467	95,817
Cherry	283	1,120	1,403
Fig	11,380	19,290	30,670
Lemon	37,759	2,740	40,499
Nectarine	5,273	730	6,003
Olive	13,415	2,755	16,170
Orange	657,851	753,000	1,410,851
Peach	534,400	474,525	1,008,925
Pear	16,112	7,337	23,449
Plum	16,580	12,950	29,530
Prunes	232,255	22,951	255,206
Quince	286	120	406
Other kinds	7,360	1,500	8,860
Total	1,644,970	1,319,644	2,964,614

	Bearing.	*Non-Bearing.*
Almond	3,740	340
Chestnut	.....	170
Pecan	.....	25
Walnuts	750	647
Total nut trees	4,490	1,182
Grapevines, acres	11,282	7,134
Berries, acres	94	36

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	13,900	$452,000
Stock	62,000	1,060,000
Dairy cows—Graded	11,883	395,610
Herefords	95	4,750
Holsteins	267	21,750
Jersey	315	22,750
Polled Angus	22	2,500
Shorthorns	73	8,275
Calves	24,046	147,470
Swine	34,200	207,410
Horses—		
Thoroughbred	24	21,000
Standard-bred	106	42,575
Common	13,990	1,068,960
Colts	2,360	61,720
Jacks and jennies	8	4,000
Mules	2,842	336,100
Sheep	58,187	26,985
Lambs	20,700	59,250
Angora goats	1,800	5,450
Common goats	933	1,700
Total stock all kinds	247,751	$4,150,655
Wool, pounds	446,800	$61,420
Mohair, pounds	11,025	880

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	1	15	$20,000
Flouring mills	3	16	235,000
Foundries and iron works	1	5	10,000
Meat products—			
Hides		...	8,000
Tallow		...	450
Planing mills	3	35	70,000

General Statistics.

Area, 4,863 square miles, or acres.	3,112,320
Number of farms	4,500
Number of acres assessed	1,375,210
Value of country real estate	$11,413,102
Of improvements thereon	$2,544,670
Of city and town lots	$910,575
Of improvements thereon	$1,456,540
Of personal property	$2,956,714
Total value of all property	$19,281,601
Expended on roads, last fiscal year	$64,855
Number of miles of public roads	1,850
Road levy per $100, 1907	40c
Value of county buildings	$119,925
Irrigating ditches—miles, 654; cost	$760,000
Railroads, steam—miles, 202.20; assessed value	$4,525,230
Railroads, electric—miles, 16; assessed value	$60,195
Electric power plants—3; assessed value	$155,590
Electric power lines — miles, 200; assessed value	$180,854
Number of acres irrigated	172,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	15,045	$71,225
Ducks	270	1,500
Geese	65	700
Turkeys	1,185	24,390
Eggs	641,265	149,250
Total value		$247,065

VENTURA COUNTY.

Ventura County, one of the smallest of the group of seven southern counties, lies between Santa Barbara County on the north and west, and Los Angeles County on the south and east, on the shores of the Santa Barbara channel. The county is triangular in shape, one face of the triangle, full 50 miles, fronting the ocean.

Of its area of 1,852 square miles, less than one fourth is under cultivation. Back from the coast in all directions rise rugged mountain ranges whose hearts are pierced in every direction with cañons and valleys of varying width. The entire northern section of the county is mountainous, but between the ranges here and there are to be found little valleys whose soil is the most productive in the world.

The mountain watersheds supply innumerable streams which, flowing in different directions, form the two principal rivers of the county, from which is obtained a vast quantity of water for irrigation. These two rivers, the Santa Clara and the San Buenaventura, rise in these northern mountains, their sources being separated but a few miles. The Piru River, the Sespe, and the Santa Paula, each of considerable length from its winding through the mountain gorges and cañons, flow into and form the Santa Clara River, which enters the county on the southeastern border, and flows in a generally western direction straight across to the sea. This is a stretch of nearly 40 miles, and the stream, with its feeders north and south, becomes the life blood, as it were, of a magnificent valley covering the southern portion of the county from east to west. Beginning on the east with a width of 2 or 3 miles, the valley gradually widens until its western breadth along the seashore is about 20 miles. The valley is broken by detached mountain ridges, whose living streams not only aid in producing the inexhaustible water supply and enhance the fertility of the soil, but afford the finest scenery and most desirable health resorts.

The San Buenaventura River rises in the mountains in the northern part of the county, flows south, and enters the Pacific within 6 miles of the mouth of the Santa Clara.

The lower part of the Santa Clara Valley is a vast plain, 20 miles or more in width, extending back from the ocean in a great crescent, whose greatest distance is 10 miles from the shore. This plain for countless ages has been receiving the alluvial deposits brought down by the streams from the hills and mountains. It is the garden spot of the county, one of the most fertile tracts of land in the world, producing annually hundreds of thousands of dollars' worth of produce. Every variety of plant life does well in this section, but so well adapted is the soil to beans and beets that these are the staples.

Other products of the county—products in which it ranks with the leading counties in the State—are apricots, walnuts, lemons, and oranges, the yield of each of which is enormous. Not alone does the county boast the largest lima bean ranches, but also the most extensive walnut grove, and the largest single lemon ranch.

Its mountain slopes are covered with verdure, and in its mountain valleys are many apiaries. In a good year a vast amount of honey is produced, netting big returns to the apiarist.

The narrow stretch of coast from southern Santa Barbara County, through Ventura County and including the northern portion of Los Angeles County, is the greatest lima bean section in the world, and Ventura County is the greatest bean-producing section in the world.

The sugar beet thrives in this great valley, and the percentage of sugar is greater here than in any other section in the world. The culture of sugar beets supports the Oxnard sugar factory, the second largest in the world, with a capacity of 2,000 tons per day.

Many herds of cattle and sheep are to be found in the mountain sections, and stock raising is an important industry.

The county was the pioneer oil producer in this State, and its production of petroleum is still large.

The mountains are rich in mineral wealth; among its productions may be mentioned asphalt, clay, gold, natural gas, petroleum, rubble, sandstone and borax. The output of oil for the year was 375,000 barrels, worth $225,000, and 12,000 tons of borax, worth $1,200,000.

STATISTICS OF VENTURA COUNTY, 1906-7.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	2,100	$84,000
Stock	14,500	217,500
Dairy cows—Graded	835	25,050
Herefords	140	5,600
Jersey	350	14,000
Polled Angus	100	4,000
Calves	2,190	15,330
Swine	6,720	19,160
Horses—Common	6,350	952,500
Colts	1,650	41,250
Jacks and jennies	8	9,600
Mules	1,430	28,600
Sheep	29,500	118,000
Lambs	15,000	30,000
Angora goats	1,600	6,400
Common goats	1,200	2,500
Wool, pounds	236,000	$15,160
Mohair, pounds	3,600	1,440

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	2,300	$9,200
Eggs	240,000	48,000
Total value		$57,200

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	6,480	2,024	$63,264
Barley	8,760	3,898	105,246
Oats	464	294	12,054
Corn	1,900	840	25,880
Total cereals	17,604	7,056	$206,444
Alfalfa hay	230	1,150	$13,800
Grain hay	7,000	7,200	100,800
Total hay	7,230	8,350	$114,600

General Statistics.

Area, 1,852.66 square miles, or 1,185,704.95 acres.	
Number of acres assessed	594,595
Value of country real estate	$5,409,109
Of improvements thereon	$635,580
Of city and town lots	$751,657
Of improvements thereon	$684,230
Of personal property	$2,031,080
Total value of all property	$9,511,656
Expended on roads, last fiscal year	$53,986
Expended for bridges, last fiscal year	$51,359
Number of miles of public roads	624
Road levy per $100, 1907	40c
Value of county buildings	$120,000
Irrigating ditches—miles, 59½; cost	$101,150
Railroads, steam—miles, 108.32; assessed value	$2,384,108
Electric power plants—4; assessed value	$14,325
Electric power lines—miles, 70; assessed value	$15,550
Number of acres irrigated	8,757

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	80,000	$24,000
Brandy	1,700	2,975

Number of wineries, 7; distilleries, 2.

Fish Industry.

	Pounds.	*Value.*
Various kinds	98,000	$3,610

Dairy Industry.

	Pounds.	*Value.*
Butter	105,260	$31,578

STATISTICS OF VENTURA COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	216,800	$2,168
Apricots	22,000	1,320
Asparagus	3,500	350
Blackberries	45,000	2,250
Beans	3,000	150
Beets	4,000	200
Cabbage	180,000	1,800
Celery	2,500	125
Cauliflower	5,000	250
Corn	16,000	160
Cherries	15,000	750
Figs	3,000	150
Grapes	48,000	3,600
Grape fruit	31,500	1,350
Lemons, boxes	132,500	463,750
Loganberries	18,000	720
Nectarines	4,500	225
Oranges, boxes	105,000	115,500
Olives	1,450,000	21,750
Pears	96,000	2,880
Peaches	90,000	3,600
Peas	4,000	200
Persimmons	3,000	210
Plums	6,000	300
Irish potatoes	937,500	19,750
Sweet potatoes	80,000	1,600
Prunes	7,000	280
Quinces	4,000	200
Raspberries	3,000	300
Strawberries	100,000	5,000
Tomatoes	120,000	1,200
Rhubarb	1,000,000	40,000
Total	....	$692,098

Dried—	*Pounds.*	*Value.*
Almonds	26,480	$8,045
Apricots	720,000	129,600
Beans, Lima	49,120,000	1,964,800
Beans, others	5,068,000	152,040
Onions	175,500	10,530
Peaches	600	108
Peanuts	700	70
Prunes	480,000	19,200
Walnuts	3,600,000	540,000
Total	....	$2,824,393

Canned—	*Cases.*	*Value.*
Tomatoes	400	$900

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	50,000	....
Pine, acres	50,000	....
Sawmills, number	2	$15,000
Charcoal, sacks	15,000	7,500
Fuel, wood, cords	8,000	80,000
Lumber, feet	775,000	19,375
Total value		$121,875

Power used for mills and manufactories in county—Steam, 9; electrical, 4.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	10,000	600	10,600
Apricot	80,000	9,160	89,160
Cherry	1,500	280	1,780
Fig	1,800	700	2,500
Lemon	75,000	31,500	106,500
Nectarine	585	240	825
Olive	32,060	2,450	34,510
Orange	92,000	17,360	109,360
Peach	6,000	1,850	7,850
Pear	2,980	720	3,700
Plum	1,720	550	2,270
Prunes	22,000	4,800	26,800
Quince	560	240	800
Other kinds	1,200	800	2,000
Total fruit trees	327,405	71,250	398,655
Almond	10,960	2,200	13,160
Walnut	105,750	54,980	160,730
Total nut trees	116,710	57,180	173,890
Grapevines	106,200	17,650	123,850
Berries, acres	56	23	79

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 12,400	......	$48,000
Beeswax	24,200	6,000
Broomcorn	20,000	200
Flowers and plants, acres	80	16,000
Hemp	1,200,000	72,000
Garden seed and bulbs	3,650	9,450
Sugar beets, tons	120,110	610,605

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	1	2	$1,800
Brick	3	23	10,050
Cigars	1	2	2,000
Confectionery	4	5	14,600
Foundries and iron works	3	22	36,000
Meat products	..	60	......
Hides	..	...	25,920
Lard	..	...	22,500
Meat packed	..	...	3,840
Tallow	..	...	450
Olive oil	..	10	6,000
Planing mills	4	20	28,800
Sugar, beet	1	620	1,590,000

Manufactured Output.

	Quantity.
Brick	1,675,000
Hides, pounds	324,000
Lard, pounds	180,000
Meat packed, pounds	24,000
Tallow, barrels	300
Olive oil, gallons	3,000

YOLO COUNTY.

Yolo County is acknowledged by those at all acquainted with its wonderful fertility to be the gem of the great Sacramento Valley. Approaching it from the north or from the south, one is impressed with the increasing richness of the soil.

About four fifths of its area is level, but the western portion breaks into hills, with cañons and valleys of considerable extent, chief among which is Capay Valley, noted as one of the earliest fruit sections of the State. The hills are nearly all used for grazing, except the numerous homesteads. Along the eastern side of the county, near the Sacramento River, is what is known as the "tule basin," which contains about 40,000 acres. These lands are overflowed during high water, but as the water recedes furnish rich pasture for immense herds of stock. The county has very little waste land.

The two principal streams are Putah Creek and Cache Creek, the former being the boundary line, for a portion of the way, between Solano and Yolo counties. Cache Creek is the outlet of Clear Lake. Its elevation is 1,300 feet above sea level, and with Cache Creek as its only outlet, it will be seen that nature has furnished a magnificent natural reservoir. It is estimated that 50,000 horsepower could be generated by its waters, and that there would be enough left to irrigate every acre of land on each side of the creek, after it reaches the valley.

During high water Cache Creek has brought down from the hills and mountains immense quantities of the very cream of the soil, and for ages has been depositing this upon the land. The result is that there is a rich sedimentary deposit of from 20 to 30 feet in depth, entirely without hardpan, which is as rich as the valley of the Nile. This is particularly true of a large area around Woodland. It is ideal fruit land. You may find growing on this soil wheat, barley, oats, corn, alfalfa, all the vegetables of a temperate and sub-tropical climate, apples, apricots, nectarines, plums, pears, peaches, prunes, oranges, lemons, limes, figs, pomegranates, grapes (table, wine, and raisin), olives, almonds, walnuts, berries, and melons. Some of these lands are better adapted to particular crops than others, yet there are eighty-acre tracts of this sedimentary soil in the valley on which everything that has been named is now produced. The foothills in the western part, from Winters to Capay, and north, as well as those bordering Capay Valley, are mostly very fertile, and a great many have planted orchards and vineyards, the warm soil and exemption from frost making it a very desirable location.

The products are varied. Until within a few years, the cultivated area was devoted almost entirely to the production of wheat and to stock raising. Yolo still holds the banner as the largest producer of wheat and barley, according to acreage, but in the meantime she is coming to the front as a fruit producer.

The grape industry is a very important item. Yolo has the honor of producing the first raisins of commerce in America, and the late R. B. Blowers was the pioneer grower. The Seedless Sultana grape, which is grown here quite extensively, makes a very plump and "meaty" raisin, and for years the Woodland Sultanas have been acknowledged by the trade to be the best in the State. The shipment of table grapes to the New York market is quite an industry.

This county is noted for producing some of the fastest horses in California, and any day, on the streets and roads, can be seen fine specimens of driving horses. Woodland has been a center from which thousands of horses and mules have been shipped during the past few years, and they have gone to all parts of the country, notably to Hawaii, the Philippines, South Africa, and the Southern States.

There are thousands of acres of alfalfa, and the area is rapidly increasing. As each acre will yield from six to eight tons of hay, it can readily be seen how important the dairy interest may become. For stock of any kind there can be no better feed than alfalfa, either green or cured for hay.

The county seat is Woodland. Its streets are wide and clean, and lined with shade trees, while here and there can still be seen some of the majestic old oaks which suggested the name of the city.

Winters is located on Putah Creek, in the southwestern part of the county, and is noted as the earliest fruit section in the State.

Davisville, also located on Putah Creek, is in a very fertile section. There are probably more almonds grown here than in any other district in the State.

Yolo is on Cache Creek. It is also in a very fine fruit section, and boasts of having the largest almond orchard in the world. It has an olive-oil and pickling plant. The olives used for oil are first dried, and then run through a mill, which separates the seed from the pulp, the latter being then pressed to extract the oil. It is claimed that this process gives an oil of superior flavor, and is the only mill in existence which uses this process. The olives, after being dried, can be stored away and will keep in that condition for an indefinite time, thus giving the mill the entire year in which to work up the product.

Esparto is near the mouth of Capay Valley, on Cache Creek. It is surrounded by a fine body of land, largely devoted to fruit, vines, and alfalfa. It is quite a shipping point for wheat and barley.

The Woodland Chamber of Commerce, the Winters Board of Trade, and the Guinda Board of Trade are active public organizations.

The Legislature of 1905 made an appropriation of $150,000 for the purchase and equipment of a University Farm and to provide instruction in agriculture in connection therewith. This farm has been located upon a tract of about 780 acres of first-class valley land contiguous to the town of Davisville. The Legislature of 1907 appropriated $132,000 for additional buildings, equipment, etc. Courses of instruction are in preparation.

STATISTICS OF YOLO COUNTY, 1906-7.

Fish Industry.

	Pounds.	*Value.*
Salmon	300,000	$30,000
Other kinds	450,000	31,500
Totals	750,000	$61,500

Wines, Brandies, Etc.

	Barrels.	*Value.*
Beer	2,300	$13,800

Number of wineries, not receiving, 1; distilleries, 1; breweries, 1.

STATISTICS OF YOLO COUNTY, 1906-7—Continued.

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	21,600	$648
Apricots	1,013,825	45,620
Asparagus	20,000	800
Blackberries	25,000	1,000
Beans	407,000	16,280
Beets	130,000	1,300
Cabbage	1,400,000	21,000
Celery	67,000	1,340
Cauliflower	121,000	3,630
Corn	203,000	4,060
Cherries	6,000	240
Gooseberries	4,200	165
Grapes	10,036,600	878,200
Grape fruit	4,000	200
Lemons, boxes	75	225
Loganberries	2,625	105
Nectarines	3,600	180
Onions	6,400	1,280
Oranges, boxes	2,100	3,675
Olives	264,000	79,200
Pears	2,464,505	86,260
Peaches	2,185,250	87,410
Peas	6,500	195
Persimmons	4,500	90
Plums	663,475	26,540
Irish potatoes	4,600,000	46,000
Sweet potatoes	5,500	220
Prunes	2,411,580	96,450
Quinces	3,000	30
Raspberries	5,250	780
Strawberries	15,750	1,400
Tomatoes	4,100,000	71,800
Total	....	$1,476,323

Dried—	*Pounds.*	*Value.*
Almonds	452,500	$54,300
Apricots	63,780	13,370
Beans	4,400,000	110,000
Figs	203,500	5,085
Onions	1,400,000	28,000
Peaches	503,820	50,380
Raspberries	2,643,000	66,075
Raisins	2,206,000	99,270
Walnuts	2,500	250
Totals	11,875,100	$426,730

Canned—	*Cases.*	*Value.*
Apricots	6,120	$24,480
Pears	600	2,500
Peaches	14,000	50,400
Plums	600	1,400
Tomatoes	15,000	30,000
Totals	36,320	$108,780

	Tons.
Melons	1,965
Cucumbers	275
Squash	493
Lettuce	13
Carrots	50
Parsnips	5
Oyster plant	4
Radishes	10
Spinach	5
Turnips	25
Horse radish	25

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	586,130	$187,560
Skimming stations	5	....	....
Butter, pounds	..	203,860	50,965
Cheese, pounds	..	92,000	14,720
Cream, gals. (not included above)	..	164,000	196,800

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	25,000	6,500	$195,000
Barley	50,000	8,400	210,000
Oats	1,000	238	7,140
Corn	500	40	960
Total cereals	76,500	15,178	$413,100
Alfalfa hay	17,000	85,000	$595,000
Grain hay	16,000	15,000	150,000
Total hay	33,000	100,000	$745,000

General Statistics.

Area, 1,017 square miles, or 650,880 acres.

Value of country real estate	$1,251,130
Of improvements thereon	$804,865
Of city and town lots	$1,398,145
Of improvements thereon	$2,201,110
Of personal property	$15,696,780
Expended for bridges, last fiscal year	$55,900
Road levy per $100, 1907	35c
Irrigating ditches—miles, 400; cost	$110,000
Railroads, steam—miles, 87.80; assessed value	$1,932,465
Electric power plants—1; assessed value	.....
Electric power lines — miles, 71½; assessed value	.....
Number of acres irrigated	9,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	800	......	......
Apricot	85,000	......	......
Cherry	6,000	......	......
Fig	4,000	......	......
Lemon	1,500	......	......
Nectarine	250	......	......
Olive	19,085	......	......
Orange	10,000	......	......
Peach	135,000	......	......
Pear	23,000	......	......
Plum	1,500	......	......
Prunes	21,000	......	......
Quince	325	......	......
Total fruit trees	307,460	52,000	359,460
Almond	122,325	......	......
Walnut	5,000	......	......
Other nuts	25	......	......
Total nut trees	127,350	......	127,350

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	10,200	$45,900
Ducks	210	945
Geese	70	756
Turkeys	2,025	5,060
Eggs	296,090	74,020
Total value		$126,681

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 1,509	......	$4,520
Beeswax	1,200	300
Broomcorn	10,000	800
Hops	25,950	2,590
Alfalfa seed	891,330	80,220
Clover seed	88,200	12,350
Sugar beets, tons	6,246	34,350

STATISTICS OF YOLO COUNTY, 1906-7—Continued.

Livestock Industry.

	Number.	*Value.*
Cattle—Beef	750	$18,750
Stock	9.300	128,000
Dairy cows—Graded	300	15,000
Angus	6,000	156,000
Holsteins	225	19,680
Shorthorns	500	43,750
Calves	2,800	16,800
Swine	10,000	50,000
Horses—		
Thoroughbred	55	5,500
Standard-bred	520	26,000
Common	4,700	235,000
Colts	650	1.300
Jacks and jennies	60	15.600
Mules	3,000	300,000
Sheep—		
Fine 13,250		
Common ...30.550—	43.800	250.650
Lambs	2,000	4.000
Angora goats	750	2,060
Total stock all kinds	85,410	$1.288.090
Wool, pounds	350,000	$70,000
Mohair, pounds	3,000	900

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	4,000	$32,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	1	4	$90,000
Confectionery	2	6	40,800
Flouring mills	1	20	135,000
Farm impl'ments	1	10	75.000

	Amount.	*Value.*
Meat products—		
Fresh meats, lbs.	1,923,900	$192,390
Hides	669,000	66.900
Lard, lbs.	214,985	23.650
Meat packed, lbs.	15,000	3,000
Tallows, lbs.	185,400	9,275
Olive oil, gals.	500	1,100
Pickles (cucumbers), gals.	2,500	750
Pickled olives, gals.	7,460	2.980

Manufactured Output.

	Quantity.
Cigars	180,000
Flour, barrels	27,000
Malt, tons	669,000
Hides, pounds	214,985
Lard, pounds	15,000
Meat packed, pounds	515
Tallow, barrels	500
Pickles (cucumbers), gals.	2,500
Pickled olives, gals.	7,460

YUBA COUNTY.

Yuba County comprises about 105,000 acres of valley land, 100,000 acres of foothill land, and 195,000 acres of mountainous land. It extends from the Feather and Bear rivers to high in the Sierras, and is centrally located in the Sacramento Valley. In the mountains lumbering, mining, and stock raising are the leading industries. The mining industry is receiving more attention than at any other time in the past. In the valley, at the edge of the foothills, dredge mining has become quite an industry; at present there are ten dredges at work on the Yuba River.

Yuba is a great county for agricultural pursuits. When the soil and climatic conditions are considered, the land will produce almost any kind of a crop. At present it is devoted chiefly to grain and stock raising, but there are many orchards and vineyards which are thriving. Poultry raising has also been found to be a very profitable business.

Marysville, the county seat, is the principal town, and is a wholesale center of some note, having excellent transportation facilities in all directions by rail and stage. It has one of the largest and best equipped woolen mills on the coast, also a large and well-equipped flouring mill, and six machine shops for the manufacture of centrifugal pumps of all sizes. There is at present a large machine shop and foundry for the manufacture of dredge and all kinds of mining machinery.

The Western Pacific Railroad is building into and through the City of Marysville, as is also the Northern Electric Railroad. The latter road is completed between Marysville and the towns of Oroville and Chico, and south to Sacramento. A survey for an electric roadbed has been completed from Marysville to Grass Valley, Nevada City, and Auburn, and the road will be built as soon as the necessary rights of way have been secured.

Marysville Sand Cement Block and Brick Company has been incorporated with $50,000 capital; to manufacture cement blocks, bricks, and sewer pipe. This is due to the quality of the sand, which is pure crystallized quartz, 98 per cent silica, which is taken from the Yuba River.

This sand has been shipped a number of years to Portland, Washington, San Francisco, and other points. It is pronounced by experts altogether the best sharp, coarse, clear sand in the West for cement, foundry and filtering.

STATISTICS OF YUBA COUNTY, 1906-7.

General Statistics.

Area, 625 square miles, or 400,000 acres.		Number of miles of public roads	427
Number of farms	900	Road levy per $100, 1907	40c
Number of acres assessed	380,508	Value of county buildings	$81,000
Value of country real estate	$2,411,520	Irrigating ditches—miles, 100; cost	$160,000
Of improvements thereon	$440,800	Railroads, steam—miles, 44.11; assessed value	$113,699
Of city and town lots	$737,065	Railroads, electric—miles, 3.04; assessed value	$6,700
Of improvements thereon	$1,011,490	Electric power plants—1; assessed value	$164,000
Of personal property	$1,302,365	Electric power lines — miles, 135½; assessed value	$54,200
Total value of all property	$5,903,240		
Expended on roads, last fiscal year	$14,291		
Expended for bridges, last fiscal year	$15,726		

STATISTICS OF YUBA COUNTY, 1906-7—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	12,600	6,804	$204,120
Barley	4,005	1,762	44,040
Corn	5	10	320
Total cereals	16,610	8,576	$248,480
Alfalfa hay	440	2,200	$22,000
Grain hay	9,200	13,800	138,000
Total hay	9,640	16,000	$160,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	7,400	1,090	8,490
Apricot	15,000	4,100	19,100
Cherry	10,000	3,000	13,000
Fig	4,000	2,000	6,000
Lemon	3,721	2,100	5,821
Olive	8,000	1,800	9,800
Orange	33,800	29,600	63,400
Peach	61,300	27,300	88,300
Pear	17,600	3,100	20,700
Plum	3,400	600	4,000
Prunes	17,900	5,000	22,900
Total fruit trees	182,121	79,790	261,911
Almond	5,000	700	5,700
Pecan	500	...	500
Other nuts	2,100	560	2,660
Total nut trees	7,600	1,260	7,860
Grapevines	485	...	485

Wines, Brandies, Etc.

	Barrels.	*Value.*
Beer	2,500	$17,500

Livestock Industry.

	Value.
Cattle—Stock	$111,150
Dairy cows—Graded	31,230
Calves	2,420
Swine	4,300
Horses—Standard-bred	7,500
Colts	6,400
Jacks and jennies	900
Mules	15,980
Sheep	6,540
Common goats	2,500
Total	$188,920
Wool, 250,000 pounds	$35,000

Wool scouring plant, capacity 4,000,000 pounds.

Manufactured Output.

	Quantity.
Cigars	12,000
Flour, barrels	29,000
Lard, 14 cars	....
Meat packed, 156 cars	400,000
Ground barley, tons	9,350

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,150	$4,600
Turkeys	234	4,200
Eggs	.....	93,600
Total value		$102,400

Fruit, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	300,000	$3,000
Cabbage, celery, and cauliflower	....	5,810
Grapes, tons	2,680	61,800
Pears	1,200,000	36,000
Peaches	4,000,000	130,000
Plums	600,000	12,000
Tomatoes, boxes	10,000	5,000
Cucumbers, boxes	30,000	15,000
Total	....	$288,610

Dried—	*Pounds.*	*Value.*
Almonds	400,000	$60,000
Apricots	100,000	20,000
Figs	8,000	3,200
Pears	200,000	20,000
Peaches	500,000	99,000
Plums	40,000	4,000
Prunes	4,000,000	200,000
Raisins	1,600,000	136,000
Totals	6,848,000	$542,200

Canned—	*Cases.*	*Value.*
Pears	1,000	$3,000
Peaches	24,000	74,000
Plums	5,000	15,000
Totals	30,000	$92,000

Dairy Industry.

	Pounds.	*Value.*
Butter	400,000	$100,000
Butter shipped in	40,000	12,000

Number of creameries, 1.

Miscellaneous Products.

Tobacco planted, 10 acres; freight shipped by team, 15,000,000 pounds; ten dredges, valued at $350,000; new and general improvements in city of Marysville, $500,000.

Forest Products.

Area of timber lands, 1,800,000 acres, valued at $37,800. Power used for mills and manufactories in county—Steam, 2; electrical, 5; water, 1.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	3	3	$10,000
Carriages and wagons	2	5	6,000
Cigars	2	3	6,000
Confectionery	2	5	30,000
Flouring mills	1	15	145,000
Foundries and iron works	1	12	12,000
Leather goods	2	11	40,000
Machinery, hydraulic	1	3	6,000
Malt	1	3	24,000
Meat products—Hides	1	25	17,600
Planing mills	2	18	68,575
Collars	2	2	5,232
Woolen mills	1	130	300,000
Yuba Construction Works	1	100	....
Soda works	2	6	24,290
Ice plants	2	8	37,500

REPORT

OF THE

CALIFORNIA
STATE AGRICULTURAL
SOCIETY

FOR THE YEAR 1908

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1909.

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REPORT

OF THE

STATE AGRICULTURAL SOCIETY.

To His Excellency, J. N. Gillett,
Governor of the State of California.

Sir: We submit herewith the fifty-fifth Annual Report of the California State Agricultural Society. This report contains an account of the receipts and expenditures of the Society for the last year, a number of articles on subjects of industrial interest from parties competent to write on the same, and statistical reports from forty-nine of the fifty-eight counties of California. The industrial articles cover subjects of special interest to those desiring information regarding the agricultural conditions in this State, especially the subject of irrigation and its relation to State development.

It was long ago recognized by our foresighted statesmen that the ultimate complete development of California must depend on the wise application of the water from Nature's storehouse, the mountains, to the semi-arid plains of the valleys. This fact is being recognized by the people of California more keenly with each passing year, and very soon all will become advocates of irrigation. Owing to increasing interest in the subject at home and abroad. we have endeavored to secure a review of the irrigation situation in the three great geographical subdivisions of the State that are most adapted to irrigation and most in need of it, namely, Southern California, the San Joaquin Valley. and the Sacramento Valley.

The statistical feature of the report improves from year to year by reason of the increased experience of the County Statisticians. It is yet far from satisfactory, however, and will continue to be unsatisfactory so long as some of the county supervisors ignore the law on the subject and decline to send in a report from their respective counties. At present we can not summarize the returns and give State totals as we ought to do, and as we would like to do, for the reason that the missing reports would render the totals incomplete, and statistics are only valuable in so far as they are full and correct. Hence, we have been compelled to publish the reports by counties, allowing those that make returns the benefit of the same. The value thereof is such as attaches to the benefit to be derived from knowing the productive wealth of any one of the counties that send in a report.

It would seem that a supervisor, who is sworn to support the law and the constitution, would not require any other prompting than to have his duty in the premises pointed out to him, but our experience has proven that some of the officials only respect a law that carries a penalty, and hence we have taken the liberty to have a bill introduced in the legislature which amends the law requiring supervisors to supply certain statistics to the State Agricultural Society, by attaching a penalty thereto, and also a penalty to those producers who fail to make return to, or answer the questions of, the respective statisticians. If this amendment is enacted into law we believe it will accomplish the desired result, and give us such returns as will enable us to compile aggregates on State production of extreme value to investors and others interested in the State's development and the State's resources.

The State Agricultural Society has been sorely handicapped for want of money for some years past, making the work of rehabilitating the institution very difficult. A few years ago the Society's Annual Fair had degenerated to a point that caused the people to lose interest in it. Of late years there has been a steady effort by the Directors to counteract this feeling of indifference, by first cutting out the objectionable features of pool selling and whisky drinking on the Society's grounds, and second, getting together better displays of the State's live stock and industrial products. The efforts made in this direction have been attended with some success, considering the lack of means to work with, and the Board of Directors are now convinced that by consolidating all the departments of the Fair in one enclosure, and by a better equipment for the housing of exhibits and live stock and the accommodation of visitors, and by a more liberal appropriation for premiums and for exploitation work, they will be able to get up a series of Fairs that will be in a measure creditable to California. They are convinced, also, that if by more generous support and more liberal premiums they can succeed in holding a few good Fairs, the feeling of distrust that has maintained among the people in regard to the State Fair will become dispelled, that the attendance will be largely increased, and once on the upgrade the revenue should grow sufficiently to insure of each Fair being a little better than its predecessor, and in time the institution ought to become self-supporting. This is a point worth aiming for, but we want to emphasize the fact that to reach this desirable end we must, for a few years at least, be liberally assisted by the State. In the line of this ultimate object the Society will this winter ask of the legislature such assistance as will enable it to improve its equipment and increase its premiums, believing that if its requests are granted the start will be made toward the end we are striving for.

The Fair two years ago was an improvement on the one the year before, and the Fair last year was an improvement on the one two years ago. These results were obtained by a systematic effort put forth by the officers and Directors of the Society without money to back them, and with the same effort and a little financial assistance, it holds to reason that future Fairs ought to show a large improvement over the past. For the first time in many years the State Fair of 1908 paid its own expenses and a little surplus, though the surplus was not sufficient to meet the current expenses of the Society during the time intervening between Fairs, and hence we have been compelled to borrow money and create a deficiency.

It has been the history of the Society to go gradually in debt from year to year. The same was once true of what to-day are some of the most prosperous agricultural societies in the Eastern and Middle West States. There came a time, however, when the State got behind them with generous support, they then started on the upgrade, they improved the fairs, they increased their revenue, and now many of them are more than self-supporting. With proper support and proper management there is no good reason why California can not do as well as they have done.

The industrial conditions as they have come under our observation and as shown by reports made to this Society, may be briefly summed up as follows:

The past year was one of general prosperity in California for the tillers of the soil.

The spring of 1908 was marked by a material deficiency of rainfall, which resulted in a shortage in the hay and cereal crops of the State, but the higher prices that have maintained for hay and grain have returned to the producers of these products a full average revenue. On the other hand, the fruit crop, which depends for its success largely on irrigation, was not affected by the drouth, and was one of the biggest in the history of California. By reason of the large yield prices ruled lower, yet everybody had a surplus, and the fruit growers, almost without exception, experienced a prosperous year.

The mining interests of the State, according to the latest figures of the Mining Bureau, show an increased output, while the dairy business, which is a rapidly growing industry in California, maintained its own.

The wheat crop last year, as nearly as can be ascertained from figures available, aggregated about 10,500,000 bushels, which was less than the crop of the year before, but a larger yield than the State harvested in 1905 or 1904, which, however, were off years.

The barley yield last year, estimated from the same returns, was about 25,000,000 bushels, some less than the year before, but the higher prices which maintained will probably make the crop of last year more valuable in dollars and cents than any crop harvested by the California farmers for some years.

This is not, strictly speaking, a corn State, and yet our production last year was a little more than 4,000,000 bushels, which is an excess over the yield of the year before.

The hay crop was about 800,000 tons, a little short of the year before, but was generally of good quality, and the higher prices realized made hay a profitable product.

Our sugar beet industry continues to increase, the yield last year aggregating about 170,000,000 pounds, which is the largest crop ever harvested, and shows an increase for the last ten years of an average of a little more than 10,000,000 pounds per year.

The production of butter last year, in round numbers, was 48,500,000 pounds, of cheese 6,000,000 pounds, and of condensed milk, 100,000 cases. The Pacific Dairy Review, an authority on the subject, gives the total value of the dairy output for 1908, including the amount realized for calves, at $25,225,000.

California is one of the greatest bean states in the Union, its crop last year being estimated at a little more than 80,000,000 pounds, or nearly 10,000,000 pounds in excess of the crop the year before.

The hop production of the State last year aggregated about 14,500,000 pounds, which is more than an average for ten years, but not quite equal to the yield of 1907, when California harvested the biggest hop crop in its history.

Wool continues to be an important item of California's production, though its yield is gradually on the decline. The crop last year being estimated at about 15,000,000 pounds, which is 750,000 pounds less than the crop the year before, and 900,000 pounds less than the crop of 1906, which, however, was considerably above the average for the preceding ten years.

The dry spring referred to had its effect on the honey crop, and reduced the yield to about 5,500,000 pounds, or 1,000,000 pounds less than the yield the year before.

The shipment of fresh deciduous fruit during 1908 aggregated about 12,900 carloads. The great bulk of the deciduous fruit still goes from north of Tehachapi, while the great bulk of the citrus fruit is still produced south of the Tehachapi. The total shipment of citrus fruit last year for the entire State, aggregated some 32,000 carloads.

The cured or dried fruit crop aggregated about 140,000 tons, exclusive of prunes, while the prune crop aggregated only about 24,000 tons, which was a falling off of more than half compared to the previous year.

California harvested last year about 2,500 tons of almonds, and about 8,000 tons of walnuts.

The raisin crop last year aggregated about 65,000 tons, while the cured figs amounted to a little more than 9,000 tons.

The pack of canned fruit and vegetables last year was very large, owing to the big fruit crop and low prices, but the returns are so incomplete as to render figures speculative.

In 1907 the wine crop of California was about 60,000,000 gallons, and the brandy yield about 6,500,000 gallons, which probably is in excess of the amount of wine and brandy pressed last year, for while grapes were plenty and low priced, the wineries were so well stocked up that they did not have the incentive to manufacture as industriously as they otherwise might have done.

While the year 1908 was marked by a financial depression which swept across the country and more or less demoralized many branches of industry, it will be seen from the foregoing figures that the intrinsic resources of California's wealth were not materially impaired, and that there was no sound reason for any relaxation in industrial pursuits in this State excepting the lack of confidence, and that confidence being now fully restored and the producers in possession of the returns of a full average season's output, we can look forward with confidence to a renewal of all the usual activities during the year 1909, with the addition of such new enterprises, or enlargement of old ones, as follow full harvests and good prices.

Very respectfully,

B. F. RUSH, President.

J. A. FILCHER, Secretary.

FINANCIAL STATEMENT.

February 1, 1908, to January 31, 1909.

SUMMARY.

RECEIPTS.

1908.			
Feb. 1—	Cash balance	$964 79	
	Park and pavilion receipts	14,851 85	
	Premiums	15,108 85	
	Rent	1,200 30	
	Futurities	2,905 00	
	James Whitaker	2,995 00	
	Bills payable	5,000 00	
			$43.025 79

DISBURSEMENTS.

	Expense	$12,235 94	
	Races	4,193 00	
	Salaries	5,680 00	
	Pay-rolls	3,952 50	
	Advertising	1,337 79	
	F. W. Kiesel	1,345 00	
	Premiums	11,277 16	
	Entrance due	2,313 00	
	Building and improvement	378 19	
	Interest	179 15	
1909.			
Jan. 31—	Cash balance	134 06	
			$43.025 79

IRRIGATION IN THE SACRAMENTO VALLEY.

By O. H. MILLER.

The present year will witness in the neighborhood of 100,000 acres of land under irrigation in the Sacramento Valley. For the development of this large area of irrigated land the people of this State are greatly indebted to the pioneers who braved the terrors of an unknown land in search of the precious yellow metal of which California has contributed so liberally to the world at large. Mining ditches that were half a century ago utilized to carry water from the numerous rivers and streams to the placer mines that were to be found in all portions of the foothills, were in later years, after the placer mines had been worked out, converted into ditches to supply water for irrigation purposes to many thousands of acres of highly fertile land lying on both sides of the valley. These areas produce large quantities of citrus and deciduous fruits, berries, nuts, and alfalfa.

It was largely through the utilization of water furnished by these old mining ditches that the people of the great Sacramento Valley first learned the value of irrigation.

The development of irrigation from pumping plants is of more recent date.

There is now in the Sacramento Valley in the neighborhood of 10,000 acres, or one tenth of the total area under irrigation, that is supplied by pumping plants. Many of these plants supply only one to five acres, while two recently installed are known to irrigate from one well as much as 200 acres. It is impossible to give definitely the exact number of pumping plants in the Sacramento Valley, but from the most careful estimates secured from companies that furnish the pumps and engines for these plants, it is believed that there are about 2,000 such pumping plants now in use throughout the valley. Probably an average of about five acres is supplied from each one of these plants.

The Sacramento River is a source of supply of a large number of pumping plants. In some instances the pipes are placed through the levees, but more frequently they are placed over the banks and then down to the bed of the river. Some of these larger plants furnish water to as much as 500 acres.

Electric power is used by many of these plants. The abundance of electric power that is generated in the mountains adjacent to the Sacramento Valley makes it possible for rural communities to enjoy the advantages of electric power and light. Gasoline is also extensively used for power. Taking into consideration the present price of power and fuel for the average sized pumping plant and where water is within a reasonable distance of the surface, it is generally estimated that water can be handled at an expense of about 25 cents per acre for each irrigation

Of course, where wells of from 50 to 100 feet in depth are necessary to secure a sufficient quantity of water, the cost of each irrigation will increase proportionately to the distance the water has to be raised.

Perhaps the most highly developed system of pumping in the Sacramento Valley is to be found at Dixon, Solano County. There are 44 plants, irrigating about 1,100 acres in the immediate vicinity of Dixon, the power of which varies from 10 to 30 horsepower per plant. The effect of irrigation in that section is evidenced from the fact that six years ago the Dixon Creamery was dispensing about $15,000, while last year they paid out over $85,000, an increase of $70,000 in six years.

When an acre under irrigation will produce from 4 to 10 tons of alfalfa, with the product selling at $15 a ton, it is easily seen that irrigation either by pumping or gravity, is a matter of more than passing importance.

There are at least four large gravity systems in the Sacramento Valley. They are the Butte County Canal, the Central Canal, the Yolo Consolidated, and the Los Molinos systems. The Butte County Canal takes its water out of the Feather River below Oroville and irrigates several thousand acres of land in Butte and Sutter counties in the vicinity of Biggs, Gridley, and Live Oak. The Central Canal takes its water from the Sacramento River just above Hamilton City and carries it in an immense ditch, 60 feet wide at the bottom, down through Glenn and Colusa counties. One branch of the canal runs out to Willows and another goes down near the Sacramento River. The Yolo Consolidated Canal finds its source of supply in Clear Lake, Lake County. This is the oldest gravity system in the valley. From it is irrigated several thousand acres of land between Woodland and Davis and the foothills in Yolo County. The Los Molinos system takes its water from the river of that name in the southern part of Tehama County and irrigates about 10,000 acres just below Tehama on the east side of the Sacramento Valley.

There are several other projected systems that will no doubt be constructed at an early date. The largest of these is the Feather River Irrigation Company, which will take water from the Feather River immediately below Oroville, and extend its system from the town of Nelson straight through to the Sacramento River. It is claimed that there will probably be irrigated in the vicinity of 250,000 acres from this ditch.

Reports of the hydrographic branch of the United States Geological Survey show that there is an amount of water that could be made available for irrigation sufficient to cover the entire floor area of the Sacramento Valley nine feet deep. This abundant supply naturally tends to make it possible for landowners to secure water at prices that may be considered exceedingly cheap. The cost of water from gravity systems runs all the way from $1.00 to $3.00 per acre per year.

Mention should be made of the first Government irrigation project to be constructed entirely within the State of California. This unit is at Orland, in Glenn County, and not long ago the Reclamation Service awarded the contract for the construction of the dam and spillway. The reservoir will be built on Stony Creek, about fifty miles back from Orland. The flood waters of winter will be stored and carried down the natural channel of the river, the diverting dam to be ten miles from

Orland. Here the water will be taken out of the channel and from there spread over the land to be irrigated. This project will contain about 15,000 acres and the Government engineers hope to turn the water on in the spring of 1910.

It has not been the endeavor of the writer to make special mention of all the irrigation systems in the Sacramento Valley, but refer only to the more important. There is not a county in the valley that does not possess some excellent systems. It has been fully demonstrated that as a general rule diversified farming is possible only by means of irrigation. The effect of this has been greatly to increase irrigation throughout the valley. The subdivision of large areas of land has also been a factor in bringing other areas under irrigation.

The Sacramento Valley contains about two and one half million acres of land that could be irrigated. The time will come when every acre of this vast domain will be supplied with water. With the annual production of crops in this area now amounting to $125,000,000, one can hardly imagine what will be the value of these crops when all of this is brought under the highest form of cultivation.

IRRIGATION IN THE SAN JOAQUIN VALLEY.

By WILLIAM ROBERTSON.

In some parts of California the necessity for irrigation is an open question, and some of the fairly productive counties in the State point proudly to the fact that they don't irrigate and also assert that because of this condition their fruit is of a better quality and flavor than that of the irrigated districts. I do not intend to take up any argument along that line, but rather to deal with the question from an economical standpoint, and tell in as few words as possible the good results obtained from irrigation in the San Joaquin Valley.

Forty years ago this valley was composed mainly of large holdings in the hands of men who either grazed the land or raised grain. In those days there was little prosperity, and many of the men who to-day have become rich tell of the hardships they endured in earlier years in order to maintain possession of their holdings.

Probably one of the greatest barriers to progress in irrigation has been the incessant legal warfare carried on by lawyers, representing large land holdings and corporations, caused by our riparian laws.

In the days of Spanish and Mexican rule California was governed by the riparian laws of Spain, which claimed the water as rightfully belonging to the people, and the natural conditions of this country being very similar to those of Spain it was an entirely satisfactory law, but since the State came into the Union we have been regulated under the English riparian code, which is governed by conditions as opposed to ours as the poles.

The English riparian law is intended to preserve the piscatorial and manufacturing right to the owners of property through which the river flows, and on account of the heavy yearly rainfall, the rivers also perform the necessary function of draining the land.

With us, however, the waters from the rivers are necessary to irrigate the soil and make our land productive, reclaiming it from that aridity, under which it lay previous to its coming under the improving and civilizing influence of the white man. Consequently, a change in our riparian laws is absolutely necessary to put us in the most favorable condition for developing to its utmost the great resources of this wonderful State.

The waste of water under our present system is almost criminal, and before long the question of conserving and properly distributing the large outflow from the immense water shed along the Sierras will become an acute one.

Notwithstanding all our difficulties, however, irrigation has made great progress, and the San Joaquin Valley to-day stands out prominently as a world wonder at the immense change that has been wrought.

Forty years ago Indians roamed the plains; a few white men earned a somewhat uncertain livelihood, and in summer throughout the valley only a weary waste of parched ground met the eye; but the fertile brain and scientific skill of thoughtful men have been used to good purpose in applying the artificial methods of watering the soil in other lands situated similar to ours, causing to spread out before us a panorama of stately homes, splendid orchards, bearing the orange, peach, prune, apricot, nectarine, lemon, etc. Beautiful vineyards from which are distributed to the world vintages that excel those of Europe; table grapes, that are a marvel of deliciousness; raisins, that in quality and quantity, place us in the front rank of the world's producers, and waving fields of that prince of forages, alfalfa, which has done so much for the development of our cattle and dairying industries.

What a glorious change has been wrought. Instead of the return of a few paltry thousands of dollars a year, the whole valley resounds with glad songs of prosperous content from the throats of hundreds of thousands of people, who are yearly reaping returns far into the millions of dollars, and enjoying all the comforts of a refined, social, and intellectual life.

With all this development, however, we are only practically at the beginning, because of the large body of land still to be cultivated.

The San Joaquin Valley, nestling in the sheltered embrace of the Sierra Nevada Mountains on the east and the rolling hills of the Coast Range on the west, forms a garden spot containing 11,500 square miles, and the whole floor of the valley from north to south is a vast expanse of soil which for depth, quality, and productive power is not excelled in the world.

The San Joaquin River with a watershed of 1,600 square miles, the Kings River with a watershed of 1,742 square miles, and the Kern River with a watershed of 2,345 square miles, as well as numerous smaller rivers and streams, form such a magnificent aggregation to draw upon for its water supply, little wonder need be expressed that, brought under the controlling power of man, such extraordinary results have been attained.

As an example of what irrigation has done for Fresno County, I would state that in 1870, before the days of irrigation, the estimated value of all farm products, including betterments and additions to stock, was $229,068, and the population of the county 6,336. In 1907 the output of the county exceeded $30,000,000, and the population had increased to 60,000, a tenfold increase in population over 1870, and 130-fold increase in production. The disparity in growth between population and production brings strongly to light the tremendously productive power of irrigation. What is true of Fresno is equally true of all the eight counties in the San Joaquin Valley. Irrigation has improved their resources and increased their wealth. Millions of acres that thirty years ago lay comparatively idle and worthless represent to-day millions upon millions of invested capital and productive power.

The immense watershed of which I have already spoken, places the farmers in this valley under most favorable economical conditions. The easiness with which it is distributed, and the volume of the flow, enable the water companies to supply it at nominal cost. In Fresno County, which I believe has the cheapest system, the yearly charge is 62½ cents an acre. In some of the other counties it runs from 75 cents to $1.00 an acre yearly, but even the highest price is marvelously low when compared with irrigation charges in many other districts. The work which was so well begun in Fresno County has kept extending through the entire valley, and many ambitious irrigation projects have been completed, the latest being those in Stanislaus and Merced counties.

A little investigation and comparison of results in the San Joaquin Valley with other counties which do not practice irrigation, reveals the fact and proves indubitably that as a producer and money-maker irrigation is king.

What we are working for is wealth in production and returns for same in needed dollars. Irrigation has proved a getter of both, and I believe every one desiring a home will do well to make inquiry regarding this part of the State. All California is desirable, but judged by its development and wealth, we can say without undue egotism that few parts of the State excel in desirable features the great San Joaquin Valley.

IRRIGATION IN SOUTHERN CALIFORNIA.

By FRANK WIGGINS.

The eight counties comprising the 45,000 square miles of rich and productive territory in southern California—a territory embracing about one third of the area of the entire State—owe their remarkable development to the conservation of water, the sinking of more than four thousand artesian wells and the completion of vast irrigation projects. It has been truthfully stated that no other section of the Great West is more dependent upon watershed protection and surface and subterranean water supply, because the chief asset for production is water. Southern California is looked upon and is widely advertised as the garden spot of America. It is the ideal section for home life and for the accomplishment of great things in the general line of production.

The climate is delightful, and the soil is so fertile that the maximum production results from the minimum of labor and water supply. Nature has been lavish in her gifts for the empire of the Southland, but the chief element of progress and wealth in production is water. The natural stream-flow, while not as great as could be utilized, is yet ample to sustain the prosperous communities already built up, and with the future utilization of the immense quantities of flood waters now running to waste during the winter, coupled with the additional supply soon to be secured through the building of the Los Angeles aqueduct, bringing waters from the Owens River 260 miles distant in inexhaustible quantity, the development and expansion of the section immediately tributary to Los Angeles will receive an impetus never before experienced in the history of that region.

Comparatively a few years ago all of southern California was classed as a desert land, with little or no prospect of becoming worth while as an agricultural or horticultural section. The jackrabbit was in possession and sheep ranches abounded, while the Spaniard and the Mexican stood about, like Micawber, waiting for something to turn up. And they might have been waiting yet, had not the enterprising miner, promoter and homeseeker, with industry as the chief assets, appeared on the scene. The result everybody knows. The "desert" has been reclaimed, and with the intelligent use of means and labor in the control of the water supply, southern California has indeed become THE garden spot of America, if not of the world.

WATER HAS ACCOMPLISHED WONDERS.

Possibly the greatest achievement in irrigation projects, in addition to those established on a smaller scale in the various counties of southern California, has been attained in Imperial County, formerly the eastern half of San Diego County. The area of this new county is 4,000 square miles, embracing 2,560,000 acres. There are nine mutual water companies in this county, with systems established for the scientific irrigation of 400,000 acres. More than 650 miles of canals are in use, the supply of water coming from the Colorado River. Plans are projected to secure additional water from the Laguna dam on the Colorado River, at a point on the border of San Bernardino County. If successful, 200,000 additional acres of virgin soil will be brought under irrigation. Imperial Valley is 110 miles long and 40 miles wide—more than one half of the valley lying in Imperial County. The staple crops are alfalfa, barley, Kaffir corn, Indian corn, Milo maize, while stock raising is one of the chief industries of the people. All kinds of fruits and vegetables are grown profitably, and successful attempts have been made to grow cotton. The total cost of the irrigation canals and ditches in Imperial County is placed at about $4,000,000.

Santa Barbara, Ventura, Los Angeles, Orange, San Diego, Imperial, San Bernardino, and Riverside comprise the eight counties of southern California. Remarkable progress has been made in the line of systematic irrigation in all of them, and many millions of dollars have been expended by corporations and individuals in the construction of dams and reservoirs for the conservation of mountain water, for the construction of canals and ditches, for the sinking of artesian wells, and for the operation of private pumping plants.

Everything that will grow in any part of the world can be grown, and is grown, on southern California soil with less care and with more profit for the investment and labor than can be attained in any other section on the face of the globe.

The great citrus belt, where the largest, sweetest, and best oranges and the finest lemons in the world are produced, lies in southern California, and the groves are of immense value. It is in southern California that the fruit-grower and the agriculturist bored for water, and instead, in many instances, found oil, one of the greatest sources of the wealth of the southland, so that the farmer and fruit-grower came into double wealth, finding both water and oil.

What water and industry have done for southern California is shown by recent figures submitted by the Los Angeles Chamber of Commerce for the territory immediately tributary to that great and stirring city. The figures follow:

PRODUCTION FOR 1907-8.

Citrus fruits, 30,000 carloads; carloads vegetables, cauliflower, 400; potatoes, 500; tomatoes, 350; celery, 2,000; onions, 800; nuts, 9,000 tons; cantaloupes, 2,000 carloads; raisins and dried fruits, 5,000 tons; butter, 6,000,000 pounds; cheese, 950,000 pounds; eggs, 275,000 cases; flour, 400,000 barrels; canned goods, 350,000 cases; olives, pickled, 1,000,000 gallons; olive oil, 500,000 gallons; beet sugar, 100,000,000 pounds; wine and brandy, 1,200,000 gallons; beer, 210,000 barrels, petroleum, 35,000,000 barrels; beans, 32,000 tons.

IRRIGATION AND DAIRY EXPANSION.

By WM. H. SAYLOR,
Secretary of the State Dairy Bureau.

Fifteen years ago this fall the writer came from the East to cast his future lot with California. The splendid exhibit of Fresno County's resources at the Chicago World's Fair was the incentive to buy a railroad ticket with that point as its destination. We were told by the "boosters" in charge of the exhibit that Fresno County had no dairy industry to speak of, but great opportunities, and as it was "opportunities" we were looking for at the end of the fair, we landed in Fresno. It was not a very cheerful thing—this hunting for opportunities—just then. The "silver panic" was at its worst. Several hundred able-bodied men were fed regularly at the public "soup-house;" but this did not discourage us. We started at once to find those "opportunities"—and we found them even if they were beyond our reach.

It was this way: We dropped into one of the leading grocery stores and found several "rolls" of butter, which from their quality may have been from two weeks to two months old. It was butter typical of the make of that time, of worse than second grade, wrapped in a piece of cloth that suggested the remnants of a worn-out piece of wearing apparel, and was soft and "mushy," as butter experts say. It was not the class of butter that tempts one to say to the waiter—"some more butter, please." When we inquired of the grocer in regard to the price, he told us it was eighty cents for a two-pound roll, and volunteered that it was the finest "coast" butter that he had purchased in San Francisco, and not the cheap "ranch" butter of which small quantities were made around Fresno. We had studied the art of butter making in an Eastern agricultural college, and had also practical experience along this line. This began to look like an "opportunity," for in our natural self-estimation we had considered just how much better butter we could have made had we had the opportunity to make it. We told the grocer that our aim in coming to California was to get in the dairy line, but he shook his head and said we were out of place. Fresno was not a section for the dairy business and we should have chosen the "coast country" as a basis of usefulness.

A few days later we went by the "hay market," where we found ten or a dozen wagons loaded with alfalfa hay waiting for a buyer, while the men in charge were sleeping or lounging under the shade of the trees in the courthouse park. We aroused one and asked him the price. With the enthusiasm of a customer in sight, he replied, $4.00 a ton delivered in the city and $4.50 delivered out in the country. It was fine, fresh, odorous hay-alfalfa, the ideal dairy feed, richest of all roughage in protein. Here was indeed an "opportunity"—butter at forty cents a pound, the hay out of which it can be made raised profitably at four dollars a ton. We had helped to make a little money in the East with butter at twenty cents and hay worth twelve dollars a ton. Fresno looked good to us, and we stayed. We were young and in a new country, but we could see in the conversion of the enormous yields of alfalfa into butter and other products for human consumption a great industry, and that Fresno was a "dairy country," if it was anything, despite the opinion of our new-made friend, the grocer.

A year later a few business spirits had the boldness to start a public creamery in Fresno. The local farmers who had been used to harvest a crop of grain, fruit, or grapes once a year, and having an easy time between harvests, didn't take freely to the labor of harvesting a crop from cows twice a day, seven days a week, in sunshine and in storm, and after a brief experience the public creamery closed; but the dairy spirit lived. Forty-cent butter, and four-dollar alfalfa hay wouldn't down. After a few years a number of Danes, the race that is the cream of dairy enterprise in Europe, got together and formed a coöperative creamery company after the fashion that has succeeded in making their native country an intensified dairy unity. They didn't mind milking cows twice a day 365 days in the year. They liked it. The creamery started in a small way, but it has grown until now it distributes over $300,000 annually among the Fresno County farmers, mostly all of which represents profit, for in the dairy business on a California alfalfa farm practically the only expense is labor, and as the Fresno farmers and their families do their own work, they pocket almost all the cash that is represented in the periodical "milk" or "cream" check. To-day Fresno County has six large creameries, and instead of buying "coast" butter, she ships four times as much to markets on the coast as she consumes. She is very much a "dairy country."

What has happened in Fresno is practically the case with every county and every locality in California where irrigation has made alfalfa cultivation possible during the long period of growing weather throughout the year where expensive shelter is not required for the comfort of cows, and where good prices are paid for a fine article of butter or other form in which the product of the cow is marketed. Almost coincidently with the starting of the creamery business in Fresno County, the same enterprise was taking hold of all the counties with irrigation facilities, and since then the story of the development of the dairy business in conjunction with irrigation and alfalfa growing in California is told in statistics that have been compiled by the State Dairy Bureau.

Growth of Butter Production in Nine California Counties.

Counties.	1898.	1900.	1902.	1904.	1906.	1907.	1908.
Fresno	291,754	604,861	1,025,374	1,619,746	2,644,897	2,786,817	3,315,926
Kern	....	129,848	156,878	200,936	334,070	372,569	521,495
Kings	....	258,750	727,282	1,099,400	1,677,272	1,960.364	2,419,651
Merced	....	623,608	712,202	1,563,771	2,361,528	2,469,726	2,831,846
Sacramento	285,984	742,443	1,186,135	1,508,293	1,617,633	1,060,098	1,277,771
San Joaquin	....	506,047	907,694	1,015,568	1,641,374	1,625,538	1,605,152
Stanislaus	190,655	423,185	677,058	1,564,749	2,759,582	3,615,469	4,113,866
Tulare	....	302,615	683,560	1,497,762	2,075,929	2,522,707	2,729,377
Yolo	321,218	533,525	743,268	831,185	1,387,210	726,532	944,268
Totals	....	4,124,882	6,819,451	10,901,410	16,499,495	17,139,820	19,759,352

In the preceding table is given the output of butter for nine counties in the San Joaquin and Sacramento valleys, five of them since 1898, and all of them since 1900 for every alternate year, and for each of the two past years. The table is given because it presents a concrete exhibition of the success of the dairy business on a basis of irrigation in California.

This is certainly a remarkable showing. No other section of the country shows such a development along the line of the dairy business. And still it is only in its infancy. A person in visiting one of these great dairy counties in search of their dairy industry might easily be inclined to question the accuracy of these figures, in view of the fact that he would find an extremely small fraction of total acreage given over to the business. But the invasion of these irrigated districts is strong, healthful and on a good basis. It only needs a lot of enterprising, intelligent farmer-settlers to make the irrigated districts of California, not only a source of butter supply for Californians, but I firmly believe the time is coming when California butter, and possibly the other dairy products, will be more familiar to appetites in the East than any other of her products.

WEALTH IN CALIFORNIA COWS.

State Dairy Bureau Values Output for 1908 at $25,224,151.

The Pacific Dairy Review summarizes the value of the output of the dairy industry in California for the year 1908, as follows:

In the last two issues of The Review we have given a statement taken from the report recently issued by the State Dairy Bureau, which showed the production of butter and cheese in California during the year ending September 30, 1908. These are the principal sources of revenue to the dairy industry of the State, but they do not constitute all of it. There is some condensed milk produced in the State. Each year brings on a big crop of calves from approximately 450,000 dairy cows in the State. There is an immense volume of skim milk, butter milk and whey produced as by-products, and there are nearly two million mouths in California that must be fed an amount of fresh milk and cream that can only be approximately estimated.

On each of these channels through which the product of our dairies is converted into cash, or its equivalent, the State Dairy Bureau has tried to place a money valuation. Of course it can only be at best an approximation, and for this reason the figures are purposely conservative.

In case of butter and cheese the average price paid in the San Francisco market is used as the basis of the estimate. This is the lowest market in the State, as it gets the surplus butter not consumed near places of production. It is also based on wholesale prices, while in reality a great portion of the make is sold at retail prices by the producers. Furthermore, the price at which valuations are made is on a basis of the market quotations in San Francisco, while as a matter of fact the bulk of the butter is sold in San Francisco at a premium over the quotations.

On this basis the Bureau values the butter produced in the State for the statistical year ending September 30, 1908, at $13,474,366 and the cheese product at $801,126. Of condensed milk there was produced 100,069 cases on a basis of forty-eight twenty-ounce cans to the case, which are valued at $375,259. The problem of arriving at a valuation of the raw milk and cream consumed is a more difficult one, and can only be arrived at by using as a basis the per capita consumption as determined by the United States census. If the consumption of milk and cream in California can be taken on the same basis, the valuation on the quantity consumed is well within the amount given in the accompanying table, which is estimated on a basis of wholesale prices, without making allowance for the large proportion sold direct by producers at retail prices.

The following table gives the valuation of the dairy output as determined by the Bureau for the year ending September 30, 1908:

Value of 48,468,585 pounds of butter	$13,474,366
Value of 6,162,514 pounds of cheese	801,126
Value of 100,069 cases of condensed milk	375,259
Value of milk and cream consumed	7,555,000
Value of calves produced on dairy farms	1,760,000
Value of skim milk from butter production	1,258,400
Total	$25,224,151

CONDENSED MILK PRODUCTION.

This is a branch of the dairy industry of California that has attracted some interest, but it seems to have experienced considerable of an up-and-down career since it has been started. This is shown in the following table giving the production for the last ten statistical years:

Year.	Cases.
1899	52,558
1900	66,302
1901	100,140
1902	146,860
1903	126,874
1904	186,905
1905	244,878
1906	113,025
1907	134,907
1908	100,069

The report of the State Dairy Bureau states that notwithstanding a large trade that California enjoys in condensed milk, both for exportation and local consumption, the condensing business has had great difficulty in getting a foothold in the State. There are at the present time four factories in operation. What was formerly the largest one in the State has been temporarily closed recently. As in case of cheese, butter prices seem to have offered the most attractive inducement to the cow owners through the fact that butter production gives back to them the skim milk.

ALFALFA CULTURE IN CALIFORNIA.

BY H. C. BLEWETT.

Alfalfa, or Lucerne, as it is called in some states, has been aptly termed the "King of forage plants," and while it has been grown in a small way in California for a great many years, the area planted has not assumed large proportions until the last ten or fifteen years.

Its introduction to the State has been a boon to the California farmer, and he has been wise enough to recognize it as such. Wherever there is water enough for irrigation will be found alfalfa; and wherever there is alfalfa will be found fat cattle, and fat bank accounts.

The largest areas planted are in the San Joaquin Valley, in the counties of Kern, Kings, Tulare, Fresno, Merced, and Stanislaus. In the last named alone over 100,000 acres have been planted in the last six years, and as a natural consequence it has risen from eighth to second place in point of dairy products.

While I have no exact figures as to the value of this product, it will easily exceed a million dollars annually, and when we consider that only a small part of the alfalfa planted is used in dairying, the enormous benefits derived by the farmers will be easily seen. Alfalfa will grow on nearly any kind of soil, but experience has shown that a firm sandy loam, with a semi-porous substrata—not hardpan—at a depth of from five to ten feet to be the best.

The soil should be deep and of fine texture, and a small percentage of alkaline silicates, as a plant food, is beneficial and requisite to a continuation of a large yield. Soils containing gypsum, or some of its forms, produce the best alfalfa grown in California, and where the soil has been found deficient in that respect it has been found highly profitable to apply commercial gypsum in the same manner as fertilizer; that is, by scattering broadcast over the surface. The cost of applying it in this manner is small and in many instances I have known the yield to be doubled.

Land to be seeded to alfalfa should be thoroughly prepared, as a field should grow and be productive for years, and a little extra labor used in preparation of the land will be repaid a great many times by the saving in time and trouble when irrigating and caring for the future crops.

There are several methods of preparing land for alfalfa used in the West, but the most approved method is the checking or flooding system which is generally employed in California.

When the land is fairly level the square check system is best, but when it is rolling and uneven it is cheaper and better that the check should follow the contour of the land, without regard to shape.

In laying out a field several things should be carefully considered, namely: the character of the soil; the grade of the land; and the water supply. When the soil is porous and the seepage great, the number of supply ditches should be increased, and the checks made smaller; in fact, small checks are preferable under most conditions.

The land should be well graded, without depressions, and the levees should be broad and low. The common mistake of making a high sharp levee results in a barren strip of land through the field, difficult to cross, and furnishing an ideal home for gophers, without any advantage whatever.

After checking and grading the field should be flooded before plowing and seeding, as it frequently happens that the first application of the water will cause the land to settle and cave in spots. After all such holes have been filled, and the grade reëstablished, the land should be plowed deep, and thoroughly harrowed before seeding. Broadcast seeding is generally practiced, although some have used a specially constructed drill with good results, after which a very light, short tooth harrow, or brush, is used to cover. A light roller run over after seeding will help to secure a good stand, as it prevents drying, and presses the seed firmly in contact with the soil.

Great care should be exercised in the selection of seed as quite a large percentage of even the best seed are not fertile, and some dealers are not always careful to buy the highest priced and cleanest seed for their patrons. Fourteen to sixteen pounds per acre are usually recommended to be sown, and this would probably be enough if all the seed sprouted, but my own observation has been that better results are obtained from twenty to twenty-five pounds per acre. Most of the poor alfalfa seen is the result of too great economy in seed.

Seeding can be done at any time during the winter or rainy season, but it is better to seed during the fall as the ground does not dry on top, and by the time irrigation is necessary the plant is well established, and its growth will not be retarded by the packing of the soil around the roots caused by summer irrigation.

The method of harvesting varies somewhat in different localities, but in the dry interior valleys one method is usually followed. When the field is well in blossom it is time to cut, for if allowed to stand until too ripe the leaves begin to fall and much of the food value of the hay is lost.

After cutting it should not be allowed to lay on the ground over a half day before raking, as it will cure readily in the winrow, and thus avoid bleaching.

A little good judgment on the part of the farmer in the matter of shocking and stacking will result in a fine, bright hay, full of nutriment to the last straw.

It is a common practice of most dairymen to pasture their fields practically the whole year, but it is generally conceded that it is better and more economical to cut the alfalfa and feed the hay. Continuous pasturing will injure the plant and finally destroy it altogether. The softer the soil the quicker the destruction will take place.

The amount of forage which an acre of alfalfa will produce depends largely upon the farmer who raises it, and the locality in which it is grown.

In some of the western and northwestern states only two and three crops per year are obtained, but in California with its long summer seasons, four to six crops are the rule, with an annual yield of from eight to twelve tons per acre, when properly cared for. Compared with the common forage crops it will easily yield three times as much as the best of them.

It is replacing other crops rapidly, and its food value has become so generally recognized that even the immense increase in acreage has not kept pace with the demand, and hay is higher in the general markets to-day than ever before.

There is good reason for this, too, for alfalfa comes nearer to being a balanced ration for stock than any of the other forage plants. It even exceeds red clover—a close family relation—in food value in the proportion of eleven to seven, according to reports of chemists.

A field of alfalfa is a valuable asset to a farm, and the farmer who possesses one, with a herd of good dairy cows to consume its product, has a safe and permanent income every day in the year, and is on the high road to prosperity.

THE EUCALYPTUS SITUATION IN CALIFORNIA.

By G. B. LULL, State Forester.

The past two years have witnessed the organization of thirty-eight companies in California for the purpose of exploiting eucalyptus lands and growing this tree for revenue. In addition, a large number of real estate companies have made the handling of lands adapted to eucalyptus propagation a side line of more or less prominence. Dealers in these lands or the stock of organized companies claim that no other commodity of an investment character finds more ready sale, and this statement seems amply borne out.

In connection with this situation it is pertinent to examine the foundation upon which rests this sudden activity in planting to discover, if possible, whether it has a stable foundation and is of lasting importance, or whether it will fall of its own weight, shattering the hopes of those interested in its success.

The best data for investigating purposes are contained in Circular 116, United States Forest Service, entitled "The Waning Hardwood Supply." Therein is shown that at the present rate of cutting the hardwood forests of the United States will be exhausted in sixteen years. This alarming statement begets the question, "Where shall we turn for the hardwood material so necessary for the daily needs of civilized life when the hardwood forests shall be cut away?" Careless and over-optimistic persons respond that it can be imported (from what source is not specified) or that a substitute will be found. In times of plenty such answers may satisfy, but to a nation confronted with a hardwood famine they bring no assurance.

Realizing the serious nature of this condition the Forest Service and State of California in 1903 coöperatively conducted a study of the genus eucalyptus to determine its adaptability to cultural methods and its value in the hardwood market. The result of this study was published in part as Circular No. 2 of the State Board of Forestry. With the appearance of this publication the live interest in growing the eucalypts for profit began. The study demonstrated conclusively that the eucalypts can be grown in grove form throughout the temperate portions of California, that under good cultural conditions they will grow many times faster than any hardwood indigenous to the United States and that the properties of the mature wood of the leading species are similar to hickory, oak, and the staple hardwoods now in use.

The first and last statements would have occasioned no great concern, but the first and second together immediately conjured up ideas of monopolizing the hardwood supply of the United States. Hence companies were formed, suitable lands came into demand, and the boom was on.

It may be said that the growing of eucalyptus is in response to a real demand that may never grow less urgent. This seems sufficient justification for widespread interest, particularly in view of the fact that the temperature requirements of the genus renders its commercial propagation outside of California a doubtful venture. When one considers the condition of supply and demand, the limitation of the commercial range and the fact that no insect or other pest preys upon the tree, he can see ahead nothing but enormous wealth to those fortunate to be interested in this project.

This may or may not be the result. Everything depends upon the conditions governing each plantation. For example, a company may have good land, favorable climatic and water conditions and conduct its affairs intelligently yet fail to return a profit to its investors because its tract is inaccessible to market and its profits are eaten up by transportation charges. In another case the climatic or water conditions may be unfavorable or the soil shallow or of alkaline character, or the investor may be defrauded by a dishonest company or the manager of the company may be inefficient. All these factors should be carefully considered by prospective investors.

Another feature of eucalyptus investments requiring study on the part of prospective investors is the claims of the company as to returns. By this means alone much can be learned regarding the motive for the company's activity. In order to do this the publications of the Federal Forest Service, the State Board of Forestry, and those of the University of California must be used as standards for comparison. These publications are prepared by experienced men who weigh the proposition impartially and are attracted only by its merits. Should the estimated returns of any company exceed greatly the amount warranted by the text and figures of growth and yield contained in these publications the company should be regarded with suspicion. The returns receivable from intelligent work in eucalyptus growing are large enough to satisfy the most exacting investor. The company that exaggerates them is generally impelled by ignorance or dishonest motives. In either case the investor will do well to seek investments in a safe, more conservative company.

A remarkable fact regarding the past activities of eucalyptus companies is their apparent willingness to issue conservative literature. A few organizations of wild-cat tendencies have arisen, but their operations have been quickly checked by the State Board of Forestry or the different Realty Boards. Recently the eucalyptus growers in Los Angeles voted to have formed a committee whose duty it will be to review the literature of the various companies and standardize it. This committee has been appointed as follows: By the State Realty Federation, D. W. Carmichael, Sacramento; by the Los Angeles Realty Board, Jos. R. Loftus, Los Angeles; by the Forestry Society of California, W. A. Munsell and Geo. E. Fairhead, Los Angeles; by the State Forester, C. H. Sellers, Sacramento, formerly Assistant State Forester. The State Forester is ex officio a member of this committee. The watchfulness of this committee should go far toward preventing the operations of wild-cat companies which will be a benefit to legitimate companies and investors alike.

Predictions regarding the future of any industry usually have little weight, because experience has too frequently shown that its status has been entirely changed by unforeseen events. Such may be the fate of any predictions made regarding the future importance of the eucalyptus in California. From our present knowledge of the rapid growth and qualities of this remarkable genus, however, and the certain demand for hardwood it would seem certain that eucalyptus growing is destined to take a high place among the industries of California. It would appear to require no wizard's mind to foresee that this State will become, within the next twenty years, the base of hardwood supplies and the home of the hardwood manufacturer. If such should be the case the long-despised eucalypts will be greater wealth-producers than the orange or any other of California's famous crops.

INTENSIVE FARMING IN CALIFORNIA

By CLARENCE E. EDWARDS,

The future of California depends on intensive and diversified farming. It is to the superficial cultivation of large tracts in single holdings that California's lack of progress in the past, along agricultural lines, is due. The prime essential for the proper development of the State is the elimination of large holdings in favor of the small farmer. There is no land elsewhere where intensive farming has been found more profitable than in California. In all these countries where vast populations on small areas of agricultural land are compelled to farm on the intensive plan, is found the greatest comfort in the home, while in those countries where vast tracts are held in single ownership is found the greatest poverty. But it is only in California that intensive farming is at its best, for here both climate and soil united with intelligent cultivation, bring forth results that are impossible in less favored lands.

The people of California are awakening to the possibilities of soil and climate of the State, and with this increased knowledge comes the doom of large holdings of land. Where once great tracts maintained, at most, one hundred people, now thousands are provided with homes on the same area. Thousands of acres of California's richest soil still lie waiting for the coming of the small farmer, and it is only through intensive farming that these lands will give their best results, and when the land is worked to its utmost that result is something never dreamed of by farmers in the older states. Such thorough farming, without exhausting the resources of the soil, requires an intelligence, scientifically educated, to constantly supervise the work.

This fact makes it plain that the area of land which one man can care for and supervise properly must, of necessity, be small. Hence it is that intensive farming requires a small farm. But with this intensive farming diversity of product must go hand in hand, for it is a dangerous condition to have but one product on a small farm. In good and in average seasons the crop will pay wonderfully well, but when there comes a bad season, a poor market, or any of the many conditions that are adverse, the small farmer finds himself without means of sustenance, and is obliged to wait for the coming season to enable him to recover from the mishap. It is the small farm, intensively cultivated, with diversified crops, that is the boon of the farmer and the hope of the State. In the small farm there must be no waste places; no weed-grown corners nor weed-lined fences to deface the farm and draw life from the growing crops. Between tree and vine rows no grass nor weed must find room to absorb irrigating water and draw sustenance from the soil which belongs to the crop.

To the man of small means the small, diversified farm is specially alluring, for while he is able to buy but a few acres he is assured that he can not only provide for his family, but will also be able to lay aside something each year to provide for future comfort. His returns are not only sure, but if properly managed are as regular as a monthly salary. The expenses of a small farm are light, and the owner is always certain of having table necessities.

California is not a shiftless man's country. The farmer must have intelligence and the faculty of application, combined with energy and perseverance. He must apply his mind and his energy to the business at hand. Numerous instances might be cited of men who came to California with small means, achieving success from diversified, intensive farming and becoming substantial citizens in course of a few years. Hundreds of men in California who are to-day among the most prominent citizens came with but sufficient to make a first payment of a small tract of land and purchase stock and make improvements. These men devoted themselves to scientific, intensive farming, and made it pay from the start.

One instance of the many that might be recorded is sufficient to show what can be done. A prospective farmer bought twenty acres of land at $100 an acre, paying one fourth cash, giving his notes for the balance on easy payments. His original outlay was $250 for his first payment on the property; improvements, $2,000; horses, wagons, farm implements, etc., $350; six cows, $240; six young pigs, $30; chickens, $20; incidentals, $110, making a total outlay of $3,250.

Ten acres of the land was devoted to alfalfa, eight acres to vineyard and two acres to orchard, garden and house lot. Five acres of the vineyard were given to Tokay grapes and three acres to seedless Thompsons, for raisins. While these vines were reaching maturity the alfalfa, the cows, pigs and chickens and their progeny, supported the family, paid the interest on the deferred payments and gave a small sinking fund for the principal. In four years' time the vineyard brought sufficient returns to pay off a good part of the purchase price and by the end of the fifth year the land was debt free and bringing in a good income.

It must be borne constantly in mind, however, that more depends upon the man than upon the soil and climate. California is not a lazy man's country, and the above instance of good results would not have been possible had not the man worked intelligently, persistently and to the best advantage all the time. There have been frequent instances in California where a man has been able to secure a good piece of land with improvements at a cost which made it a bargain, simply because the original owner failed in the necessary requisites to make it a success. The same farm which ran one man in debt gave the other a good living and enabled him to lay aside something each year.

An instance of this recently occurred in one of the foothill valleys. A man purchased forty acres lying partly on hill and partly along a creek. It was an ideal farm, all cultivable, and on the hill were two fine springs which were utilized in furnishing the nine-room house with water. The improvements cost $2,500, while the land cost $2,000, making the total investment $4,500. The owner, while a good man as men go, wanted to live without working very hard. He put his bottom land in pasture, devoting five acres to alfalfa and sixteen acres in rye grass. His hill land was left in timber except one acre for family orchard and vineyard. He kept two cows, a few chickens and turkeys and half a dozen angora goats and sat down to wait for a living income to grow. It did not grow and in its stead he found a debt accumulating.

He finally gave up in disgust and sold the place of $3,500. The new owner expended $1,000 in changing conditions, put $500 in cows and chickens, making the place stand him $5,000. He had ten good grade cows, costing him $40 each, one hundred young laying hens, ten turkey hens, two gobblers, four horses and ten hogs. He increased his alfalfa patch to eight acres, and put the rest of the rye grass patch into berries, fruits and vegetables. This took the twenty-one acres of bottom land. On his hill land he increased his orchard to five acres and his vineyard to five acres. His house grounds, with stables, corrals, poultry yards and lawn covered three acres, leaving six acres of timber around the springs which supplied the place with water. This timber furnished all necessary firewood. The forty-acre place was now managed on proper lines and brought the owner, who used both brains and hands, $3,000 a year income.

There is constant demand in California for the products of a small diversified farm. Thousands of carloads of poultry products, dairy products, live stock and meats are shipped into California every year. These can all be produced on a small farm, and their marketing planned so that cash returns can be realized every month. The farmer gets cash from the creamery every thirty days. He gets cash for his poultry products and vegetables on delivery. His fruits are always in demand, selling for cash. His hogs fatten on skim milk and sell for cash. With intelligent supervision something can be sent to market regularly every month in the year, bringing a cash income as regularly as a salary, and much more satisfactory than any salary ever received by a man behind a counter or at a desk, for it carries with it a feeling of independence and ownership, and the further satisfaction of being one's own employer.

There is a wonderful future in intensive farming in California, for with the high life value of the soil, unfailing water, and unexcelled climate, there is no limit to the productivity. The day will come when the great interior valley of the State, the combined Sacramento and San Joaquin valleys, will be given over to intensive farming, and that great stretch of land, fifty miles wide and five hundred miles long, will have a population of many million of thrifty and industrious farmers.

In all the Coast Range valleys, and in the southern part of the State opportunities for intensive farming on small ranches are increasing every year. Coincident with this increase of small farms comes an increase in demand for the products raised on them, and with all the increase of production there has been no diminution in the demand; rather there has been a constant increase in demand and also an increase in prices paid for these products. With every increase in the farming population of the State there is commensurate increase in the population of the cities and towns, which calls for increased supply of farm products.

Good land for intensive farming in California can be bought for from $50 to $100 an acre. This can be had for a small cash payment and easy terms for the balance if one so desire, so that the bulk of capital can be put into development and improvement. With a cash capital of $3,000, a small diversified farm, intensively cultivated, will give an active, energetic man a good living for himself and family and permit him to put aside a comfortable sum in the bank each year.

THE POULTRY INDUSTRY IN CALIFORNIA.

By COL. L. C. BYCE.

The poultry industry of the State, since its inception only a comparatively few years ago, has made advancement greater than that of any other section in the world. Thirty years ago if one wished to procure 500 or 1,000 hens to stock up a poultry ranch they could not be obtained except by having them shipped in from the East; and now if a poultryman has for sale a like number of fowls he scarcely needs go beyond his neighbor to find a customer. In the great chicken center of Petaluma, with its nearly one and a half million hens, one would very naturally expect to be able to buy any number of fowls desired, but there, as elsewhere, in the State where fowls are kept, the local demand is so great for stocking up ranches being started in the immediate neighborhood, that only old hens too old to be productive, ever leave the vicinity, and buyers from remote sections are somewhat surprised at not being able to find any one willing to sell laying pullets.

There is a reason for all this; or, it may be said there are many reasons, all of which contribute to make California the most desirable place for poultry raising. Whoever heard of poultry ranches in any other State in such numbers and carrying from 5,000 to 8,000 fowls on a ranch? Tributary to Petaluma there are over 800 poultry ranches having from 1,000 to 8,000 laying hens each. Other sections are rapidly coming to the front as great poultry producing centers. There is no part of our great State that is not adapted to extensive poultry culture, even the mountainous parts have some of the most favored places, and poultry is not simply engaging the attention of those of small means or those whose health has failed them and are seeking outdoor employment, but owners of very extensive tracts are fast finding that no crop can be raised nor can the product of their acres net them as much as is secured through a well-conducted poultry business. This is opening up the way for the employment of a great many men competent to manage or conduct such places.

The soil of many of our valleys, large and small, together with the hillsides are especially well adapted. The climate is particularly propitious. Housing is less expensive than elsewhere, markets are good and everything tends to make poultry raising easy and profitable to those who intelligently engage in the business. There is no room, however, in the poultry business for the careless or shiftless or those who think that "anybody can raise chickens."

Selecting a location is of great importance; oftentimes there is such a demand in the local market as to exceed prices paid in the larger cities, while feed is correspondingly cheaper; therefore it does not always follow that one must locate near to the largest market to obtain the greatest profit for his efforts.

It has become an old story to hear it said "A hen will pay $1.50 per annum." There are numbers of poultrymen whose word would be accepted on any other subject as truth, who say they have made as high as $2.25 net per hen per annum, and the man who can not show more than $1.00 net per annum belongs to some other line of work than in poultry raising. The prevailing high price of feed for the past year has not been without its beneficial side. While poultry products were bringing uniformly good prices and feed moderate in price, poultrymen were somewhat inclined to be satisfied with the good returns, but when feed made very material advance in price the thoughtful and considerate poultrymen immediately began to weed out all old and limited producing fowls, thereby resulting in a largely increased average for the flock, as well as a decreased consumption of food and a resultant satisfactory profit.

But what of the future? It is a fact that California is producing less than half of its present requirements in the poultry line. A leading Chicago paper recently deplored the fact that the American hen had completely failed in her duty; hence eggs were commanding a price of 36 cents per dozen wholesale in that city. Corresponding reports come from other places clearly defining the fact that overproduction is something for future generations to worry over. This is not only true for our own United States, but the report comes from one Consul-General Richard Guenther, of Frankfort, that Germany is not able to supply her home demand for eggs, and in 1907 imported $34,643,000 worth of eggs.

In view of all this, little need be said of the future for California as a poultry-producing state. What with eggs reaching a maximum in the San Francisco market of 57 cents per dozen, the long-continued range of high prices, the insufficiency of home supply, the shipment of eggs into the Eastern market at favorable times, the apparent lack of supply everywhere to meet prevailing conditions, the unusually favorable climatic conditions of California, the adaptability of soil so universal throughout the State, the freedom from disease and the assurance of good market conditions, should appeal to every right-calculating man that out State is truly the poultryman's paradise.

IMPORTING SEED WHEAT.

The following bulletin by H. F. Roberts, of the Kansas Agricultural College, on the question of seed wheat, contains suggestions of value to all wheat growers, and is worth a place in this report. The California grower may substitute the University State Farm for the Kansas Experiment Station. and he will have the conditions as they apply in California.

The wholesale importation of seed wheat, advocated by some who are desirous of improving the conditions in wheat growing in Kansas would be inadvisable, since it affords no remedy for existing conditions. Where wheat "runs out" it is due to one of several facts:

1. Deterioration in size and quality of the grain, owing to poor soil and poor culture. This can be remedied by proper rotation, manuring, and cultivation.

2. Deterioration in variety. Wheat frequently consists of several strains of different value, in which certain ones of inferior quality get the upper hand under given conditions of soil and climate. The remedy for this form of running out lies in selective breeding of superior strains, beginning with single superior plants as starting points, the progeny of which have been tested for a sufficient number of generations to prove their worth. This is a very different thing from selecting a mass of superior looking grain, whether imported or domestic, for seeding purposes.

3. Deterioration may be due to an accidental mixture of different varieties in which one of the varieties in the mixture, though undesirable. may supplant the other. This case is similar to the preceding. These mixtures can be avoided by sowing a pure strain of the desired variety by itself for seed. The introduction of other wheat by means of traveling separators can be avoided by threshing the seed wheat after the general field has been threshed.

4. Deterioration in the hardness of wheat, where the wheat appears to become softer from year to year. If this is not due to the gradual increase of soft wheat originally present in the seed, it is due to the presence of "yellow berry"—the appearance of soft, starchy grains in hard wheat—which occurs even in pure-bred strains coming from a single mother plant. The yellow berry is partly a climatic product, and as such can not be cured by importations, since the new wheat will, if it already has the tendency, inevitably produce yellow berry in our climate. Yellow berry, however, does not occur in all wheat plants to the same extent. Breeding experiments at the Kansas Experiment Station show that it is, to a certain extent, a hereditary or racial tendency. The Botanical Department of the Experiment Station finds that strains free from yellow berry in 1906 gave rise to but 4 per cent of yellow berry in 1907, while strains with 75 to 100 per cent of yellow berry in 1906 have but 24 per cent in 1907. It is probable that the yellow berry can be

bred out of our wheat. The Botanical Department now has in the field nearly 400 pure-bred strains of wheat in their third year, each of which came from a single head of wheat in 1906. Most of these are hard wheats. Some are absolutely free from yellow berry and are better than any imported wheat that has ever come into the State, in color, shape and body of the berry, high gluten content, hardness, and weight of kernel. All of our pure-bred wheats have preserved all of the characters, unimpaired, since they were selected in 1906. None of them are running out. Of some of these we shall have enough seed to plant five-acre plots a year from next September.

We also have in our breeding grounds wheats immensely superior in yield. A comparative yield test of 367 of our own pure-bred wheats was made in 1908 by the Botanical Department, in which each pedigree or pure-bred row grew alternately with a check or standard row of Kharkov, hitherto the best hard red winter wheat grown at the station. In this test each row was made 66 feet long and was planted with 250 seeds. All the grain of each row was carefully harvested separately and weighed. As a result, 42 pure-breds exceeded the total Kharkov average yield for the entire field, and 47 others exceeded the yield of both the adjoining Kharkov rows.

We have all the wheats that equaled or exceeded the Kharkov now growing in the field. The Kansas wheat grower need import no wheat to secure varieties of superior yield or quality. The Kansas Experiment Station has pure-bred strains growing which show these superior qualities over best imported wheats.

CLIMATE AND THE TOURIST.

By ALEXANDER G. McADIE.

In the Climatology of California, page 34, it is written

> "When a native of San Francisco is asked which is the coldest month of the year, he is generally at a loss for an answer, and if asked which is the warmest, he may say November."

This confusion arises from the comparatively small range of temperature in this section, and to some degree is true for reasons which we shall touch upon later for the entire strip of coast, not only in California, but also Oregon and Washington. The records of the weather bureau for San Francisco, covering a period of some thirty-eight years, show that May and November have about the same temperature, 57 degrees Fahrenheit; that the warmest month is September, 61 degrees Fahrenheit, and the coldest, January, 50 degrees Fahrenheit. But there are more balmy days with bright sunshine in winter than in summer; and hence the very general impression held by natives and tourists that winter is summer and summer is winter on the Pacific coast. The people of San Francisco realize in a general way that the terms winter and summer are purely conventional and lack the significance attaching to them in other parts of our country. Yet few San Franciscans clearly comprehend or could explain to the visitor the air drainage system of the bay section. Once you clearly understand what I may call "the ventilating plant" of that section, you can readily see why we wear woolens in July in the city and white duck in localities less than ten miles away. In other parts of the world winter and summer are reversed in the calendar; but in this section it is not so much the *out-of-datedness* that is remarkable, as the wonderful reversal of normal conditions within short distances and what I may call the plainly marked "control of climate by air movement." The weather bureau office in San Francisco is 210 feet above sea level. It is located on the fifteenth floor of a large office building. We have instruments recording simultaneously conditions on the street and conditions on the roof, and we study these records. If there shall ever be built in San Francisco a building one hundred stories high, we would be in a position to demonstrate to the stranger the marked stratification of the air. We could show him the stream lines at different levels, the varying temperature gradients and the sharp lines of contrast between the condensed vapor and the seemingly clear atmosphere. It would be easily possible on a summer afternoon for the visitor to enter at the street level, under a gray sky with strong southwest winds and a temperature of 55 degrees, requiring one to be rather warmly clad, and by the time the roof was reached the day would have changed into one of bright sunshine, light east or northeast breeze, temperature about 76 degrees—in brief, the climate of a day in June in the East.

Little wonder then that the meteorologist thinks to himself "here surely Nature has designed her own climatological laboratory." We who from hilltops bathed in the genial warmth of a summer day look down upon the mantle of fog spread thin above the city may prefer the climate of the upper level; but yet the old maxim holds true "tastes differ," and there are those in San Francisco who prefer the climate of the lower level, who enjoy the stimulating effects of the fresh fog, the cool air and the delight of vigorous effort, with the glow of health which it engenders. Indeed, San Franciscans enjoy and appreciate their fog, and in my judgment it is largely because this breath of the sea fills the life of the city, stirring the pulses of the citizens, shaking all drowiness from body and soul that the city by the Golden Gate wins her proud designation—Indomitable.

Passing from the coast climate with its more or less frequent fogs and even temperatures, we find in the districts back from the coast about twenty miles a much higher percentage of sunshine and less fog. The temperature is somewhat higher in summer and cooler in winter. There is less water vapor present, and speaking in general terms the climate is dryer. We may take Los Angeles as a type of these conditions. If you ask a native of Los Angeles which is the warmest month, he will probably answer correctly, August; and for the coolest, January. The coolest day recorded in the weather bureau records for Los Angeles shows a minimum temperature of 28 degrees Fahrenheit. There is probably no portion of the United States where climatic data have been more extensively published and utilized for the benefit of the tourist than in this city of Los Angeles; and I take this opportunity to say that the fullest information will always be cheerfully given tourists at the weather bureau office in the Central building. One matter which must be touched upon before leaving the climate of the southern counties, is that of rainfall. The records of the weather bureau, covering a period of thirty years, show that the seasonal rainfall is nearly sixteen inches, an amount sufficient for agricultural and other purposes. This is a matter of some importance, as there is a very widespread impression that this section is not blessed with abundant or sufficient rainfall. There have been occasional dry seasons and there doubtless will be others; but our rainfall records should certainly satisfy all doubting Thomases. I have thought it worth while to prepare a table of the rainfall from 1877 to 1907. You will note that in one season there was a rainfall over 28 inches; and there have only been seven seasons in the thirty under discussion when the rainfall was below 10 inches. We see that there have been seven Novembers, for example, without rain; but only three Decembers and never a January. On the other hand, it will probably surprise most citizens of Los Angeles to know that in one month of December, 1889, more than 15 inches of rain fell.

Passing now still further inland, we come to the foothills and mountains. It is in these sections that the true climate of California is to be found. The pity of it is that so many of our cities and towns are in the valleys or lowlands. Too often the air drainage of the valleys is such that lower temperatures and higher humidities prevail in the centers of greatest population. Even on the high peaks of the Sierras we have found warmer weather than in the mountain valleys, and every fruit grower knows how vastly superior the hill countries are in the protecting of fruits against frost. During the winter of 1898 a minimum thermometer was exposed near the summit of Mount Lyell, over 13,000 feet elevation, the lowest temperature recorded was — 17 degrees Fahrenheit. Whereas during the same period we had some records in the State showing temperature as low as —30 degrees. Again one can often rise above the limit of the winter fogs by climbing the foothills. At an elevation of one thousand feet it is not unusual to find bright sunshine and comparatively warm, dry weather; while below the water courses and the great level valley is covered with a mantle of fog.

It has been my rare good fortune to be able to stand upon the summits of Mount Whitney, 14,501 feet; Mount Shasta, 14,200 feet; and Mount Rainier, 14,394 feet, and in a sense to thus look down upon this wondrous Pacific coast. We see the snow, the fog, and the passing clouds. We realize that on this Pacific coast fronting the broad ocean, we get the first draught of the flowing river of pure air moving in our latitudes from west to east around the world. Reverse this circulation and the Pacific slope would be as bleak as Siberia. The moving air, the sea and the mountains combine to make this a land suitable for men to dwell in and enjoy their daily vocation. Surely we who have been thus favored should be in all respects worthy of the advantages given us.

RESOURCES

OF THE

STATE OF CALIFORNIA.

(BY COUNTIES.)

ALAMEDA COUNTY.

Alameda County fronts the bay of San Francisco for a distance of 38 miles, with an average width of 25 miles, extending to and beyond the summit of the Contra Costa hills, comprising numerous beautiful valleys, besides the broad Alameda Valley, which last is bounded by the waters of the bay on the one side and the Contra Costa hills on the other, and is one of the richest and most fertile valleys in the State.

The principal stream is Alameda Creek. There are other creeks crossing the county and emptying into the bay, two of which furnish water for the city of Oakland. The country around Hayward is one of the great fruit-raising regions, many millions of pounds being shipped annually.

The soils immediately along the bay in Alameda Valley and the marshes formed by the overflow are heavy, but very fertile when reclaimed. Then comes a broad belt of rich, black adobe that is crossed by deposits of alluvium made by shifting channels of streams running down from the Coast Range. In the Niles region are lighter loams. About Livermore are uplands, bench and valley lands. Between the latter two classes the variation in potash, lime, and phosphoric acid accounts for difference in grape crop. Mission San Jose is characterized by gravelly, upland, adobe soil, and was evidently chosen by the padres of the old Spanish mission for its exemption from frost, caused by its slight elevation above the surrounding valleys. The Pleasanton section consists of agricultural and grazing lands. The soil is a very rich sediment, producing hay, grain, potatoes, hops, and beets in abundance. At Alvarado the surrounding country is a fine farming and fruit region, and gardening and dairying are largely carried on. The fertile, alluvial soil is finely adapted to fruit-growing.

The average rainfall of the county is about 30 inches.

Alameda County was among the first to begin the planting of orchards and vineyards. The county is divisible into three sections—the cherry district, the apricot district, and the vineyard district.

From Oakland to Hayward is the home of the cherry, and in an ordinary year this crop is good for a profit of a quarter of a million dollars.

The apricot section includes all the region east and south of Hayward, but the center is at Niles. The Alameda apricot is high colored and the flavor exquisite. One of the most popular varieties, the Alameda Hemskirk, was originated here. The other varieties preferred are the Blenheim and the Moorpark. A first-class apricot orchard is easily worth $500 per acre, and some could not be bought for $750 or $800. Apricot trees yield from twelve to twenty tons an acre, worth from $20 to $30 a ton. Thousands of carloads of apricots are shipped annually from this county.

While cherries and apricots are the king and the queen of fruits, there are others which do well, among them being the Bartlett pear. The plum is another fruit which thrives, and the smaller fruits and berries are profitably grown.

In Alameda County are the largest currant patches in the United States. The size of an average currant farm varies from twenty to forty acres. Local canneries pack a great number of cases of this fruit, and thousands of chests of currants are shipped away each year.

Almonds, chestnuts, English walnuts, pecans, beechnuts, and hazelnuts are extensively cultivated.

Alameda is par excellence a vegetable-producing county. It has led in this industry for a long time, and the area devoted to vegetables has been increasing at a rapid rate, since the profit in peas, potatoes, tomatoes, rhubarb, asparagus, and several other vegetables is large enough to tempt the owners of the best soil to go into the business.

There are 8,000 acres devoted to vegetables in the county, not including sugar beets, which would add 4,000 or 5,000 acres more.

Many acres in this county are planted to tomatoes, which prove to be a most profitable crop. It is not unusual to find 100 acres of tomatoes growing upon a single farm.

The potato crop is of increasing importance, since it has been found that there is good money in the big Burbank potatoes and other commercial varieties. The best soil will produce from 75 to 80 sacks to the acre, although record yields of 150 sacks have been produced.

The growing of peas for canning has assumed importance. The output of the San Leandro cannery, located in this county, has reached as high as 1,200 cases per day, and 3½ tons of peas have been grown upon a single acre.

One of the prosperous agricultural industries is the growing of rhubarb for the California and Eastern markets.

The hop industry is chiefly located near Pleasanton, and during the picking season employment is given to some 2,000 pickers. The Pleasanton hop yards are the largest under one wire in the world. Over sixteen million pounds of cable and of trellis wire are used for the network that spans the twenty-foot poles to sustain the weight of the full-grown vines.

California was the first State in the Union to manufacture beet-sugar on a commercial scale. In Alameda County it has been manufactured for the past thirty-three years. Within her borders is located not only the pioneer beet-sugar factory of this country, but also one of the largest factories in the world. The annual production of beet-sugar in California exceeds that of any other State. The product of the land used for this industry is annually worth $10,000,000. Beets in Alameda County average over 14 per cent sugar of 88 per cent purity, and they yield an average of 15½ tons to the acre. The planting season extends from the first of February to the middle of May. This provides a long period of activity for the factory, which begins operations in August, and has continuously maturing crops of beets to handle.

The average annual output of salt recovered from San Francisco Bay, in Alameda County, is 100,000 tons, including both coarse and fine salt.

Oakland is the county seat, located on the bay opposite San Francisco, and has for its immediate neighbors the cities of Berkeley and

Alameda. These three cities are very prosperous and have a rapidly increasing population.

The University of California is located near the city of Berkeley, and has an average attendance of 3,500 students.

STATISTICS OF ALAMEDA COUNTY, 1907-8.

General Statistics.

Area, 840 square miles, or 537,600 acres.

Number of farms	2,482
Number of acres assessed	445,500
Value of country real estate	$18,788,275
Of improvements thereon	$8,452,672
Of city and town lots	$88,113,200
Of improvements thereon	$44,186,525
Of personal property	$23,280,036
Total value of all property	$183,383,458
Expended on roads, last fiscal year	$500,000
Expended for bridges, last fiscal year	$200,000
Number of miles of public roads	850
Road levy per $100, 1908	40c
Value of county buildings	$825,000
Miles of streets in towns and cities	450
Railroads, steam—miles, 134.74; assessed value	$3,071,382
Railroads, electric, assessed value	$5,198,900
Electric power plants—5; assessed value	$2,105,000
Electric power lines—miles, 60; assessed value	$100,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	4,250	3,250	$108,875
Barley	16,246	15,648	444,303
Oats	6,582	4,200	155,400
Corn	486	1,030	37,080
Buckwheat	40	40	3,200
Total cereals	27,604	24,168	$748,858
Alfalfa hay	785	3,267	$42,471
Grain hay	52,648	66,800	1,336,000
Straw	22,542	.....	11,271
Total hay	75,975	70,067	$1,389,742

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	36,425	7,627	43,052
Apricot	282,000	69,322	351,322
Cherry	102,927	21,472	124,399
Fig	2,000	......	2,000
Lemon	750	250	1,000
Olive	4,200	1,500	5,700
Orange	1,200	700	1,900
Peach	22,875	2,250	25,125
Pear	60,750	12,224	72,974
Plum	27,860	4,375	32,235
Prunes	156,000	36,700	192,700
Quince	3,825	225	4,050
Total fruit trees	700,812	156,645	856,457
Almond	48,222	4,300	52,522
Walnut	3,250	2,500	5,750
Total nut trees	51,872	6,800	58,272
Grapevines	5,267	1,500	6,767
Berries, acres	678	......	678
Totals	5,945	1,500	7,445

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Almonds	90,000	$36,000
Apples	37,322	56,123
Apricots	2,463,722	556,782
Asparagus, tons	1,200	185,000
Blackberries, crates	1,040	5,200
Beans	483,372	25,025
Beets, tons	80,000	402,000
Cabbages	1,450,000	14,500
Celery	5,300	265,500
Cauliflower	30,000	2,500
Corn, table	2,225,000	290,000
Currants	442,200	22,250
Cherries	672,123	56,120
Figs	30,000	1,500
Gooseberries	48,600	14,000
Grapes, tons	10,500	377,000
Loganberries, chests	1,750	8,000
Onions	400,000	60,000
Oranges, boxes	1,000	5,000
Olives	22,000	660
Pears	2,500,000	50,000
Peaches	675,000	61,000
Peas	6,650,750	332,537
Pumpkins	125,000	20,000
Plums	432,525	43,252
Irish potatoes	12,500,785	375,023
Sweet potatoes	80,000	2,400
Prunes	2,525,750	126,277
Quinces	25,000	750
Raspberries	1,342	8,052
Strawberries	9,000	54,000
Tomatoes, tons	40,000	400,000
Cucumbers	55,525	13,881
Rhubarb	2,950,525	295,052
Squash	210,000	5,200
Walnuts	90,000	13,500
Totals		$4,184,084

Dried—	*Pounds.*	*Value.*
Almonds	42,870	$8,566
Apples	64,200	6,000
Beans	300,000	10,000
Onions	850,000	8,260
Pears	200,000	16,520
Peaches	16,000	875
Peas	250,000	3.500
Plums	3,200	175
Raspberries	375,000	20,000
Walnuts	46,200	6,930
Garlic	500,000	....
Vegetables, in general	......	200,000
Carrot seed	......	40,000
Onion seed	......	26,525
Nursery trees	......	80,000
Totals		$452.351

Canned—	*Cases.*	*Value.*
Canned fruits and vegetables	500,725	$1,665,000

Dairy Industry.

	Production.	*Value.*
Creameries, cream	779,074	$779,074
Skimming stations	4,000,000	800,000
Butter, pounds	3,000,000	900,000
Cheese, pounds	4,600	920
Total		$2,479,994

STATISTICS OF ALAMEDA COUNTY, 1907-8—Continued.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	2,650,000	$652,500
Sweet wines	680,000	34,000
Champagne, cases	3,000	60,000
Beer, barrels	240,000	2,400,000
Brandy	200,000	100,000
Carbonated and soda water	......	570,000
Total		$3,816,500

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	5,000	$200,000
Stock	12,575	314,375
Dairy cows—Graded	9,850	......
Brown Swiss	3	......
Herefords	200	......
Holsteins	3	......
Jersey	26	......
Polled Angus	1	......
Red Polled	12	......
Shorthorns	45	......
Calves	6,300	50,400
Swine	5,000	50,000
Horses—		
Thoroughbred	259	259,000
Common	21,250	2,116,200
Colts	925	46,250
Mules	230	32,200
Sheep	8,040	48,240
Lambs	5,575	19,500
Angora goats	195	3,900
Common goats	211	5,177
Total stock, all kinds		$3,545,242
Mohair, pounds		$70,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	19,775	$108,762
Ducks	600	5,400
Geese	302	3,200
Turkeys, pounds	50,000	15,000
Eggs	1,450,000	725,000
Total value		$857,360

Miscellaneous Products.

	Value.
Honey and hives	$2,390
Hops, alfalfa seed, clover seed, flax seed, garden seed, grass seed, sorghum—cane, syrup (gallons), nursery stock, flowers, plants, etc	415,525
Sugar beets, 50,000 tons	250,000
Total value	$667,915

Manufactories.

	No. of Employes.	*Value of Product.*
Bookbinderies and job print and litho	600	$2,225,000
Paper boxes	75	150,000
Wood boxes	100	275,125
Brick	100	1,775,275
Brooms	105	80,000
Carriages and wagons	50	225,125
Cotton, silk, jute	600	2,000,000
Cigars	195	1,750,325
Clothing	695	3,750,225
Coffee, spices, etc	158	462,500
Confectionery, fancy cakes, etc	450	1,205,125
Fertilizers	50	75,000
Bags, tents, and awnings	100	500,000
Electrical supplies	15	100,000
Flouring mills and health foods	800	1,275,000
Drugs	20	500,000
Furniture	100	750,225
Jewelry	40	300,000
Leather goods	300	875,225
Machinery output of foundries, including products of iron and steel	2,500	15,870,050
Malt	6	55,000
Matches	25	175,000
Meat products	600	
Hides		450,125
Lard		50,000
Meat packed		3,125,075
Tallow		25,000
Olive oil	25	50,000
Paints, oils, etc	400	1,975,275
Pickles	12	.. ..
Pickled olives	.....	100,000
Sewer pipe	150	750,000
Planing mills, sash and door factories	1,025	4,375,175
Potteries	250	1,183,472
Salt	15	100,000
Soap	50	225,000
Artificial stone, crushed rock, etc	600	2,775,225
Carbonic acid gas	7	50,000
Store and office fixtures	50	450,000
Syrups and extracts	3	20,000
Tanneries	25	250,000
Creamery products	62	485,000
Tin and galvanized iron and tinware	60	425,000
Willow and woodenware	30	50,000
Patent roofing	50	550,125
Woolen mills	30	300,000
Miscellan's rubber mfg	21	60,000
Iron pyrites	12	36,000
Totals	10,560	$52,234,672

Manufactured Output.

Unsegregated output	$2,250,125

AMADOR COUNTY.

Amador adjoins El Dorado County on the south, Alpine on the west, Calaveras on the north, and Sacramento and San Joaquin counties on the east. It is inland and occupies the east central portion of the State.

It has no navigable rivers. The Cosumnes forms a part of its northern boundary and the Mokelumne forms its entire southern boundary. Both of these rivers are tributaries of the Sacramento.

Varying, in the main, in altitude from 30 feet to 1,500 feet, and in temperature from 30 to 100 degrees Fahrenheit; having an average annual rainfall of 29 inches, and having land possessing every ingredient requisite in most productive soil, the county has never failed to produce a crop.

There is no climatic condition of any portion of California, except the climate of the immediate seashore, but that may be found here. There is no product of any portion of the State but that may here be fostered. The greater portion of the county being a rolling or foothill region, is adapted to the cultivation of any kind of farm, of horticultural, or of viticultural product.

Grain hay, potatoes, the peach and the apple, and the raisin and the wine grape can not be excelled elsewhere in flavor or in general appearance.

In many parts of the western portion of the county a great variety of vegetables is grown throughout the year.

Yielding (as the county does) an abundance of the best natural grasses, it offers inducements to stockmen, many of whom are awakening to a more full realization of the adaptability of this section to stock raising.

Distinctively the county is a region of mineral deposits.

Besides what is used locally, two carloads and upwards of potter's clay and more than one carload of coal are shipped daily from the county. We hope soon to have as large a shipment of fire brick. Silica is being shipped to outside markets. Other exports are lime rock, granite, marble, sandstone, greenstone, talc, and copper. The one resource, however, that is paramount, is gold from the quartz mines. Ten large quartz mines are at present operating on a most satisfactory basis.

Our county is easily reached and is healthful. A miner here does not have to endure the cold of the Klondike, nor the hardships of the Nevada mining districts.

Everything is favorable to the operation of mines here. Well constructed roads make the quartz zone accessible at any point. Wood and coal for fuel are at hand; fuel oil is brought by railroad immediately upon the great quartz zone—the famous "Mother Lode"—which traverses the county from southeast to northwest. Water supplied by canals leading from mountain lakes in the Sierra Nevada Mountains is used for motive power and for irrigation and for domestic purposes as well.

Electric power is also available. The Pacific Gas and Electric Company of California has an electric plant located upon the Mokelumne River six miles from Jackson, the county seat.

This electric works has a capacity of 27,000 horsepower, which power can operate all of the machinery of Amador County for many years hence, and is, at the same time, sufficient for all other local purposes. Besides this, a large amount of power is supplied to the bay cities.

An estimate made from reports of cruisers, who have recently been over the timber belt, shows that there are in the county 10,000,000 feet of standing timber, most of which is sugar pine, yellow pine, spruce, fir, cedar, and different varieties of oak. Although not in such great abundance, there are many other kinds of timber.

The timber belt has from 1,000 feet to 4,000 feet greater altitude than the main mineral zone—the "Mother Lode"—which separates two regions of widely divergent interests. The resources of the western section are millstuffs, products of the farm, the garden, etc., coal, pottery, fire brick, lime, and merchandise in general. The resources of the eastern region are lumber, round timber, lagging, shakes, shingles, charcoal, wood, marble, granite, talc, and mountain potatoes and apples that are unexcelled in appearance, flavor, and as keepers.

From these two sections solicitors, with their diversified products, come to the mines and towns along the "Mother Lode," which provide a ready market.

Amador ought to be a county of magnificent homes. Nowhere can more beautiful and inspiring landscapes, nor balmier skies, nor purer water, nor a more equable climate be found. Every kind of the best building material is right on the ground. The best of architects and builders are available.

Our schools, as good as the best of the kind, capably supervised, are of the primary and the grammar grades. There is also one union high school.

Manufacturing and kindred pursuits are making encouraging headway. We are watching, with great interest, the progress being made by the fire brick plant at Ione. The potteries near Carbondale are placing their products upon the market. The breweries of Jackson and Sutter Creek hold their own in the open market. The several wineries do a thriving business. Two ice plants are taxed to their utmost capacity. The Amador County Steam Laundry provides employment for a great many. The local machine shops and foundry recognize no superior. The door and sash factory at Sutter Creek supplies the local demand in its line. All kinds of stone dressing is most capably and artistically done.

Mountain lakes and valleys and river canyons furnish abundant opportunity for those needing recreation, or for those that enjoy hunting and fishing.

Mineral springs having medical properties that are prescribed in certain cases are found in different parts of the county.

It seems that nature could not have done more in the preparation of an inland county—even the seashore is becoming more and more accessible by the shortening of distance through rapid transportation. From the main quartz zone of the county San Francisco may now be reached in eight hours. In time this distance will be covered in five hours. Then San Franciscans will come in greater numbers to enjoy with us this land of sunshine, fruits, and flowers, of mineral wealth, and countless opportunities for profitable and safe investment.

STATISTICS OF AMADOR COUNTY, 1907-8.

General Statistics.

Area, 568 square miles.

Number of farms	852
Number of acres assessed	270,802
Value of country real estate	$2,796,360
Of improvements thereon	$892,997
Of city and town lots	$285,095
Of improvements thereon	$758,314
Of personal property	$670,536
Total value of all property	$5,574,841
Expended on roads, last fiscal year	$20,536
Expended for bridges, last fiscal year	$23,629
Number of miles of public roads	615
Road tax levy per $100, 1908	33c
Value of county buildings	$50,000
Irrigating ditches, miles, 151½; cost	$102,700
Railroads, steam—miles, 20; assessed value	$262,812
Electric power plants—2; assessed value	$223,500
Electric power lines—miles, 51½; assessed value	$29,050
Number of acres irrigated	6,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	11,068	1,353	12,421
Apricot	2,916	110	3,026
Cherry	2,959	120	3,079
Fig	2,835	55	2,890
Lemon	63	11	74
Nectarine	1,052	......	1,052
Olive	1,947	88	2,035
Orange	1,053	176	1,229
Peach	12,682	1,010	13,692
Pear	10,742	619	11,361
Plum	10,201	80	10,281
Prunes	13,132	575	13,707
Quince	692	......	692
Other kinds	80	.....	80
Total fruit trees	71,422	4,197	75,619
Almond	5,431	650	6,081
Chestnut	2,118	4	2,122
Pecan	25	......	25
Walnut	1,155	190	1,345
Total nut trees	8,729	844	9,573
Grapevines	357,540	35,000	392,540
Berries, acres	35	......	35

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	35,000	$15,000
Ducks	30	180
Geese	20	340
Turkeys	100	2,400
Eggs	5,000	14,533
Total value		$32,453

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	428,400	$8,568
Apricots	405,000	8,100
Blackberries	5,500	450
Beans	13,000	520
Beets	13,000	260
Cabbage	20,000	400
Celery	3,500	350
Cauliflower	2,000	200
Corn	70,000	2,800
Currants	400	40
Cherries	40,700	2,035
Figs	25,000	1,250
Gooseberries	200	20
Grapes	7,609,000	80,450
Loganberries	500	50
Nectaries	25,500	1,275
Onions	120,000	2,400
Oranges, boxes	50	150
Olives	25,000	1,500
Pears	387,600	7,752
Peaches	417,300	8,560
Peas	8,000	400
Persimmons	500	25
Plums	72,000	1,440
Irish potatoes	875,000	15,200
Sweet potatoes	1,000	20
Prunes	319,000	6,380
Quinces	17,500	395
Raspberries	750	188
Strawberries	3,500	575
Tomatoes	32,000	960
Totals	10,940,900	$152,713

Dried—	*Pounds.*	*Value.*
Almonds	4,000	$500
Apples	14,000	1,570
Beans	1,000	30
Chestnuts	12,000	1,500
Currants	1,500	150
Figs	600	36
Grapes	200	20
Nectarines	2,000	200
Onions	110,000	2,200
Pears	31,200	2,700
Peaches	25,800	2,150
Plums	37,100	3,250
Prunes	126,600	7,340
Raisins	1,000	83
Walnuts	12,500	1,500
Totals	379,500	$23,229

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	......	......
Skimming stations	2	......	$7,600
Butter, pounds		156,000	58,205
Cheese, pounds		20,000	3,500

STATISTICS OF AMADOR COUNTY, 1907-8—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	3,850	1,390	$55,600
Barley	4,450	1,068	32,040
Oats	2,130	511	15,330
Corn	320	640	25,600
Total cereals	10,750	3,609	$128,570
Alfalfa hay	1,130	5,650	$67,800
Grain hay	4,025	8,050	120,750
Grass hay	1,126	1,126	11,260
Total hay	6,281	14,826	$199,810

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	171,000	$37,470
Sweet wines	2,000	800
Beer, barrels	5,220	41,760
Brandy	750	1,500
Cider	100	40
Vinegar	3,700	925

Number of wineries, 5; distilleries, 2; breweries, 2.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	276	$5,522
Stock	12,095	145,085
Dairy cows—Graded	......	48,605
Shorthorns, bulls	7	135
Calves	1,379	6,986
Swine	1,347	4,581
Horses—		
Thoroughbred	6	2,325
Standard-bred	5	1,700
Common	2,029	9,620
Colts	232	5,255
Jacks and jennies	5	260
Mules	153	7,260
Sheep	1,315	2,488
Lambs	50	35
Common goats	634	1,206
Wool, pounds	4,000	8,000
Mohair, pounds	80	16

Miscellaneous Products.

	Pounds.	*Value.*
Bee hives, number	7	$9
Sorghum, cane	730,000	1,825
Tobacco	500	50
Gold ore, crushed, tons	756,000	3,780,000

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	70,400	......
Cedar, acres	400	......
Pine, acres	70,000	......
Sawmills, number	3	......
Charcoal, sacks	10,000	......
Fuel, wood, cords	8,000	$56,000
Lumber, feet	321,000	6,420
Piles, poles	130,000	107,500
Posts, pieces	9,500	1,425
Sash and door factories	1	1,500
Shakes, thousand	25	150
Shingles, thousand	20	100
Lagging	167,000	11,775
Logs, round	55,000	110,000
Total value		$294,840

Power used for mills and manufactories in county—steam, 13; electrical, 7; water, 7.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	1	25	......
Carriages and wagons	1	4	......
Clay		20	$100,000
Coal		9	72,000
Electrical supplies	1	2	5,000
Flouring mills	1	3	11,000
Foundries and iron works	2	24	60,000
Ice	3	7	60,400
Lime	1	20	10,000
Malt	2	9	22,500
Meat products—			
Hides		......	12,863
Lard		......	3,640
Tallow		......	1,384
Olive oil		......	188
Gold ore mines	15	2,500	......

Manufactured Output.

	Quantity.
Clay, tons	35,000
Coal, tons	16,000
Flour, barrels	2,000
Lime, barrels	10,000
Malt, tons	375
Hides, pounds	82,000
Lard, pounds	22,900
Tallow, barrels	93
Olive, oil, gallons	150

BUTTE COUNTY.

Butte County has an area of 1,777 square miles, consisting of three sections—mountain, foothill, and plain. It is situated north of the center of the State, about 500 miles from Los Angeles and 150 miles north from San Francisco, yet it is warmer in winter than Florida. There is an abundance of rain, the average being about 25 inches each season. The supply of water for power and irrigation purposes is unlimited.

Embraced within its boundaries there is a great diversity of climate, scenery and industrial pursuits. The valley section is devoted to the growing of deciduous fruits, dairy products, and cereals. The warm thermal belt along the foothills is devoted chiefly to the growing of oranges, olives, figs, and many of the deciduous fruits; in the higher hills and mountains forming the eastern portion of the county, stock raising, lumbering, and mining are extensively engaged in. Apple growing is also becoming an important industry in the higher altitudes.

In the middle of summer when the orange trees are crowding to maturity their crop of oranges to be harvested during the following November, one can in a day's ride arrive at an altitude in the high Sierras and enjoy snowballing; while, on the other hand, he can within a day's drive in midwinter, from the snow-capped mountains reach the county seat in the valley and pick from the trees oranges for his Christmas dinner.

Butte County has two rivers—the Sacramento and the Feather—as well as a number of creeks, the most prominent being Butte Creek, Honcut, Chico, Rock, and Pine creeks. The Sacramento River heads at Mount Shasta in the north and takes its course directly southward, and forms the western boundary of Butte County. It is navigable 100 miles north from Butte County and south its entire length to the San Francisco Bay. Along its Butte County banks are some highly diversified and profitable farms, the products from which are mainly shipped to the markets by river steamers.

The second river in size, but perhaps the first in commercial value to Butte County, is the Feather. It drains an area of 4,000 square miles; in the higher altitudes it supplies water for a large area of grazing land; in its descent toward the valley the water is taken from the river for irrigation purposes. After the valley has been reached it is again tapped by the Butte County Canal Company's ditch, and the Feather River Canal Company is now preparing to take out a large ditch about three miles below Oroville, which will be capable of irrigating 200,000 acres of the Sacramento Valley land, upon which will be produced alfalfa, stock, berries, sugar beets, poultry, vegetables, and every deciduous and citrus fruit known to California.

In addition to the large assortment of farm products already grown in Butte County, about one year ago the Bureau of Soils of the United States Department of Agriculture undertook experimentation with crops under irrigation west of the city of Biggs, near the center of the territory to be irrigated by the Feather River Canal Company. Four different crops were planted—rice, alfalfa, vetches, and eucalyptus or gum trees. It is well established that the last three crops will thrive on these lands, and the recent harvesting of the first crop of rice planted has proved that this territory will become one of the leading rice producers of the United States.

The opportunity for profitable investment in Butte County has been realized and is being realized by the large vested interests. Capital is now pouring into the county and the magnitude of the investments show that men of large business affairs have unbounded confidence in the future of the county and in the opportunities which it presents for remunerative investment.

Some of the larger concerns now found in this field are as follows:

The Great Western Power Company—at an investment already made of over $12,000,000. This company is completing an enormous plant on the Feather River, about 20 miles distant from Oroville; a total of 450,000 horsepower will be produced, making the system of this company by far the largest in the world.

The Sacramento Valley Beet Sugar Company. Plant located 12 miles from Chico. Investment, $1,800,000. Sugar beets grown on the Butte County lands are shipped to this factory over the Northern Electric Railway.

Gold dredging companies, located at the Oroville gold dredging field. Investment in lands and machinery, $20,000,000.

Diamond Match Company. Pacific coast plant located in Butte County. Investment in this plant, $3,000,000.

Irrigation systems already constructed represent an investment of $1,326,000. These cover an area of about 20,000 acres up to the present time. The Feather River Canal will cover about 200,000 acres when completed.

Interurban Electric Railway System. Investment of the Northern Electric Railway Company in Butte County, $1,200,000.

Fruit canneries, fruit drying yards, olive mills, and orange packing houses represent a total investment of $1,000,000.

Four transportation lines traverse the county: The Northern Electric Railway system; the Southern Pacific and the Western Pacific (or Gould system), and a line of steamers on the Sacramento River to tide water.

The principal cities are: Chico, population, 12,000; Oroville, the county seat, population 6,000; Gridley, 1,500; Biggs, 1,200.

These facts serve to show that men of large capital see opportunities in Butte County for the investment of large amounts of money. New companies are constantly coming into the county, realizing it is a field of safe and sound investment.

STATISTICS OF BUTTE COUNTY, 1907-8.

General Statistics.

Area, 1,720 square miles, or 1,100,800 acres.	
Number of farms	2,104
Number of acres assessed	903,840
Value of country real estate	$13,973,955
Of improvements thereon	$2,917,300
Of city and town lots	$2,650,915
Of improvements thereon	$3,878,915
Of personal property	$3,615,725
Total value of all property	$29,565,915
Expended on roads, last fiscal year	$66,715
Expended for bridges, last fiscal year	$115,398
Number of miles of public roads	1,600
Road levy per $100, 1908	40c
Value of county buildings	$250,000
Irrigating ditches—miles, 442; cost	$1,326,000
Railroads, steam—miles, 131; assessed value	$2,041,297
Railroads, electric—miles, 46; assessed value	$232,000
Electric power plants—4; assessed value	$104,600
Electric power lines — miles, 152; assessed value	$69,300
Number of acres irrigated	14,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	51,758	28,930	$867,900
Barley	30,830	23,357	583,925
Oats	3,515	2,140	85,600
Corn	1,252	545	13,625
Alfalfa hay	9,544	38,053	380,530
Grain hay	57,149	74,377	743,770
Grass hay	1,049	2,140	32,100

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	38,151	17,467	55,618
Apricot	16,398	1,601	17,999
Cherry	7,710	2,091	9,801
Fig	11,484	2,247	13,731
Lemon	4,083	914	4,997
Nectarine	2,103	325	2,428
Olive	89,108	8,304	97,412
Orange	155,972	25,041	181,013
Peach	300,799	57,624	353,421
Pear	28,002	4,319	32,420
Plum	9,637	1,558	11,195
Prunes	117,932	37,383	145,315
Quince	968	125	1,093
Other kinds	5,000	......	5,000
Total fruit trees	787,347	160,999	931,423
Almond	86,695	20,794	107,489
Chestnut	699	127	826
Pecan	170	60	230
Walnut	2,407	1,067	3,537
Total nut trees	89,971	22,048	111,582
Grapevines, acres	682	314	996
Berries, acres	394	37	431

Wines, Brandies, Etc.

	Gallons.	*Value.*
Sweet wines	9,500	$4,800
Cider	380	75
Vinegar	56,000	8,500

Number of wineries, 3.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	3,165,815	$31,658
Apricots	682,742	6,827
Asparagus	25,315	2,500
Blackberries	61,475	3,073
Beans	186,260	4,656
Beets	38,450	385
Cabbage	148,490	2,965
Celery	28,600	855
Cauliflower	17,700	530
Corn	272,800	2,730
Currants	4,700	235
Cherries	229,795	11,480
Figs	42,900	2,695
Gooseberries	825	100
Grapes	1,165,975	11,660
Grape fruit, boxes	885	2,712
Limes, boxes	75	375
Lemons, boxes	1,795	4,500
Loganberries	54,050	4,320
Nectarines	16,600	1,650
Onions	241,700	2,500
Oranges, boxes	167,432	209,390
Olives	3,629,585	108,890
Pears	1,747,385	17,385
Peaches	2,203,250	22,500
Peas	33,130	1,655
Persimmons	12,055	600
Plums	509,700	6,000
Irish potatoes	1,589,675	15,900
Sweet potatoes	170,445	2,560
Prunes	2,289,435	22,895
Quinces	62,000	1,240
Raspberries	66,275	2,620
Strawberries	79,100	7,910
Tomatoes	747,180	8,500
Dried—	*Pounds.*	*Value.*
Almonds	855,700	$85,570
Apples	5,250	265
Apricots	298,510	14,925
Beans	21,800	765
Chestnuts	9,050	725
Figs	1,159,565	27,510
Nectarines	19,000	950
Onions	221,870	33,030
Pears	219,300	10,965
Peaches	5,371,700	268,585
Plums	22,400	2,250
Prunes	1,354,300	54,175
Raisins	77,290	3,965
Walnuts	84,350	10,125
Canned—	*Cases.*	*Value.*
Pears	1,088	$3,265
Peaches	69,300	207,900

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	20,265	$607,950
Stock	14,205	213,075
Dairy cows—Graded	3,750	150,840
Herefords	50	2,550
Holsteins	72	3,600
Jersey	170	2,500
Calves	2,130	40,645
Swine	18,355	91,575
Horses—		
Thoroughbred	45	18,500
Standard-bred	345	69,200
Common	12,105	725,560
Colts	1,265	37,920
Jacks and jennies	16	8,000
Mules	2,193	219,500
Sheep	102,820	308,460
Lambs	20,100	30,150
Angora goats	1,285	3,750
Wool, pounds	975,000	78,065
Mohair, pounds	11,760	1,765

STATISTICS OF BUTTE COUNTY, 1907-8—Continued.

Fish Industry.

	Pounds.	Value.
Salmon	40,000	$4,000

Forest Products.

	Amount.	Value.
Area of timber lands, acres	350,000	......
Cedar, acres	35,000	......
Pine, acres	140,000	......
Redwood, acres	175,000	......
Sawmills, number	11	......
Charcoal, sacks	300	$150
Fuel, wood, cords	75,000	112,842
Laths, thousand	377,500	1,875
Lumber, feet	550,000	1,100,000
Pickets, pieces	503,500	15,135
Posts, pieces	36,100	5,415
Railroad ties, pieces	250,000	187,500
Sash and door factories, number	1	75,000
Shakes, thousand	427,000	4,275
Shingles, thousand	10,000,000	30,000

Power used for mills and manufactories in county—Steam, 18; electrical, 10; water, 2.

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, number	1,543	$3,058
Beeswax	300	.....
Flowers and plants, acres	105	80,000
Honey	60,000	4,800
Hops	211,760	17,740
Garden seed	3,000	3,000
Sugar beets, tons	23,000,000	57,900
Rice	160,000	6,400
Melons, acres	310	4,500
Pumpkins, acres	600	15,000
Turnips, acres	5	750
Peppers, acres	2	500
Rhubarb	40,000	1,800

Poultry and Eggs.

	Dozen.	Value.
Chickens	42,850	$224,125
Ducks	219	1,315
Geese	55	1,320
Turkeys	2,100	50,000
Eggs	710,500	177,645

Dairy Industry.

	Production.	Value.
Butter, pounds	325,000	$97,500

Manufactories.

	No.	No. of Employes.	Value of Product.
Brick	1	28	$42,000
Confectionery	7	20	30,000
Flouring mills	2	25	84,250
Foundries and iron works	2	56	100,000
Jewelry	1	2	1,000
Machinery repair shops	4	140	225,000
Matches	1	40	50,000
Olive oil	7	325	210,000
Pickled olives	10	300	100,000
Planing mills	3	70	150,000
Granite	1	3	12,000
Marble	..	1	10,000
Syrups and extracts	1	1	1,000
Soda works	1	10	15,000
Ice plant	1	10	25,000

Manufactured Output.

	Quantity.
Flour, barrels	18,500
Hides, pounds	360,000
Lard, pounds	95,000
Tallow, barrels	925
Olive oil, gallons	69,750

CALAVERAS COUNTY.

On the western slope of the Sierra Nevada Mountains, nestled among its foothills and extending into the great valley of the San Joaquin, is the county of Calaveras. Its situation midway between the north and south boundaries renders it among the desirable locations of the State. It has an area of over 1,000 square miles, being about equal in size to the state of Rhode Island.

The Mokelumne River on the north divides the county from Amador, while the Stanislaus River separates the county from Tuolumne on the south. The extreme northeast corner joins Alpine. On the west San Joaquin and Stanislaus counties join Calaveras, making Calaveras almost a triangle in shape.

The Calaveras River runs in a westerly direction through the central part of the county. It is from this river that the county gets its name.

Some early travelers discovered a great quantity of bones and skulls upon its bank, and gave it the name Calaveras, meaning skulls.

From the peculiar formation and location of the county, the salubrity of the climate is remarkable and widely varied. From May to October the county is without storms. From October to May warm and abundant rains bless the land. The absence of fogs and consequent dryness of the atmosphere gives an invigorating climate.

There are no marshes to breed malaria within the county. The sloping plane of its territory gives excellent drainage to all sections. The soft breezes of the pine region are a balm to those affected with pulmonary complaint. The chilly winds of the coast are here tempered into mildness and give healthful vigor to the inhabitants.

The county is particularly famous for its mines. The "Long Tom" and the "Rocker" are gone forever and are replaced by the quartz mill and other appliances for deep quartz and gravel mining. The county is crossed by the great "Mother Lode," which is here characterized by low, medium, and high grade ore, and in which are mines that have yielded millions. The values are revealed as depth is attained, and along the entire lode are deep lying values, as great as those that have made the Gwin, the Utica, the Lightner, the Angels, the Royal, the Morgan, and a score of others famous. Narrower and richer veins fill the vast region known as the "East Belt," of which the famous Sheep Ranch is an example.

Mining, however, is not confined to gold mining, for across the broad western end of the county, through the low foothills, runs the great copper belt. This belt parallels the "Mother Lode" about twelve miles to the west. It was here that copper mining first began in California, in the early sixties, and until the recent development of the great copper deposits of Shasta County, Calaveras was always the leading copper producing county of the State. Well equipped plants are in operation extracting and reducing the ore at Copperopolis and Campo Seco.

Deposits of iron exist, lime enough to supply the State, marble of unknown value and extent, clay for pottery, crystal for lens, asbestos of commercial value, and many kinds of precious stones.

The fortunes in mineral wealth produced by Calaveras County are but a trifle to the untold millions still embraced in its hills.

While not classed as an agricultural county, yet the entire county is dotted with farms. The soil is exceedingly fertile and under a thorough system of cultivation produces immense crops. The products of the farm are hay, grain, and potatoes.

As a tree producer Calaveras County can not be excelled. It is adapted to the production of most any fruit. Oranges, olives, apples, grapes, peaches, pears, plums, apricots, and walnuts grow well. The choicest apples are produced in the eastern part of the county; large crops are annually produced and sold at good prices. Not only is the crop a success, but the quality is regarded as greatly superior to those of the valley or coast counties.

Irrigation and power facilities are unlimited. There is a perfect network of ditches throughout the county. The streams are tapped at various points and their waters distributed chiefly for mining and power purposes. The many convenient gulches and canyons afford excellent opportunities for storage reservoirs. Several storage systems are being perfected at the present time.

The timber belt in the eastern part of the county is enormous. Vast forests of sugar pine, yellow pine, spruce, cedar, and oak cover the mountains. Logging is done by improved methods, and the lumber hauled by traction engines. The product of this vast industry is seriously retarded, however, by the limited means of transportation, although considerable quantities are used for local mining purposes. There is every promise of a great revival of this industry in the county in the near future, contingent upon the extension of the railroad.

Stock raising is important. Pasturage is abundant on the mountain ranges, and in the summer they are thronged with vast herds of cattle, horses, and sheep, brought from the valleys and lower pastures and driven back again upon the approach of winter.

Few counties, indeed, afford a more varied opportunity for the pleasure seeker or can surpass it in scenery. In many beautiful valleys, its green, fertile fields, its clear, winding streams, its snow-capped mountain tops are ever a changing source of delight, but greater and grander than all are its groves of "Big Trees." They are one of the greatest attractions on earth. Their fame has spread to the remote parts of the globe and they are of world-wide interest. It is an ideal trip through the grove. Much has been said and written about them, but an adequate conception can only be secured by a visit. A trip through the county reveals the scenery of the highland type and affords to the lover of scenic beauty a rare feast.

Calaveras County is a field for investors and homeseekers. It has unlimited mineral wealth undeveloped, vast timber resources, water in abundance for irrigation or power purposes, sites for storage systems, choicest fruits, cheap land for farming purposes, soil that will produce immensely under proper conditions, a bank, churches, newspapers, power plants, and schools that rank favorably with any in the State, and towns whose social standing is good. It can easily support double its present population, and its contribution to the wealth of the State would be increased in proportion.

STATISTICS OF CALAVERAS COUNTY, 1907-8.

General Statistics.

Area, 1,000 square miles, or 63,360 acres.

Number of farms	1,890
Number of acres assessed	484,651
Value of country real estate	$3,124,100
Of improvements thereon	$1,277,125
Of city and town lots	$190,115
Of improvements thereon	$666,625
Of personal property	$877,635
Total value of all property	$6,135,690
Expended on roads, last fiscal year	$22,300
Expended on bridges, last fiscal year	$10,000
Number of miles of public roads	412
Road levy per $100, 1908	35c
Value of county buildings	$45,000
Irrigating ditches—miles, 800; cost	$750,000
Railroads, steam—miles, 20.01; assessed value	$327,617
Electric power plants—1; assessed value	$50,000
Electric power lines—4; miles, 120; assessed value	$65,000
Number of acres irrigated	$10,530

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	1,000	450	$18,000
Barley	1,250	500	17,500
Oats	2,000	850	30,000
Corn	150	300	5,000
Total cereals.	4,400	2,100	$70,500
Alfalfa hay	1,200	6,000	$72,000
Grain hay	10,000	15,000	225,000
Grass hay	10,000	10,000	100,000
Total hay	21,200	31,000	$397,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	14,342	4,641	18,983
Apricot	2,259	291	2,550
Cherry	1,005	340	1,345
Fig	2,056	112	2,168
Lemon	150	25	175
Nectarine	200	30	230
Olive	8,570	1,360	9,930
Orange	1,024	253	1,277
Peach	12,500	500	13,000
Pear	5,024	600	5,624
Plum	3,654	69	3,723
Prunes	7,553	567	8,120
Quince	458	27	485
Total fruit trees	58,795	8,815	67,610
Almond	10,126	682	10,808
Chestnut	173	30	203
Pecan	9	.....	9
Walnut	2,528	723	3,251
Total nut trees	12,836	1,435	14,271
Grapevines	15,600	795	16,390
Berries, acres	85	.....	85

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	50,000	$25,000
Beer, barrels	10,000	30,000
Brandy	1,000	2,000
Vinegar	2,500	750

Number of wineries, 15; distilleries, 4; breweries, 2.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	725,365	$13,510
Apricots	22,500	1,025
Asparagus	12,000	500
Blackberries	65,000	3,750
Beans	100,000	5,000
Beets	50,000	250
Cabbage	200,000	......
Celery	5,500	......
Cauliflower	50,000	......
Corn	100,000	......
Currants	5,000	......
Cherries	25,000	......
Figs	170,000	......
Gooseberries	850	......
Grapes	400,000	......
Lemons, boxes	250	......
Loganberries	40,000	......
Nectarines	150	......
Onions	75,000	......
Oranges, boxes	250	......
Olives	85,000	......
Pears	125,000	......
Peaches	500,000	......
Peas	30,000	......
Plums	100,000	......
Irish potatoes	650,000	......
Sweet potatoes	8,500	......
Prunes	350,000	......
Quinces	15,000	......
Raspberries	30,000	......
Strawberries	60,000	......
Tomatoes	350,000	......
Totals	7,950,965	$120,990
Dried—	*Pounds.*	*Value.*
Almonds	50,000	$7,500
Apples	4,000	600
Apricots	1,500	600
Beans	10,000	500
Chestnuts	2,500	250
Figs	2,500	250
Onions	175,000	2,000
Prunes	150,000	7,500
Walnuts	250,000	3,000
Totals	645.500	$22,200

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	3.800	$20,000
Ducks	50	200
Geese	20	350
Turkeys	300	8,000
Eggs	.....	50.000
Total value		$78,550

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	160,000	$2,000,000
Cedar, acres	20,000	300,000
Pine, acres	140.000	1,700,000
Sawmills, number	6	60,000
Charcoal, sacks	4,000	1,250
Fuel, wood, cords	15,000	65,000
Lumber, feet	6,000,000	500,000
Posts, pieces	7,000	1,050
Shakes, thousand	150	1,200
Total value		$4,628,500

Power used for mills and manufactories in county—Steam, 17; electrical, 10; water, 12.

STATISTICS OF CALAVERAS COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	4,500	$100,000
Stock	25,500	255,000
Dairy cows—Graded	20	1,000
Calves	4,000	20,000
Swine	2,000	8,000
Horses—		
Thoroughbred	69	6,900
Standard-bred	4,056	300,000
Common	550	18,000
Colts	125	1,500
Jacks and jennies	325	3,000
Mules	1,000	65,000
Sheep	25,000	75,000
Lambs	5,000	5,000
Angora goats	500	1,500
Common goats	900	1,800
Wool, pounds	60,000	12,000

Dairy Industry.

	Production.	*Value.*
Butter, pounds	75,000	$18,750

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 240	.....	$960
Honey	6,000	600

Manufactories.

	No.	*No. of Employees.*	*Value of Product.*
Foundries and iron works	1	40	$80,000
Meat products—			
Hides	6	20	15,000
Lard	..	.....	5,000
Meat packed	..	.....	2,000
Tallow	..	.....	1,500

COLUSA COUNTY.

Colusa County is located on both sides of the Sacramento River, which is by far the largest stream in California, and is navigable at all times 75 miles above the town of Colusa, our county seat, which is located on the west bank of the river, 60 miles above Sacramento City. The Sacrament Valley at this point (Colusa) is about 35 miles wide, and contains soils of all degrees of fertility. There is no place in California where all of the land is first class, but we can truthfully say that Colusa County contains as large a percentage of fine lands as any other locality, and the Sacramento River bottom land for fertility is not excelled in California.

Colusa County produces to perfection all of the varieties of vegetables, grains, and fruits that are grown in the United States, including almonds, prunes, apricots, raisins, and olives, which are not produced in the United States outside of the Pacific States. As long ago as the Mid-Winter Fair, held in San Francisco during the winter of 1894-5, Washington Navel oranges grown in our courthouse grounds took the first prize and grape fruit or shaddocks grown here took first prize. These oranges and shaddocks were in competition with fruits of the same varieties from all sections of California.

The Southern Pacific system runs up through the middle of the county, averaging about ten miles west of the river. Along this road are the towns of Arbuckle, Williams, and Maxwell, each surrounded by a fine agricultural country, and each a good shipping point.

Encouraged by the report of the Government Soil Expert, the citizens of these three towns and vicinity have been prompted to plant several hundred acres to vines, and those old enough to bear convince the owners that no mistake has been made. The products grown around these towns is generally shipped by rail, but the river is a check on freight tariffs. College City, six miles north of the south line of the county and three miles east of the railroad, is surrounded by an exceptionally good country. Here the grape industry flourishes, and the returns more than profitable. The union high school there is in a flourishing condition.

Colusa has a population of 3,000, and is one of the prettiest towns in California. The streets are 80 and 100 feet wide, smooth and well kept, and there are hundreds of shade trees—elm, walnut, and locusts—along the sides of the streets; in many places these trees have been substituted by orange and olive trees, which grow and bear fruit, seemingly as vigorously as though cultivated. Colusa has three fine public schoolhouses; one primary, one grammar, and the other a high school. The graduates from the Colusa High School are admitted to the California University without examination. There are six churches in Colusa, and two of them cost over $25,000.00. There is a convent that cost

$30,000.00. Colusa has a flour mill, second to none in the State, a foundry and machine shop, two banks, gas works, electric light system, water works, and other concomitants to a live town.

All of the other county towns are well supplied with churches and schools.

Our climate averages as good as any in the world. In fact, no objection can be found to the weather, unless it be that it is a little too warm for two or three months, but sunstroke is unknown; flowers bloom in the open air every day in the year. Statistics show that there is no more healthy locality than the town and county of Colusa. Colusa was settled in 1850, and there has never been an epidemic in the town. Our roads are generally in an excellent condition, being graded and graveled, which makes them hard and smooth. We know that everything considered, Colusa County is as good as any place in California for the homeseeker of moderate means, but no one need come to California with the expectation of accumulating a fortune without making an effort. Our population is made up of people from every State in the Union, and, therefore, you are not likely to be thrown wholly among strangers.

On the Sacramento River are the towns of Princeton, Colusa, Sycamore, and Grimes, all supported by as fine land as there is in any country, and each doing a large shipping business. Then every farmer on the river has his own landing, so that he can ship his produce from his own door by boat.

In the foothills, in the western part of the county, are the towns of Sites, Leesville, Sulphur Creek, and Stonyford; and many fertile valleys and also numerous mineral springs, which are great health resorts. The most celebrated springs are the Hot Sulphur Springs, Fouts Springs, and the widely known Cook's Spring, where they have a large bottling works, and the water is shipped to every town of importance on the Pacific coast.

There is some gold mining and some quicksilver mines worked, and very profitably at one time. Copper, manganese, and other ores abound in the hills, but Colusa has never been classed among the mining counties.

All vegetables, grain and fruits are raised without irrigation, but the Sacramento River carries sufficient water (and it can be used) to irrigate the whole Sacramento Valley. Several thousand acres in the northern portion of Colusa County are now being irrigated by a canal taken from the Sacramento River. A sure and more equitable system for irrigation is in practice in Colusa, that of forming a coöperative company, each member subscribing for as many shares as he has acres to irrigate. The Roberts Ditch Irrigation Company and the Colusa Irrigation Company are capable of irrigating 4,000 acres, the former adjoining Colusa on the west, and the latter irrigating the lands adjoining Colusa on the east and south. Both are organized on the coöperative plan; the members are perfectly satisfied and the system is a decided success. There are many other irrigation plants being put in operation, and it will not be long until all the valley lands will be irrigated, and this valley becomes THE GARDEN SPOT OF CALIFORNIA.

STATISTICS OF COLUSA COUNTY, 1907-8.

General Statistics.

Area, 1,080 square miles, or 691,200 acres.

Number of farms	885
Number of acres assessed	600,704
Value of country real estate	$8,897,362
Of improvements thereon	$592,843
Of city and town lots	$343,860
Of improvements thereon	$673,135
Of personal property	$1,611,050
Total value of all property	$12,118,250
Expended on roads, last fiscal year	$26,932
Expended for bridges, last fiscal year	$17,029
Number of miles of public roads	1,255
Road levy per $100, 1908	35c
Value of county buildings	$100,000
Irrigating ditches—miles, 17; cost	$3,400
Railroads, steam—miles, 56; assessed value	$744,791
Electric power plants—1; assessed value	$3,745
Electric power lines—1; miles, 16; assessed value	$1,280
Number of acres irrigated	1,230

Cereal Products and Hay.

Tons of 2,000 pounds.

	Tons.	*Value.*
Wheat	10,363	$310,890
Barley	65,353	1,633,825
Oats	151	3,775
Corn	3,110	80,860
Total cereals	78,977	$2,029,350
Alfalfa hay	6,450	$64,500
Grain hay	45,320	362,560
Total hay	51,770	$427,060

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	7,710	210	7,920
Apricot	18,270	600	18,870
Cherry	1,350	.....	1,350
Fig	4,140	2,000	6,140
Lemon	750	100	850
Nectarine	30	20	50
Olive	6,395	.....	6,395
Orange	7,950	1,400	9,350
Peach	10,900	240	11,140
Pear	4,275	.....	4,275
Prunes	83,100	1,250	84,350
Quince	120	20	140
Total fruit trees	144,990	5,840	149,830
Almond	23,320	6,400	29,720
Walnut	3,350	800	4,150
Total nut trees	26,670	7,200	33,870
Grapevines	690,800	265,600	956,400
Berries, acres	50	10	60

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	2,331	$11,655
Ducks	30	150
Geese	8	64
Turkeys	1,120	22,400
Eggs	119,122	29,780
Total value		$64,049

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	1,520	$45,600
Stock	17,460	349,200
Dairy cows—Graded	2,475	74,250
Calves	5,967	47,736
Swine	18,280	146,240
Horses—		
Thoroughbred	5	1,250
Common	3,250	140,000
Colts	1,230	30,750
Jacks and jennies	45	5,625
Mules	3,840	384,000
Sheep	70,000	175,000
Lambs	40,000	50,000
Angora goats	3,500	10,500
Total stock all kinds	167,572	$1,000,101
Wool, pounds	610,000	$76,250
Mohair, pounds	14,000	2,800

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apricots	50,000	$2,000
Asparagus	48,000	2,400
Blackberries	4,000	200
Beans	3,000	75
Beets	4,000	100
Cabbage	55,000	825
Celery	25,000	625
Cauliflower	3,000	75
Corn	25,000	300
Figs	100,000	100
Grapes	398,000	3,980
Lemons, boxes	150	450
Loganberries	3,300	254
Onions	35,000	700
Oranges, boxes	3,300	8,250
Olives	20,000	.....
Pears	116,000	2,320
Peaches	9,500	190
Peas	22,000	220
Irish potatoes	620,000	12,400
Sweet potatoes	20,600	412
Tomatoes	75,000	750
Totals	1,636,850	$36.551
Dried—	*Pounds.*	*Value.*
Almonds	246,000	$32,820
Apricots	58,190	2,327
Beans	680,000	20,400
Figs	56,120	1,783
Onions	165,430	2,481
Pears	6,125	428
Peaches	8,250	660
Plums	21,950	878
Prunes	1,094,000	32.820
Raisins	1,040,000	36.400
Walnuts	11,233	898
Totals	3.387.298	$131.895

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	648	$4,536
Lumber, feet	500,000	15.000
Total value		$19.536

Power used for mills and manufactories in county—Steam, 2; sawmill, 1; flour mill, 1.

STATISTICS OF COLUSA COUNTY, 1907-8—Continued.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Cook's Springs mineral water	243,337	$77,864

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	350,636	$70,718
Skimming stations	4	125,318	35,359

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 7,511	.....	$2,250
Broomcorn	220,000	8,250
Honey	18,000	2,700
Alfalfa seed	45,000	8,100
Dressed poultry	326,282	......
Wild game	98,565	......

Fish Industry.

	Pounds.	*Value.*
Black bass	18,800	$1,880

Manufactured Output.

	Quantity.
Cigars, thousand	80,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	1	2	$85,000
Meat products—			
Hides, 3,120		.....	9,630
Lard,, 64,200 lbs.		.....	8,025
Tallow, 62,400 lbs		.....	3,110
Sandstone	2	40	85,968
Quicksilver, 17 flsks		.....	648
Gold, tons		.....	734
Manganese, 3,500 tons		.....	35,000

CONTRA COSTA COUNTY.

Contra Costa is one of the central counties, its shore line being within 14 miles of San Francisco. It possesses unusually good traveling facilities, both by rail and by steamer. The county has 70 miles of water front, nearly all of which is upon deep water, navigable by all vessels engaged in commerce. Over three fourths of its area is cultivated, the balance being used for grazing. The only mountain of any size is Mount Diablo, which is 3,896 feet in height and almost in the geographical center of the county.

About two thirds of the area is rolling and hilly. Lying between the hills are some of the most fertile and beautiful valleys in the State, which are drained and watered by many streams, the banks of which are bordered by oak, sycamore, laurel, willow, etc., while the hills are dotted with oaks, many of which are of large size.

The farming lands in the eastern section are between the foothills and the San Joaquin River. The soil is of a rich alluvial nature, and produces wheat, barley, alfalfa, fruit, and vines. To the northward and between the uplands and the San Joaquin River is a body of tule lands, a large portion of which has been reclaimed, and is some of the most productive land in the State, being a rich deposit of sediment and decomposed vegitation. Alfalfa, asparagus, potatoes, beans, etc., are produced on the largest scale on such lands, the asparagus being shipped East by the carload during the early spring.

The average rainfall is from 18 to 23 inches, which is ample for all purposes of agriculture, horticulture, etc.

In depth, the soil throughout the county shows a remarkable continuity of rich alluvial deposits underlaid by limestone or clay. There is an occasional change to a coarse sandy and gravelly heavy loam of black or brown tint. It has great power for enduring drought, and is easy to work, giving large returns. The soil in the uplands is in character similar to that of the lowlands, and being drier, is for some purposes even better.

Irrigation is not required to insure crops; the abundant rainfall, the absence of evaporating heat, and the moisture-laden breezes from the ocean furnish abundant humidity for all forms of vegetable life without recourse to artificial irrigation.

The many beautiful valleys and the rolling hills are strikingly similar in general characteristics to the gentle slopes of sunny France. Scattered in all directions are numerous small vineyards and orchards that produce rich results. Fruit growing has proved successful and remunerative.

Grain raising is very prominent in this county. A very large acreage is planted to wheat, oats, barley, and hay.

The raising of sugar beets is a growing industry.

Vegetables of all kinds are raised very profitably and on an extensive scale; one very large tract of land is used entirely for the production of asparagus for early Eastern shipment. Potatoes, beans, etc., are also a prolific and profitable crop, especially in the central portion.

Natural feed is abundant, both on the hillsides and at a higher elevation.

Stock raising is a leading industry, as the reclaimed lowlands for summer grazing and the rolling hills for winter, close together, create conditions whereby a failure is impossible. The stock farms have produced some of the most famous trotting and pacing horses. In addition to the raising of horses, much attention is given to blooded cattle, sheep, and hogs.

Large dairies are conducted, and in the western end the product mostly shipped to the cities is milk, while in the central and eastern parts butter is the main object. Low freight and express rates give unusual advantages.

Contra Costa County is well adapted to poultry raising. Feed can be obtained cheaper than in other sections where the industry is thriving. The central part of the county is only a few hours' drive from Oakland and suburbs. The demand for eggs is always greater than the supply.

The only important mining industry is the coal mines of Mount Diablo, although some little mining for precious metal has been done.

The terminus of the Santa Fe railroad is located at Point Richmond, and many substantial improvements in the way of wharves, etc., on a very extensive plan, have been constructed.

Port Costa, the shipping point for the bulk of the grain raised in California, has extensive warehouses.

At Pinole are located large stockyards; near Vallejo Junction is the largest smelting works in the State; at Vallona are extensive lumber yards, where ships from Oregon and Puget Sound discharge. At Crockett are flouring mills; also agricultural works.

STATISTICS OF CONTRA COSTA COUNTY, 1907-8.

General Statistics.

Area, 877 square miles, or 561,267 acres.

Number of farms	1,600
Number of acres assessed	490,177
Value of country real estate	$10,392,283
Of improvements thereon	$4,564,215
Of city and town lots	$3,188,580
Of improvements thereon	$1,894,180
Of personal property	$6,331,512
Total value of all property	$29,405,603
Expended on roads, last fiscal year	$85,085
Expended for bridges, last fiscal year	$3,487
Number of miles of public roads	450
Road levy per $100, 1908	40c
Value of county buildings	$425,000
Railroads, steam—miles, 141.33; assessed value	$3,034,833
Railroads, electric—miles, 18; assessed value	$128,376
Electric power plants—1; assessed value	....
Electric power lines—miles, 59; assessed value	$100,000
Number of acres irrigated	1,200

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	15,000	22,500	$900,000
Barley	30,000	45,000	1,350,000
Corn	1,000	5,000	15,000
Alfalfa hay Grain hay Grass hay	119,000	238,000	2,380,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines Sweet wines Champagne	4,550,000	$1,820,000
Cider	4,500	1,800

Number of wineries, 63; distilleries, 3; breweries, 2.

Fish Industry.

	Pounds.	*Value.*
Salmon	30,000	$3,000
Other kinds	10,000	1,000

STATISTICS OF CONTRA COSTA COUNTY, 1907-8—Continued.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apples	18,000	4,000	22,000
Apricot	50,000	6,000	56,000
Cherry	15,000	8,450	23,950
Fig	4,000	575	4,575
Lemon	750	250	1,000
Nectarine	1,000	250	1,250
Olive	10,050	3,950	14,000
Orange	3,000	450	3,450
Peach	35,650	4,500	40,150
Pear	110,000	8,000	118,000
Plum	19,150	1,000	20,150
Prunes	77,000	10,000	87,000
Quince	3,000	200	3,200
Almond	280,000	10,000	290,000
Pecan	600	.....	600
Walnut	19,500	10,000	29,500
Grapevines	3,195,070	150,000	3,345,070
Berries, acres	.....	.....	350

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	150,000	$4,500
Asparagus	750,000	75,000
Blackberries	56,000	2,400
Beans, acres	2,000	......
Corn	60,000	1,500
Currants	10,000	500
Cherries	12,000	1,200
Figs	11,000	1,000
Gooseberries	2,000	160
Limes, boxes	600	900
Loganberries	1,950	117
Onions	450,000	3,150
Oranges, boxes	1,100	1,650
Pears	350,000	8,000
Peaches	380,000	4,900
Peas	17,000	1,700
Persimmons	2,500	250
Plums	13,000	250
Irish potatoes Sweet potatoes	8,000	......
Prunes	150,000	6,000
Quinces	18,000	300
Raspberries	2,500	250
Strawberries	9,000	400
Tomatoes	255,000	2,550
Dried—	*Pounds.*	*Value.*
Almonds	2,000,000	$200,000
Walnuts	400,000	60,000

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	35	......	......
Butter, pounds		200,000	$60,000
Cheese, pounds		10,000	1,500

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	8,500	$340,000
Stock	15,000	450,000
Dairy cows—Graded	600	30,000
Angus	9,000	360,000
Calves	5,400	54,000
Swine	9,000	90,000
Horses—		
Thoroughbred	150	37,500
Standard-bred	900	225,000
Common	5,000	500,000
Colts	1,500	60,000
Jacks and jennies	900	90,000
Mules	15,000	45,000
Lambs	8,500	12,750
Angora goats	150	300
Wool, pounds	35,000	4,900

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	15,000	$90,000
Geese	1,108	16,620
Turkeys	500	2,000
Eggs	509,250	127,550

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 900	.....	$9,000
Honey	950	1,000
Alfalfa seed	1,550	180

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	5	500	$2,155,000
Cement	1	.....	......
Cigars	2	.....	......
Flouring mills	2	.....	100,000
Lime	3	500	1,000,000
Matches	1	.....	100,000
Paper	1	90	284,700
Potteries	1	75	......
Sugar	1	.....	9,000,950
Rubber plant	1	.....	......
Powder works	2	1,000	......
Oil refineries	2	3,000	......

DEL NORTE COUNTY.

Del Norte, as its name implies, is at the far north. It is situated in the northwest corner of the State. A county of scenery unsurpassed in its grandeur, its vast redwood forests, its clear winding streams, its green fertile fields, its giant redwoods, its mountains laden with precious ores, and its rich dairy lands make it one of the most desirable places for the homeseeker.

Chief among Del Norte's industries is the dairying interest. Scattered throughout the coast portion are modern, well-equipped creameries where the product of thousands of cows is turned into butter.

This industry, with the coming of better facilities for shipment, will place Del Norte in the foremost rank as a butter-producing county. Farming is carried on to a considerable extent. A large portion of the soil is especially adapted to the culture of the apple, there being a total absence of the codling-moth pest. Pears, plums, cherries, and small fruits and berries of every description bear luxuriantly. On the Klamath River, in the southern part of the county, as well as on the Smith River, in the northern part, large, well-equipped salmon canneries are operated with great success. The center of trade lies in Crescent City, the county seat, nestled on a crescent-shaped beach, where the products of the county come for shipment, generally finding their market in San Francisco, the products in the main being lumber, butter, and from the farm.

Smith River is a small town in the center of the beautiful valley of the Smith River, where such business is carried on as is usually conducted in a farm and dairy district.

Requa, a small town near the mouth of the Klamath River, is a trading post for that district.

The arable portion of the county is confined generally to the coast portion, commencing at its northern boundary and extending through its entire length, excepting a few miles to the southward of Crescent City. The arable land may be divided into three classes: First, that formed by the disintegration of sands, which with the aid of fertilization and rotation produces good crops, and is especially adapted to the growth of apples, an industry yet in its infancy. Second, those lands formed by the constant washing of rich vegetable matter and the detritus carried by streams from the mountain sides and distributed in the valleys to a great depth, known as sediment lands. Third, marsh or lake lands, a large area of which borders on Lake Earl, at times partly inundated by the overflow of the lake, but which by a system of reclamation will constitute the most valuable land in the county for dairying purposes.

The redwood timber belt, comprising 200,000 acres, commences at the north boundary line and extends in an unbroken forest to the southern boundary of the county. It can be reasonably said that no grander or finer forest exists in the world. Its immensity can be better imagined when it is stated that a single tree yields sufficient clear lumber to build a modern cottage and finish it from cellar to garret, or more particularly, when it is stated that from a tract consisting of 160 acres there have been taken 27,802,121 feet, or an average of 173,763 feet per acre. East of the redwood belt are large tracts of sugar pine and fir.

Deposits of valuable ore lie in the hills of Del Norte, but not until recent years have those with means to develop mines turned their attention to this county.

Covering the entire expanse of coast line from Humboldt Bay to the Columbia River, the roadstead at Crescent City is the only point affording opportunity for a haven of refuge, and with assistance from the United States Government in the construction of a seawall from the United States lighthouse, to the westward of Crescent City, to an outlying rock, a distance of 2,000 feet, Crescent City harbor will be made a safe and secure refuge for the innumerable water-craft now plying along the coast. The present shipping is carried on over a wharf or pier, built on wooden piles, extending out to a depth of sixteen feet at low water.

Few counties on the Pacific coast afford a more varied opportunity for the pleasure-seeker, or those in quest of rest and recreation. This point may be reached from Grant's Pass in Oregon, the nearest railroad point, thence by stage road over mountain and through dale. the entire journey replete with grand scenery.

Del Norte County is almost devoid of railroad facilities. there being but fifteen miles in operation. However. the wonderful resources of the county have attracted the attention of the railroad corporations, and they have made a survey from the Southern Pacific system in Grant's Pass, Oregon, to Crescent City, this being the only natural pass from the great valleys of the interior to the coast.

STATISTICS OF DEL NORTE COUNTY, 1907-8.

General Statistics.

Area, 1,546 square miles, or 98,900 acres.

Number of acres assessed......	211,315
Value of country real estate...	$3,281,356
Of improvements thereon......	$99,936
Of city and town lots..........	$82,805
Of improvements thereon......	$129,000
Of personal property..........	$272,693
Total value of all property.....	$3,866,790
Expended on roads, last fiscal year	$854,385
Expended for bridges, last fiscal year	$2,524,990
Number of miles of public roads	135
Road levy per $100, 1908.......	35c
Value of county buildings......	$21,000
Railroads, steam, assessed value	$35,000
Electric power plants—assessed value	$1,500

Poultry and Eggs.

Chickens, 450 dozen, value, from $4 to $5 per dozen; ducks, 1 dozen, turkeys, 12 dozen, value, $1.50 each; eggs, value, about $2,000.

Cereal Products and Hay.

Tons of 2,000 pounds.

Wheat, 100 acres, 30 bushels to acre; barley, 300 acres, 35 bushels to acre; oats, 1,500 acres, 35 bushels to acre. Average price per ton, $30.

Grain hay, 1,500 tons; grass hay, 1,500 tons. Hay sells for from $8 to $20 per ton.

Fish Industry.

	Pounds.	*Value.*
Salmon, canned, cases..	4,000	$20,000
Other kinds.............	.....	3,500

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	9	.....	......
Skimming stations.	1	.....	......
*Butter, pounds... ..		800,000	$200,000

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*From 23 to 25 cents is average price received for butter in San Francisco.

STATISTICS OF DEL NORTE COUNTY, 1907-8—Continued.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	4,000	500	4,500
Cherry	200	.....	200
Peach	350	.....	350
Plum	500	.....	500
Prunes	300	.....	300
Other kinds	500	.....	500
Total fruit trees	5,850	500	6,350

Grapevines, 5 acres; berries, 25 acres.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	500	$10,000
Stock	1,500	9,000
Dairy cows—Graded	4,000	80,000
Swine	1,200	......
Horses—		
Thoroughbred	5	......
Standard-bred	10	......
Common	350	......
Colts	100	......
Mules	10	......
Sheep	1,500	......
Lambs	500	......
Angora goats	200	......
Common goats	150	......
*Wool, pounds	20,000	......

Predominating breeds, Jerseys and Shorthorn Durhams.

*Market fluctuates.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	8,000	$2,000
Irish potatoes, tons	350	*......
Strawberries	6,000	750

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*$1.25 sack (average).

Forest Products.

Area of timber lands, 146,000 acres; redwood, 100,000 acres; sawmills, 2; lumber, 30,000,000 feet; shingles, 15,000,000. Timber values from $10 to $25 an acre, according to location. Lumber averages $15 per thousand feet.

Power used for mills and manufactories in county—Steam, 13; electrical, 1.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Clothing, tailoring	2	6	......
Cooper-shops	2	4	......
Jewelry	2	4	......
Meat products—			
Hides, tons		35	$3,000
Lard, tons		7½	1,050
Meat packed		100	24,000

EL DORADO COUNTY.

El Dorado, the "Old Empire County," is situated about the middle of the eastern tier of counties. It is a county of hills and valleys. There are no great tracts of prairie land. The soil is as good as the best, and will produce all things that grow. No county under the sun has any greater possibilities than this county, and having once made history by the fact of gold being discovered here by Marshall, we are on the morning of a second awakening. It is true that there are no large farms here where you may see in use the combined harvester and thresher, because this is not that kind of a county, but there are many vineclad hills where grapes are grown that can not be surpassed, many orchards nestling in the little valleys that abound, where the luscious peach, the pear, the apple, the cherry, the olive, and many other varieties of fruit are grown that are known to the world as the production of El Dorado County, and that stand for good goods.

Irrigation facilities are more than ample, and if you want water it costs you twenty cents an inch. There are lots of free water ranches here, where the proprietor has the free use of all the water and more than he wants. Lots of ranches where free water may be had for the labor of digging ditches, etc.

Land in El Dorado County is cheap, much cheaper than it will be five years from now, for many good truthful reasons. Why should an investor pay $100 per acre for land that will not raise any better fruits than land which can be bought in this county for $10, and even less in some instances? And again, we are going to have more railroads here, because they are indispensable, and because we have a field for them. Railroads will come as soon as the field is open. We are opening that field, and the railroads are looking at us now.

We have the best drinking water in the world here, because it comes from the lofty Sierras, where the snowcaps kiss the clouds.

We have a good high school and 65 public schools scattered over our county where children may attend. We have plenty of firewood here for the cutting. We have lumber galore, one mill cutting close to 200,000 feet per day. We have a power plant developing 6,000 horsepower, and we have opportunities for the erection of more. We have rich gold mines, and we have a slate quarry, the only one in the West, that produces just as good a quality of slate as any quarry in the world. We have good, substantial deposits of limestone, marble, asbestos, and enough granite to rebuild the world if it were destroyed, and within a few miles of the county seat all the ingredients to make cement are to be found, which deposits, however, are controlled by the cement producers.

Hunting and fishing are good, for we have part of the beautiful world-famed Tahoe within our borders, and a thousand other lakes of lesser note, where the weary toiler may go and rest with nature. Deer are plentiful, as also are the mountain and valley quail, which afford the sportsman ample opportunity to try his skill.

STATISTICS OF EL DORADO COUNTY, 1907-8.

General Statistics.

Area, 1,796 square miles, or 1,049,440 acres.	
Number of farms	1,640
Number of acres assessed	625,779
Value of country real estate	$2,752,675
Of improvements thereon	$695,915
Of city and town lots	$229,420
Of improvements thereon	$497,760
Of personal property	$900,255
Total value of all property	$5,076,025
Expended on roads, last fiscal year	$13,960
Expended for bridges, last fiscal year	$7,830
Number of miles of public roads	750
Road levy per $100, 1908	40c
Value of county buildings	$85,000
Irrigating ditches—miles, 270; cost	$269,500
Railroads, steam—miles, 92; assessed value	$817,500
Electric power plants—1; assessed value	$55,880
Electric power lines—miles, 36; assessed value	$14,000
Number of acres irrigated	15,200

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	25	25	$1,125
Barley	50	50	2,000
Oats	75	75	3,000
Total cereals	150	150	$6,125
Grain hay	.....	20,000	$260,000
Grass hay	.....	1,000	10,000
Total hay	.....	21,000	$270,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	5,500	2,200	7,700
Apricot	500	200	700
Cherry	2,400	700	3,100
Fig	1,550	.....	1,550
Nectarine	1,600	.....	1,600
Olive	4,100	800	4,900
Orange	900	.....	900
Peach	121,500	14,500	136,000
Pear	11,500	9,000	20,500
Plum	5,500	.....	5,500
Prunes	17,200	.....	17,200
Quince	450	.....	450
Other kinds	12,000	900	12,900
Total fruit trees	184,700	28,300	213,000
Almond	1,000	.....	1,000
Chestnut	550	.....	550
Walnut	500	.....	500
Total nut trees	2,050	.....	2,050
Grapevines, acres	2,600	800	3,400
Berries, acres	45	10	55

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,500	$6,500
Ducks	250	1,200
Geese	100	500
Turkeys	200	2,400
Total value	2,050	$10,600

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	300,000	$3,000
Cherries	40,000	2,000
Figs	4,000	160
Onions	50,000	500
Pears	3,750,000	56,250
Peaches	250,000	1,750
Plums	650,000	9,750
Irish potatoes	200,000	8,000
Prunes	250,000	3,750
Totals	5,444,000	$76,660
Dried—	*Pounds.*	*Value.*
Peaches	20,000	$1,000
Prunes	50,000	1,500
Totals	70,000	$2,500

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	12,000	$4,800
Sweet wines	6,000	6,000
Beer, barrels	1,200	12,000
Brandy	6,000	12,000
Cider	500	125
Vinegar	6,000	1,500

Number of wineries, 6; distilleries, 4; breweries, 1.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	3,500	$70,000
Stock	10,000	150,000
Dairy cows—Graded	4,000	80,000
Herefords	50	1,500
Holsteins	100	3,000
Shorthorns	400	12,000
Calves	3,400	34,000
Swine	1,200	6,000
Horses—		
Thoroughbred	100	20,000
Standard-bred	400	60,000
Common	1,200	60,000
Colts	500	7,500
Jacks and jennies	10	1,000
Mules	200	20,000
Sheep	2,000	4,000
Lambs	1,000	1,000
Angora goats	1,500	3,500
Common goats	2,000	2,000
Total stock all kinds	31,560	$535,500
Wool, pounds	7,000	$800
Mohair, pounds	2,000	400

Forest Products.

	Amount.	*Value.*
Pine, acres	200,000	$3,000,000
Sawmills, number	7	150,000
Charcoal, sacks	1,000	500
Fuel, wood, cords	8,000	18,500
Lumber, feet	20,000,000	200,000
Piles	1,500	9,500
Shakes, thousand	400	2,800
Shingles, thousand	300	600
Total value		$3,381,900

Power used for mills and manufactories in county—Steam, 19: electrical, 5; water, 20.

STATISTICS OF EL DORADO COUNTY, 1907-8—Continued.

Dairy Industry.

	Production.	*Value.*
Butter, pounds	200,000	$50,000
Cheese, pounds	10,000	2,000

Miscellaneous Products.

	Value.
Honey	$5,000

Manufactured Output.

	Quantity.
Cigars, thousand	336
Hides, pounds	75,000
Lard, pounds	5,000
Tallow, barrels	10,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	3	100	$150,000
Carriages and wagons	2	5	10,000
Cigars	4	10	13,440
Foundries and iron works	2	5	12,000
Machinery	1	5	12,000
Meat products—			
Hides	..	.....	6,000
Lard	..	.....	4,000
Tallow	..	.....	3,000
Planing mills	2	10	25,000
Artificial stone	1	5	4,000
Roofing slate	..	30	50,000

FRESNO COUNTY.

Fresno extends across from the high Sierras to the mountains of the Coast Range, and in this center of the valley every form of industry in any cf the counties that make the watershed of the San Joaquin is found in a greater or less degree.

Its mountains contain lumber and minerals and fine scenery; its level plains grow cereals and fruits, and vines and vegetables; it raises cattle, and its western borders overflow with petroleum. But in addition to this diversity of interests, it has, as a great mainstay, the raisin industry, with Spain as its only competitor.

The average rainfall is 10 inches. Fresno is a wonderful example of what irrigation has done and can do. The San Joaquin River forms the northern and eastern boundary line, but the stream is not so well located for irrigation purposes as is Kings River, which, rising in the Sierras, passes south, and then west and north, in a wide curve, through the center of the farming district, carrying through the summer a volume cf water equal to 8,500 cubic feet per second.

The region is a network of streams of water, that is drawn off on the vineyards, deciduous or citrus fruit orchards, or alfalfa fields. The cost of water is low. The perpetual water right, included with the purchase price of the land, is about $6.25 per acre.

Though great as the raisin and fruit industry is, wheat is grown on vast areas, the ranches running in the thousands of acres and the product in good years amounting to millions of bushels, a considerable portion being worked into flour in Fresno. Barley is grown in large quantities, and so is alfalfa. There are creameries and skimming stations, and butter and cheese are exported. An unlimited market for dairy products, with the fact that one acre of alfalfa will keep one cow in green feed, offers the farmer of limited means an opening for immediate and profitable returns. Sheep by the thousands roam over the foothills.

Deciduous fruit shipments, green and dried, represent several million dollars. Citrus fruit growing is a developing industry. Watermelons are exported in hundreds of carloads. The vineyards cover thousands of acres, most of which are in raisin grapes, and the remainder in wine or table varieties. There are many large wineries. Excellent port, brandy, sherry, and angelica are made, as well as other varieties.

At the head of the long list of valuable products stands the raisin. When a vineyard is in full bearing it produces about 4,000 pounds of green grapes to the acre, which will dry to over one ton of raisins. The average product of five-year-old vineyards is a ton of raisins to the acre. The California raisin has possession of the American market, and is extensively shipped abroad.

The growing of nursery stock is a remunerative occupation. Honey is produced in considerable quantity, and more so with the increased production of alfalfa. Alfalfa honey equals in quality clover honey of the East. Gold is mined in the mountains, and millions of feet of lumber cut annually, most of which is floated down in flumes. There are large planing mills and many lumber yards in the city of Fresno.

The growth of the dairy business dates back only a few years, when smaller interests merged and became what may be properly called a large clearing house for butter fat. Before this, dairying was conducted in a desultory way by ranchmen who gave their time to grain, vineyards, or other possessions, and, these permitting, the cows received attention later on. Now the farmers find it advisable to attend to their cows.

The calves and hogs fed on the skimmed milk are as much a part of the dairy product as the cream itself.

Along the river bottoms of the Kings and San Joaquin sheep raising flourishes. Here, between October and April, scores of bands of sheep are herded every year. The section is fertile and rich in herbage, upon which the animals thrive until the dry season sets in, when they are driven into the mountains.

The raising of hogs, cattle, horses, and mules has advanced both as to numbers and as to quality in breeding. Large numbers of cattle are being received continually from Arizona, to be fattened and either slaughtered here or reshipped to San Francisco and elsewhere.

Thoroughbred, standard-bred, and high-class draft stallions have been brought into the county, and great interest is manifested among horsemen in raising the grade of the runner, the trotter, and the work horse. Some of the best roadsters in the State are in Fresno, and very promising youngsters in the running line are also attracting attention, while the production of the heavier breeds has met with equal success.

In a general mention of the varied resources there must be consideration of the mule. In this valley he finds an environment peculiarly adapted to his exacting requirements, and speedily attains the highest degree of mulish perfection.

STATISTICS OF FRESNO COUNTY, 1907-8.

General Statistics.

Area, 5,600 square miles, or acres.	3,587,840
Number of farms	8,000
Number of acres assessed	2,478,472
Value of country real estate	$22,129,581
Of improvements thereon	$5,209,579
Of city and town lots	$5,618,246
Of improvements thereon	$5,160,409
Of personal property	$7,204,661
Money	$175,722
Total value of all property	$45,558,198
Expended on roads, last fiscal year	$187,983
Expended for bridges, last fiscal year	$63,994
Number of miles of public roads	2,150
Road levy per $100, 1908, 40c	$124,682
Value of county buildings	$575,000
Irrigating ditches—miles, 300; cost	$3,000,000
Railroads, steam—miles, 268; assessed value	$6,069,620
Railroads, electric—miles, 10½; assessed value	$49,500
Electric power plants—1; assessed value	$70,050
Electric power lines — miles, 105½; assessed value	$38,900
Number of acres irrigated	75,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	16,848	$84,240
Ducks	193	1,338
Geese	69	1,212
Turkeys	1,016	18,288
Eggs	842,000	210,600
Total value		$315,678

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	18,194	$544,745
Stock	56,818	1,036,509
Dairy cows—Graded	21,459	837,935
Angus	305	2,825
Calves	12,775	77,618
Swine	33,995	187,058
Horses—		
Thoroughbred	80	34,495
Standard-bred	74	25,750
Common	42,476	1,545,142
Colts	2,692	118,184
Mules	3,288	393,608
Sheep	336,460	980,400
Lambs	300	450
Total stock all kinds	528,916	$5,784,799

STATISTICS OF FRESNO COUNTY, 1907-8—Continued.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	175,509	$1,755
Apricots	251,715	2,517
Blackberries	134,220	6,789
Beets	4,400,000	17,600
Muscat grapes (to winery)	2,132,000	8,528
Wine grapes	108,592,000	325,776
Seedless grapes	1,124,000	11,440
Grapes, table	19,098,000	238,725
Lemons, boxes	10,799	13,494
Loganberries	136,160	7,510
Nectarines	138,200	1,382
Onions	29,530	1,476
Oranges, boxes	67,726	84,657
Olives	1,600,000	16,000
Pears	123,894	1,238
Peaches	7,448,772	74,877
Plums	247,795	1,858
Irish potatoes	120,500	1,205
Sweet potatoes	73,140	1,097
Raspberries	321,150	16,157
Totals	147,225,110	$833,881
Dried—	*Pounds.*	*Value.*
Apples	1,042,585	$52,129
Figs	2,855,236	57,105
Grapes	1,464,000	29,280
Nectarines	417,710	20,885
Pears	38,550	1,928
Peaches	10,262,120	513,106
Plums	36,880	1,106
Prunes	1,335,000	40,040
Raisins	97,844,000	2,935,320
Totals	27,226,481	$3,650,899

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	4	300,000	$90,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Sweet wines	91,000,000	$2,093,000
Brandy	700,000	280,000

Number of wineries, 18; distilleries, 10; breweries, 1.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	5,765	2,094	7,859
Apricot	169,903	62,965	232,868
Fig	96,366	28,557	......
Lemon	6,831	1,295	......
Nectarine	34,163	883	......
Olive	18,517	5,170	......
Orange	19,318	25,397	......
Peach	2,594,139	1,430,010	......
Pear	7,090	3,346	......
Plum	5,971	5,257	......
Prunes	68,184	32,061	......
Total fruit	3,026,300	1,597,035	4,623,335
Grapevines	77,757	29,758	107,515
Berries, acres	168	......	168

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	400,000	$4,000,000
Sawmills, number	8	400,000
Lumber, feet	75,000,000	1,575,000
Total value		$5,975,000

Manufactories.

	Quantity.	*Value of Product.*
Olive oil, gallons	7,500	$16,500
Pickled olives, gallons	40,000	24,000

GLENN COUNTY.

Glenn County occupies a most favorable position in the State of California, being near the center of the Sacramento Valley and on both sides of the Sacramento River. The area of the county is 1,545 square miles, nearly evenly divided between the level, the foothills and the mountains, and containing almost every variety of soil and climate. The plains or level land is mostly farmed for wheat, barley, and hay, although many of the grain producers now have cattle, sheep, and hogs, adding considerably to the revenue. The land along the Sacramento River is being sold in small tracts, and the production of vegetables, sugar beets, etc., has taken the place of the wheat fields. The statistics for the county show a substantial increase in the productions, and the building of three new schoolhouses in the river section during the past year is evidence of an increase in population. The increase in miles of irrigation ditches shows that the people are at last alive to the importance of uniting land and water, the latter being of sufficient volume to irrigate every acre of level land in the county, and the streams coming down from the coast mountains could be the means of producing sufficient power to run electric trains all over this section. The hill country has many fertile valleys, where farming and fruit raising are income-producing factors, in addition to the sheep and cattle.

During the year an Eastern lumber company has acquired nearly 20,000 acres of the timber land in Glenn County, and a railroad to the mountains is only a matter of months.

The whole length of Stony Creek, from Orland to the county line, abounds in an excellent quality of stone for cement; a ledge of sandstone runs through the entire length of the county from Colusa northward; a big ledge of gold-producing rock is being worked on Briscoe Creek; the ore is low grade, but in such quantity that it must become a revenue producer. Another mineral ledge of immense size has been opened in the southwest corner of Glenn County in the shape of a covered mountain of manganese; the work so far shows a gain 30 feet wide, 200 feet deep, and nearly a mile long. All of these promising industries are lagging for the necessary capital to erect plants and for means of transportation.

The statistics show a considerable increase in the number of farms; this is being brought about by the Central Canal irrigation system; many of the big farms are being subdivided and small homes taking the place of big grain fields. Pumping plants are much in evidence around Orland and Willows, and are proving successful and profitable and no diminution of the underground water supply.

The county has made considerable progress, as evidenced by new roads and several good bridges and the erection of many new residences all over the county, particularly in Willows and Orland, where more improvements are under way than for any five years previous.

The immense bodies of manganese, sandstone, and cement material still lie undeveloped and await capital.

STATISTICS OF GLENN COUNTY, 1907-8.

General Statistics.

Area, 1,545.9 square miles, or 989,374 acres.	
Number of farms	1,032
Number of acres assessed	642,419
Value of country real estate	$7,868,177
Of improvements thereon	$461,901
Of city and town lots	$328,842
Of improvements thereon	$377,400
Of personal property	$1,755,522
Total value of all property	$10,791,842
Expended on roads, last fiscal year	$46,083
Expended for bridges, last fiscal year	$42,522
Number of miles of public roads	458
Road levy per $100, 1908	40c
Value of county buildings	$133,000
Irrigating ditches—miles, 82; cost	$65,600
Railroads, steam—miles, 55.78; assessed value	$1,196,057
Railroads, electric—miles, 4.9; assessed value	$24,900
Electric power lines—miles, 32; assessed value	$19,440
Number of acres irrigated	2,030

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	18,750	10,575	$317,250
Barley	45,400	38,624	965,600
Oats	1,350	1,250	37,500
Corn	270	385	7,290
Total cereals	65,770	50,834	$1,327,640
Alfalfa hay	2,610	15,660	$93,960
Grain hay	15,600	15,600	156,000
Total hay	18,210	31,260	$249,960

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	2,530	550	3,080
Apricot	3,800	800	4,600
Cherry	420	45	465
Fig	1,550	310	1,860
Lemon	3,500	415	3,915
Nectarine	45	10	55
Olive	1,460	380	1,840
Orange	5,650	1,840	7,490
Peach	5,300	590	5,890
Pear	3,600	110	3,710
Plum	1,500	205	1,705
Prunes	7,550	520	8,070
Quince	110	.....	110
Other kinds	460	80	460
Total fruit trees	34,475	5,855	43,330
Almond	5,670	870	6,540
Chestnut	15	5	20
Pecan	28	.....	28
Walnut	1,850	560	2,410
Total nut trees	7,563	1,435	8,998
Grapevines	26,400	1,200	27,600
Berries, acres	21	16	37

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	81,750	$1,635
Apricots	75,600	1,512
Blackberries	10,500	525
Beans	16,110	480
Corn	90,650	4,532
Cherries	4,200	420
Figs	155,000	3,100
Grapes	528,000	5,280
Lemons, boxes	910	2,730
Loganberries	33,000	1,650
Onions	195,000	1,430
Oranges, boxes	3,230	7,200
Olives	15,506	675
Pears	180,000	5,400
Peaches	55,500	1,110
Peas	3,500	140
Persimmons	5,100	153
Plums	16,000	320
Irish Potatoes	380,900	3,810
Sweet Potatoes	31,200	468
Prunes	56,650	1,133
Raspberries	7,650	482
Strawberries	12,300	752
Tomatoes	320,800	3,208
Totals	....	$48,145
Dried—	*Pounds.*	*Value.*
Almonds	134,400	$13,440
Apples	14,800	2,960
Figs	850	26
Prunes	445,000	13,354
Totals	595,050	$29,776

Live Stock Industry.

	Number.	*Value.*
Cattle—Stock	11,180	$167,708
Dairy cows—Graded	1,671	41,700
Angus	7	400
Holsteins	16	960
Jersey	21	1,150
Shorthorns	3	300
Calves	5,989	59,890
Swine	7,250	36,250
Horses—		
Thoroughbred	5	5,000
Common	2,063	92,825
Colts	997	24,915
Jacks and jennies	20	4,700
Mules	2,858	171,490
Sheep	109,188	382,158
Angora goats	4,776	7,165
Total stock all kinds	146,044	$996,611
Wool, pounds	35,540	$3,554
Mohair, pounds	14,328	2,865

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,995	$5,985
Ducks	108	540
Geese	21	240
Turkeys	720	12,960
Eggs	67,000	13,400
Total value		$33,125

STATISTICS OF GLENN COUNTY, 1907-8—Continued.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	100,390	$2,780
Sawmills, number	2	6,000
Fuel, wood, cords	1,820	9,100
Lumber, feet	847,000	8,470
Shakes, thousand	21	126
Total value		$224,476

Power used for mills and manufactories in county—Steam, 2.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 385	.....	$1,440
Honey	2,500	200
Sugar beets, tons	24,000	120,000

Fish Industry.

	Pounds.	*Value.*
Salmon	32,400	$2,100
Other kinds	7,500	750
Totals	39,900	$2,850

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	203,975	$59,152

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Sugar, beet	1	310	$248,000
Tiling	1	5	3,500

HUMBOLDT COUNTY.

Humboldt County is situated nearly in the extreme northwestern part of California. Its northernmost point being about 32 miles from the southern boundary of Oregon and its southern boundary is the parallel of 40 degrees north latitude, making its length north and south about 108 miles and with an average width of 35 miles. Its area being 3,507 square miles, or 2,244,480 acres.

The surface of the county is mostly hilly and mountainous, with beautiful and fertile valleys along its rivers, and north of Humboldt Bay there are extensive farming and dairying lands.

The county is plentifully watered, irrigation being unknown in the county. The Klamath and Trinity rivers and Redwood Creek in the north, with Mad River in the central part and Eel River, Van Duzen River, Bear River, and Mattole River in the south, together with their tributaries, make Humboldt the best watered county in California.

The average rainfall for the last seventeen years is 47.55 inches.

An abundance and variety of wild game and fish is to be found in the mountains and streams of the county. The deer hunting alone attracts many from all parts of the State. Last year there were over 3,000 hunting licenses sold in this county, and the number this year bids fair to go far beyond that number.

The soil is practically all productive. There is hardly a foot of Humboldt soil, aside from the river bars and the highest mountain peaks, that is not capable of producing some valuable vegetation. The bottom lands around Eel River, Mad River, and the bay are of unsurpassed fertility. The United States census report gives Humboldt County the top rank for the production of corn and oats per acre, and wheat grown in this county took the first prize at the Chicago World's Fair.

This county produces as good apples, pears, peaches, cherries, or plums as are grown in the State, and there is no fruit grown in California that can not be grown in some part of this county.

A great variety of cultivated berries will grow and produce abundantly in all sections, and immense quantities of wild blackberries and huckleberries are found throughout the county.

The leading industry of the county is the manufacture of redwood lumber, the exports of which alone are about 250,000,000 feet per year, besides that which is used for building and other purposes at home, which is not inconsiderable.

The estimated supply of standing timber is over 45,000,000,000 feet, including an acreage of redwood timber amounting to over 500,000 acres, while the pine, oak, and other timbers swell the acreage to at least 400,000 more.

The manufacture of redwood shingles, which is the most important of the minor branches of the lumber industry, is carried on very extensively. Redwood shingles, being a superior article, find a ready market throughout the Eastern States, and large numbers are shipped there from this county. Humboldt boasts of having the only electric shingle mill in the State.

Besides the lumber mills and creameries there are located here sash and door factories, planing mills, one woolen mill, one barrel factory, and many foundries and machine shops.

The H. D. Bendixsen Shipbuilding Company is located on Humboldt Bay, and vessels built by that company are known for their seaworthiness in all ports on the globe, this county furnishing the pine used in their construction.

Two tanneries are also operated in this county, and obtain the tan bark necessary for their business from the extensive oak forests which lie just back of the redwood belt.

With gold and copper mines on the Klamath and Trinity rivers, granite and sandstone quarries on Mad River, and limestone, mineral paint and petroleum found in other parts, this county does not lack for ores or minerals. Natural gas from a prospecting well at Briceland has heated and lighted that town for a number of years.

Eureka, the county seat, has a population of about 15,000, and is situated on Humboldt Bay, which bay is a sheltered and landlocked harbor 14 miles long and from 1 to 4 miles wide, and with a deep bar that permits the passage of good-sized vessels, the United States monitor Monadnock having visited the city some years ago.

A Government Land Office, Custom House, and Weather Bureau are located in Eureka, and a site has lately been purchased by the Government on which to erect a $130,000 Federal building.

Good wagon roads is the order here. Besides connecting all cities and towns together, there are two running out of the county toward the south and one on the north.

Among other things Eureka has about 15 miles of electric roads, a courthouse, that withstood the quake of 1906, a new county jail building just completed at a cost of $91,000, 6 hospitals, 13 churches, 3 daily and 2 weekly newspapers, 63 secret societies, and numerous clubs.

Humboldt County has 122 public school buildings, with 186 teachers, 27 primary, 145 grammar, and 14 high school.

Humboldt County has—

Great extent, affording choice of location.
Cheap lands in abundance.
Good wages.
Its own lumber, fuel, food, wool and leather.
Equable temperature.
Healthfulness, especially absence of fevers and malaria.
Abundant rainfall.
Good schools within the reach of all homes.

It has not—

Chinese; irrigation; summer thunderstorms; long winters; severe frosts; crop failures; cyclones; blizzards; tramps, or strikes.

STATISTICS OF HUMBOLDT COUNTY, 1907-8.

General Statistics.

Area, 3,507 square miles, or 2,244,480 acres.	
Number of acres assessed	1,563,687
Value of country real estate	$16,438,185
Of improvements thereon	$1,152,815
Of city and town lots	$4,717,930
Of improvements thereon	$2,812,555
Of personal property	$3,385,457
Total value of all property	$28,506,942
Expended on roads, last fiscal year	$91,782
Expended for bridges, last fiscal year	$18,016
Number of miles of public roads	1,180
Road levy per $100, 1908	60c
Value of county buildings	$361,480
Railroads, steam—miles, 130; assessed value	$1,052,880
Railroads, electric—miles 12; assessed value	$48,000
Electric power plants—2; assessed value	$166.165
Electric power lines—miles, 92; assessed value	$14,300
Telephone lines and equipments, assessed value	$74,129
Telegraph lines and equipments	$5,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	10,200	6,000	108,000
Cherry	2,000	.....	2,000
Peach	2,500	.....	2,500
Pear	500	.....	500
Plum	1,000	.....	1,000
Prunes	15,000	.....	15,000
Quince	500	.....	500
Total fruit trees	123,500	6,000	129,500
Walnut	400	.....	400
Berries, acres	.....	.....	250

Live Stock Industry.

	Number.	Value.
Cattle—Beef	5,000	$15,000
Stock	27,200	326,400
Dairy cows—Graded	28,250	987,750
Jersey	310	31,000
Calves	10,145	60,870
Swine	8,780	26,340
Horses—		
Thoroughbred	2	1,000
Standard-bred	575	57,500
Common	9,100	413,500
Colts	924	23,100
Mules	472	18,880
Sheep	94,360	377,440
Lambs	43,000	86,000
Common goats	1,728	5,184
Total stock all kinds	229,846	$2,429,964
Wool, pounds	376,840	$75,368

Dairy Industry.

	No.	Production.	Value.
Creameries	12	.....	......
Skimming stations	15	.....	......
Butter, pounds		4,530,000	$1,312,240
Condensed milk, cases		6.000	21.500

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	17,000,000	$140,000
Blackberries	500,000	25,000
Beans	16,000	640
Beets	600,000	2,400
Cabbage	200,000	200
Celery	20,000	1,600
Cauliflower	30,000	3,000
Corn	10,000	2.000
Cherries	64,000	3,200
Gooseberries	3,000	240
Loganberries	6,000	600
Onions	12,000	240
Pears	90,000	1,350
Peaches	200,000	9,000
Peas	80,000	4,000
Plums	10,000	400
Irish potatoes	490,000	49,000
Prunes	600,000	6,000
Quinces	6,000	120
Raspberries	5,000	500
Strawberries	110,000	11,000
Tomatoes	80,000	1,600
Totals	13,832,000	
Dried—	*Pounds.*	*Value.*
Apples	40,000	$3,200
Beans	20,000	600
Peas	1,500,000	45,000
Prunes	30,000	2,400
Strawberries	4,000	600
Totals	1,594,000	$51,800

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	100	90	$2,700
Barley	515	565	14,125
Oats	2,300	1,405	42,150
Total cereals.	2,915	2,060	$58,975
Alfalfa hay	180	845	$10,040
Grain hay	5,310	7,965	119,475
Grass hay	.....	.....	130,950
Total hay	14,220	21,905	$260,465

Forest Products.

	Amount.	Value.
Area of timber lands, acres	900,000	......
Cedar, acres	182,000	......
Pine, acres	180,000	......
Redwood, acres	538,000	......
Sawmills, number	12	......
Fuel, wood, cords	40,000	$160,000
Laths, thousand	800	2,800
Lumber, feet	253,500,000	5,070,000
Pickets, pieces	110,000	2,200
Piles	4,000	12,000
Posts, pieces	106,000	15,900
Railroad ties, pieces	....	188,096
Sash and door factories, number	5	......
Shakes, thousand	10,500	105,000
Shingles, thousand	850,000	1,197,000
Stave bolts, cords	600	4,200
Total value		$6,757,196

Power used for mills and manufactories in county—Steam, 51; electrical, 8.

STATISTICS OF HUMBOLDT COUNTY, 1907-8—Continued.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	6,200	$31,000
Ducks	340	2,040
Geese	103	927
Turkeys	410	9,840
Eggs	423,000	84,600
Total value		$128,407

Fish Industry.

	Pounds.	*Value.*
Salmon	3,260,170	$107,505
Other kinds	606,000	28,500
Totals	3,866,170	$136,005

Manufactured Output.

	Quantity.
Cigars, thousand	1,425

Wines, Brandies, Etc.

	Gallons.	*Value.*
Beer, barrels	13,562	$122,058
Cider	32,500	8,125
Vinegar	10,000	600

Number of breweries, 1.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	9	27	$78,342
Confectionery	5	15	......
Foundries and iron works	2	83	183,000
Planing mills	6	138	745,500
Marble	2	.....	......
Tanneries	2	.....	......
Woolen mill	1	45	45,000
Ice plant	1	4	14,600
Boiler works	1	25	50,000

IMPERIAL COUNTY.

Imperial is the youngest county in the State, having been formed in 1907 from the eastern part of San Diego County, formerly known as the "Colorado Desert, or Imperial Valley."

The progress of the county is practically confined to the central part of the valley.

Dairying is very profitable, owing to the fact that we have alfalfa growing throughout the winter, and furnishes an abundant supply of green pasturage. We have modern creameries with latest appliances and are located in different sections. The stock used for dairying purposes is of a very high grade, mostly pure-bred representatives of the milk strains.

Imperial Valley is one of the best stock, hog and poultry producing countries in the West, and there are also various other industries which are receiving considerable attention.

There is reason to believe that the cultivation of cotton may hold a most important part in the industrial development of Imperial County, and those interested feel greatly encouraged over the outlook.

The center of this wonderfully fertile valley is reached by a spur from the main line of the Southern Pacific Railroad.

The most important towns of the valley are Imperial, El Centro, Holtville, Brawley, and Calexico. There are located in these towns seven strong banking institutions. The hotel accommodations are excellent, and there are a number of sunny modern lodging houses.

The school and church accommodations of the valley are excellent.

Imperial Valley is 110 miles long by 40 miles wide, half in California, half in Mexico. Present irrigated area, 40 by 25 miles in California.

Irrigated from Colorado River; 500,000 miner's inches available.

Three feet of water over one acre deposits 14 tons of silt.

Area of irrigable land in Imperial County, 400,000 acres. In cultivation, 200,000 acres.

Length of canals, about 600 miles.

Maximum temperature 1908, at El Centro, 113 degrees.

Average rainfall, 4.4 inches.

Value of products 1906, $1,170,500.

In 1907, 1,200 acres of cantaloupes netted growers $327,790. In 1908, more than 9,000 acres of cantaloupes were grown, and 1,959 carloads were shipped.

All crops yield abundantly here.

Present population of Imperial County about 20,000.

STATISTICS OF IMPERIAL COUNTY, 1907-8.

General Statistics.

Area, 4,000 square miles, or	2,560,000 acres.
Number of farms	2,390
Number of acres assessed	571,712
Value of country real estate	$1,086,002
Of improvements thereon	$458,324
Of city and town lots	$1,012,823
Of improvements thereon	$211,175
Of personal property	$2,634,728
Expended on roads, last fiscal year	$8,125
Expended for bridges, last fiscal year	$9,850
Number of miles of public roads	350
Road levy per $100, 1908	60c
Value of county buildings	$25,000
Irrigating ditches, cost	$3,500,000
Railroads, steam — assessed value	$2,686,383
Electric power plants, assessed value	$25,000
Electric telephone and telegraph lines—miles, 50; assessed value	$24,044
Number of acres irrigated	175,343

Dairy Industry.

	No.	Production.	Value.
Creameries	4	.....	......
Butter, pounds		1,248,000	......

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	10	350	360
Apricot	25	6,384	6,409
Cherry	.....	57	57
Fig	12	1,778	1,790
Lemon	8	378	386
Olive	5	42	47
Orange	18	5,524	5,542
Peach	6	980	986
Pear	3	502	505
Plum	.....	153	153
Prunes	2	851	853
Other kinds	.....	.....	75,468
Total fruit trees.	89	16,999	92,556
Almond	.....	282	282
Total trees	89	17,281	92,838
Grapevines	981	5,042	6,023
Berries, acres	.....	412	412
Cantaloupes, acres	.....	.....	8,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	250	$750
Turkeys	225	2,250

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.
Wheat	250
Barley	68,275
Oats	121
Corn	350
Total cereals	68,996
Alfalfa hay	56,816
Total hay	125,812

Live Stock Industry.

	Number.	Value.
Cattle—Beef	1,250	$25,000
Stock	2,445	36,375
Dairy cows—Graded	2,110	52,750
Angus	275	10,000
Calves	1,200	6,000
Swine	82,250	246,750
Horses—		
Thoroughbred	55	27,500
Standard-bred	1,850	74,000
Common	2,120	42,400
Colts	800	4,000
Jacks and jennies	10	2,500
Mules	526	21,040
Sheep	15,587	31,174
Lambs	2,503	2,503
Total stock all kinds	112,961	$581,992
Wool, pounds	155,870	......

Forest Products.

Total value	$50,000

Power used for mills and manufactories in county—Steam, 2; electrical, 1; water, 1.

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 975	.....	$1,950
Honey	3,500	8,750

Manufactories.

	No.	No. of Employes.	Value of Product.
Brick	2	25	$750,000
Confectionery	10	50	5,000
Electrical plant	1	50	45,000
Planing mills	1	10	1,500

Manufactured Output.

	Quantity.
Brick, thousand	7,000,500

KERN COUNTY.

Kern County, lying in the southern end of the San Joaquin Valley, its easterly boundary extending on to the Mojave Desert over the extreme southerly end of the Sierra Nevada Mountains, is the second largest county in the State and probably has the most diversified resources of any.

At Randsburg, on the eastern border, is one of the largest gold mines on this coast, and the country around Randsburg has many smaller mines that are free-milling ore, which make them paying properties of people or corporations of small means.

Along the southern border where the line crosses the San Emidio Mountains are large deposits of iron ore and antimony, which are yet undeveloped, and along the western side of the county are the Sunset, Midway, and McKittrick oil fields, lying along the eastern base of the Coast Range Mountains, and which promise to yield untold wealth in their future production of oil.

In the northern part of the county, and surrounding the town of Delano, is a large body of good land which is now attracting considerable attention from investors, as development has shown that within a few feet of the surface lies an unlimited quantity of water, which can be raised to the surface to transform the arid plains into orchards and alfalfa fields.

In the northeastern part is the mining town of Kernville, surrounded by good mines, and near it on the south fork of the Kern River is the South Fork Valley, where numerous prosperous stockmen have their alfalfa fields that furnish feed to the stock that pasture in the high Sierras in the summer time.

In the center and surrounding the town of Bakersfield, the county seat, lie thousands of acres of fertile land that are irrigated by Kern River, and which are mostly used to raise stock and alfalfa, but will produce anything that can be raised where there is good land and an abundance of sunshine.

Quite a large amount of capital is being interested in the installation of pumping plants in the Weed Patch, which is a fertile tract of land lying at the base of the Coast Range and Sierra Nevada Mountains, and ranging in distance between eight and twenty miles from Bakersfield in a southeasterly direction and has heretofore been uncultivated on account of the scarcity of water.

A short distance north of Bakersfield lies the famous Kern River oil field, the production from which has amounted to many million barrels, and which undoubtedly will produce for a great many years to come.

In the Kern River and Sunset oil fields we have numerous refineries that are producing thousands of tons of asphalt that finds a ready market in all parts of the United States.

There are two transcontinental railroads passing through the county, with branch roads running to the McKittrick, Sunset, and Kern River oil fields.

In the Kern River canyon we have one electric power plant, which furnishes light and power to the cities of Bakersfield and Kern. One completed, one nearly completed, and one just commencing work that will furnish electricity for Los Angeles.

The past year has been a valuable one in the history of the development of the county, both with reference to its agricultural lands and in connection with its mineral resources. Many homeseekers have been attracted here by reason of the cheapness of the land, and particularly is this true of the northern area where the small settler must depend upon pump irrigation. In Delano, McFarland, and Wasco sections many new families have made homes, and the lands to the southeast of Bakersfield are also attracting much attention, as are the mesa lands, also the foothills on both sides of the valley. One promising colony has been founded and others are contemplated.

Perhaps the greatest stimulus to business and to immediate development has been in connection with the oil industry. The increased price of fuel oil has not only created much wealth, but it has made active the work of development in all the county's great fields, and the demand for material and the employment of men gave to Bakersfield, and to the entire county, a healthy business turn at a time when there was general depression throughout the country.

STATISTICS OF KERN COUNTY, 1907-8.

General Statistics.

Area, 8,100 square miles, or acres.	5,184,000
Number of farms	1,000
Number of acres assessed	2,869,229
Value of country real estate	$11,714,814
Of improvements thereon	$2,045,915
Of city and town lots	$1,424,725
Of improvements thereon	$1,961,510
Of personal property	$8,113,652
Total value of all property, including railroads	$32,308,498
Expended on roads, last fiscal year	$50,507
Expended for bridges, last fiscal year	$9,150
Number of miles of public roads	1,625
Road levy per $100, 1908	25c
Value of county buildings	$267,000
Irrigating ditches, cost	$342,580
Railroads, steam — assessed value	$5,695,225
Railroads, electric — assessed value	$48,750
Electric power plants, assessed value	$1,568,540
Electric power lines, assessed value	$392,850
Number of acres irrigated	140,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	2,500	$10,000
Ducks	50	300
Geese	30	300
Turkeys	300	7,500
Eggs	150,000	30,000
Total value		$48,100

No mention in the above except poultry farms.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	19,000	11,035	$353,000
Barley	13,900	9,950	268,650
Corn	.....	4,500	126,000
Total cereals	32,900	25,485	$747,650
Alfalfa hay*	.....	22,000	$242,000
Grain hay*	.....	13,000	185,000
Total hay	.....	35,000	$427,000

*Figures given relate to hay shipped out of county. Much of the hay produced is utilized by the farmer himself.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	10,000	3,000	13,000
Apricot	25,000	.....	25,000
Cherry	1,000	.....	1,000
Fig	1,000	.....	1,000
Lemon	500	250	750
Nectarine	1,000	.....	1,000
Olive	5,000	.....	5,000
Orange	6,500	2,000	8,500
Peach	41,000	10,000	51,000
Pear	1,500	.....	1,500
Plum	6,000	.....	6,000
Prunes	41,000	5,000	46,000
Quince	500	.....	500
Total fruit trees	140,000	20,250	160,250
Almond	2,000	.....	2,000
Pecan	200	.....	200
Walnut	200	.....	200
Grapevines	1,100	.....	1,100
Berries, acres	65	.....	65

STATISTICS OF KERN COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef*		
Stock	60,000	$1,080,000
Dairy cows—Graded	3,000	90,000
Herefords§		
Holsteins	100	5,000
Jersey	100	5,000
Shorthorns§		
Calves	10,000	100,000
Swine	9,000	100,000
Horses—		
Thoroughbred	15	15,000
Common	7,300	584,000
Colts	1,000	4,000
Mules	1,300	130,000
Sheep	152,000	684,200
Lambs	70,000	140,000
Total stock all kinds	313,815	$2,937,200
Wool, pounds	1,600,000	$112,000

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*There were probably 23,000 head of beef cattle shipped out of the county at an average value of $35.00 each. Many of them having been shipped into the county for feeding purposes.

§For breeding purposes.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	*10,000	......
Sawmills, number	2	......
Lumber, feet	650,000	$13,000

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*Not owned by the Government; mostly pine.

There are two small mills which supply in the mountain districts.

Manufactured Output.

	Quantity.
Brick, thousand	2,400,000
Cigars, thousand	498,000
Flour, barrels	17,435
Lime, barrels	90,000
Hides, pounds	379,000
Tallow, pounds	214,000

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	......	......
Butter, pounds		550,000	$154,000

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apricots	450,000	$9,000
Lemons, boxes	2,000	4,000
Oranges, boxes	9,400	18,800
Olives	......	250
Peaches	800,000	6,000
Totals	1,261,400	$38,050

Dried—	*Pounds.*	*Value.*
Blackberries	108,000	$6,480
Peaches	100,000	4,000
Prunes	400,000	12,000
Raisins	900,000	22,500
Totals	1,508,000	$44,980

The above articles at figures quoted are shipped out of the county. There is no available data on the amount consumed within the county.

Canned—	*Cases.*	*Value.*
Apricots	4,575	$13,725
Pears	51	178
Peaches	2,100	7,350
Plums	375	1,125
Totals	7,731	$22,378

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	1	2	$2,500
Brick	1	40	17,700
Cigars	2	16	22,400
Confectionery	2	6	10,000
Flouring mills	1	12	91,500
Foundries and iron works		87	336,000
Lime	3	75	75,000
Meat products—			
Hides		.....	37,900
Tallow		.....	10,700

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 8,000	....	$24,000
Beeswax	5,000	1,200
Honey	225,000	11,250
Alfalfa seed	160,000	22,400

KINGS COUNTY.

Kings County is located near the south end of the San Joaquin Valley and is level over nine tenths of the entire surface. Rivers: Kings, Cross Creek, Tule. Irrigation from all the streams, mainly from Kings River.

Railroads: Southern Pacific and Santa Fe.

Fruits, raisins, wine, stock, and dairying, poultry, hogs, all are raised in abundance.

One of the best dairy countries in the State. Alfalfa grows to perfection, also grapes.

The San Joaquin Light and Power Company has a line through the county from north to south. Also the Mount Whitney Power Company has entered the county from the east.

The Pacific Sugar Corporation has completed a factory at Corcoran at a cost of one million dollars, which will be in operation in the year 1909. Sugar shows a factory test of 20 per cent, and yields from 10 to 20 tons per acre.

Artesian wells are found over the south half of the county at a depth of 200 to 2,000 feet. Irrigation from artesian wells and pumping is increasing very fast.

The mountains are in the southwestern part of the county.

Oils in paying quantities have been found and are being developed.

Vegetables, berries, small fruits of all kinds, are produced in abundance, and supply the local markets.

STATISTICS OF KINGS COUNTY, 1907-8.

General Statistics.

Area, 1,257 square miles, or 840,480 acres.

Number of acres assessed	739,022
Value of country real estate	$4,594,789
Of improvements thereon	$672,640
Of city and town lots	$591,080
Of improvements thereon	$891,630
Of personal property	$1,300,463
Total value of all property	$8,050,602
Expended on roads, last fiscal year	$29,055
Number of miles of public roads	500
Road levy per $100, 1908	40c
Value of county buildings	$125,000
Irrigating ditches—miles, 140; cost	$70,150
Railroads, steam—miles, 51; assessed value	$1,136,864
Electric power lines, miles	30
Number of acres irrigated	275,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	10,400	2,489	$67,203
Barley	4,600	2,783	84,273
Corn	.....	999	31,427
Total cereals	15,000	6,281	$184,903
Alfalfa hay	9,000	30,000	$240,000

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apricots	11,576,000	$115,760
Grapes	43,366,000	206,300
Nectarines	106,000	1,060
Pears	300,000	3,000
Peaches	27,778,000	277,800
Plums	200,000	2,000
Prunes	40,000,000	160,000
Total		$765,950
Dried—	*Pounds.*	*Value.*
Apricots	1,912,000	$114,720
Nectarines	16,000	960
Pears	34,000	1,700
Peaches	4,084,000	245,000
Prunes	12,000,000	160,000
Raisins	13,000,000	450,000
Total		$977,380
Canned—	*Cases.*	*Value.*
Peaches	75,000	$175,000

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	4	......	......
Butter, pounds	..	2,298,636	$666,649
Cheese, pounds	2	250,000	22,500

STATISTICS OF KINGS COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	53	$2,120
Stock	5,977	70,115
Dairy cows—Graded	8,266	168,490
Jersey	350	35,000
Shorthorns	108	3,510
Calves	5,182	26,712
Swine	32,000	202,800
Horses—		
Thoroughbred	5	3,250
Standard-bred	16	30,500
Common	4,869	180,465
Colts	1,333	29,965
Jacks and jennies	27	1,255
Mules	738	33,592
Sheep	50,831	270,158
Lambs	19,180	9,690
Angora goats	50	70
Total stock all kind	128,985	$1,067,692
Wool pounds	881,062	$88,106

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	361,000	$180,500
Sweet wines	1,000,000	500,000
Brandy	80,500	......

Number of wineries, 3.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	12,875	$57,738
Turkeys	150	4,500
Eggs	1,707,890	341,568
Total value		$403,806

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 7,000	.....	$21,000
Beeswax	7,500	1,875
Honey	350,000	17,500
Alfalfa seed	224,000	30,360
Sugar beets, tons	20,000	120,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	500	.....	500
Apricot	90,000	7,000	97,000
Nectarine	4,800	.....	4,800
Peach	254,600	114,700	372,300
Pear	4,000	.....	4,000
Plum	104,300	2,100	106,400
Quince	7,500	.....	7,500
Total fruit trees	.....	.....	592,500
Grapevines	7,800	488	8,288
Strawberires, acres	6	2	8

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	5,000	$30,000

Power used for mills and manufactories in county—Steam, 4; electrical, 3.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	1	10	$8,000
Confectionery	1	15	55,000
Flouring mills	1	7	60,000
Leather goods	4	10	18,000
Machinery	1	25	125,000
Meat products—			
Hides	8	.....	5,900
Lard	8	.....	3,600
Tallow	8	.....	5,664
Planing mills	1	30	75,000
Granite	1	5	12,000
Sugar, beet*	1	.....	......
Ice plant	1	20	25,000
Gas works	1	7	15,000

*Just completed.

Manufactured Output.

	Quantity.
Brick, thousand	1,000
Cigars, thousand	250
Flour, barrels	10,000

LAKE COUNTY.

By her sister counties, Lake has long been cheerfully accorded the title of "The Switzerland of America," owing to her beauty of scenery. The county is located in the heart of the Coast Range, about 100 miles north of San Francisco, and is about 75 miles long and 25 miles wide. Mount St. Helena guards the southern extremity. Clear Lake is a splendid sheet of fresh water 25 miles long and from 2 to 10 miles broad. With the lake surface at an elevation of 1,350 feet above sea level; having a depth sufficient to float vessels of considerable tonnage and draft, receiving in its basin the waters from several streams of considerable flow; stocked with an amazing wealth of native food fishes; bordered by smiling valleys of great fertility, by orchards of luscious fruit, by gently swelling slopes, by ragged mountains, by wild canyons touched with a certain savage beauty; and bearing upon its heaving breast a constantly increasing proportion of the internal commerce of the community, Clear Lake is the pride of Lake County, as well as the source of its name.

Although classed as mountainous, Lake County has a number of very fertile valleys, some of them being of large area. Artesian water is obtainable in profuse quantities, and with comparatively small outlay of money or effort. Fields are growing luxuriant crops of grain, though annually sown in the same crops for more than a half century. A variety of soils is found throughout the county, and even the valleys show differences. Generally the valleys are rich with alluvium, but in places there are extensive tracts of adobe, black and heavy, and apparently inexhaustible in productiveness. Occasionally a sandy loam is found in the valleys, especially in the neighborhood of the streams traversing the county at short intervals. On the plateau crowning the low foothills which ring the valleys is a lighter soil, but when cleared is capable of raising large vineyards and orchards of peaches, prunes, etc. The rocky hillsides furnish pasture for flocks of Angora goats.

Large bodies of sugar and yellow pine, fir, cedar, and oak give employment to several sawmills and furnish the home market a good quality of lumber. The minerals have heretofore been represented by the quicksilver industry, although gold, silver, copper, and oil have been discovered in small quantities. Besides quicksilver, immense quantities of mineral water have been bottled at the many mineral springs and shipped to all parts of the country. The several mineral springs are the sites for as many health resorts, as many as thirty thousand guests being entertained from all parts of the country each summer. Some of them go to the resorts for their health, the bright, clear atmosphere being very beneficial, and the waters frequently having a highly curative property in certain complaints. Others seek the deer, the fishing, and other sports. Among the resorts are Bartlett, Highlands, Adams, Harbin, Zeigler, Witter, and Anderson springs; Blue Lakes, Laurel Dell, Hoberg's, Soda Bay, Glenbrook, Carlsbad, Saratoga, Bonanza, Astorg, England, Howard, and Bynum.

There are several mines from which large amounts of quicksilver have been taken. Natural gas is found. There are large deposits of sulphur and of borax in some parts of the county.

STATISTICS OF LAKE COUNTY, 1907-8.

General Statistics.

Area, 1,332 square miles, or 852,480 acres.	
Number of farms	925
Number of acres assessed	35,670
Value of country real estate	$2,033,483
Of improvements thereon	$549,650
Of city and town lots	$276,300
Of improvements thereon	$277,530
Of personal property	$541,236
Total value of all property	$3,678,199
Expended on roads, last fiscal year	$17,250
Expended for bridges, last fiscal year	$7,500
Number of miles of public roads	600
Road levy per $100, 1908	50c
Value of county buildings	$33,000
Irrigating ditches, cost	$3,000
Electric power plants—1; assessed value	$1,500
Electric power lines—miles, 3; assessed value	$250

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	9,779	400	10,179
Apricot	800	.....	800
Cherry	700	100	800
Fig	800	100	900
Olive	3,000	.....	3,000
Orange	500	.....	500
Peach	5,500	1,600	7,100
Pear	23,000	3,400	26,400
Plum	500	150	650
Prunes	31,450	.....	31,450
Quince	200	.....	200
Total fruit trees	76,229	5,750	81,979
Almond	3,595	.....	3,595
Pecan	.....	.....	600
Walnut	500	100	.....
Total nut trees	4,095	100	4,195
Grapevines	825,000	30,000	855,000
Berries, acres	100	.....	100

Live Stock Industry.

	Number.	Value.
Cattle—Beef	1,500	$30,000
Stock	4,450	44,500
Dairy cows—Graded	1,400	48,000
Jersey	5	200
Calves	2,315	13,890
Swine	3,000	20,000
Horses—		
Thoroughbred	4	1,600
Common	2,216	109,765
Colts	599	6,435
Jacks and jennies	8	925
Mules	209	10,425
Sheep	7,000	21,000
Lambs	2,000	40,000
Angora goats	7,210	15,000
Wool, pounds	42,000	4,200
Mohair, pounds	21,000	4,200

Fruits, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples	1,955,800	$9,779
Apricots	80,000	3,000
Blackberries	100,000	5,000
Beets	50,000	100
Cabbage	50,000	1,500
Celery	2,000	100
Cauliflower	5,000	250
Corn	15,000	300
Currants	500	25
Cherries	16,000	800
Figs	40,000	1,000
Gooseberries	3,000	200
Grapes	1,000,000	2,000
Loganberries	2,500	150
Onions	16,000	240
Pears	1,600,000	30,000
Peaches	160,000	2,400
Peas	24,000	500
Plums	100,000	750
Irish potatoes	600,000	9,000
Prunes	200,000	1,500
Strawberries	24,000	2,000
Tomatoes	200,000	2,000
Total		$72,594

Dried—	Pounds.	Value.
Almonds	20,000	$2,000
Apples	25,000	1,000
Apricots	100,000	700
Beans	20,000	800
Grapes	20,000	1,000
Onions	4,000	100
Pears	275,000	13,750
Peaches	10,000	500
Prunes	1,000,000	20,000
Walnuts	6,000	600
Total		$40,450

Canned—	Cases.	Value.
Beans	28,000	$60,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	3,000	1,800	$54,000
Barley	1,600	1,600	40,000
Oats	1,000	1,000	35,000
Corn	300	300	6,000
Total cereals	5,900	4,700	$135,000
Alfalfa hay	1,400	4,200	$33,600
Grain hay	6,400	4,800	48,000
Grass hay	1,250	1,250	10,000
Total hay	9,050	10,250	$90,600

Dairy Industry.

	Production.	Value.
Butter pounds	164,000	$41,000
Cheese, pounds	36,500	5,745

STATISTICS OF LAKE COUNTY, 1907-8—Continued.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	.....	$2,000
Sweet wines	2,000	500
Vinegar	3,600	720

Number of wineries, 17.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	6,000	$21,000
Ducks	200	600
Geese	50	300
Turkeys	400	7,200
Eggs	187,200	37,000

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	121,000	$750,000
Sawmills, number	8	18,000
Fuel, wood cords	6,000	24,000
Lumber, feet	1,250,000	37,500
Posts, pieces	4,000	500
Shakes, thousand	150,000	1,500

Power used for mills and manufactories in county—Steam, 16; electrical, 1; water, 3.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 300	2,000	$160
Honey	2,000	160
Hops	70,000	7,000
Alfalfa seed	115,000	13,800
Mineral water, cases	30,000	120,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	2	88	$2,000
Cigars	1	3	7,000
Flouring mills	3	10	30,000
Meat products—			
Lard		.....	5,000
Meat packed		.....	1,000
Olive oil	1	1	400
Pickled olives	1	1	350
Planing mills	6	12	10,000

Manufactured Output.

	Quantity.
Cigars, thousand	140,000
Flour, barrels	4,000
Hides, pounds	60,000
Meat packed, pounds	20,000
Olive oil, gallons	200

LASSEN COUNTY.

Lassen County lies in the northeastern part of California along the Nevada line. It is traversed from south to north by the Nevada-California-Oregon Railway (narrow gauge), which connects at Reno, Nevada, with the Southern Pacific system. The located line of the Western Pacific—in course of construction—runs through the southern portion of the county. Susanville, the county seat, is in Honey Lake Valley, a little south of the center of the county.

Lassen embraces large areas comprising rich valley lands, suited to agriculture, rolling hills and uplands, affording splendid range for stock; and mountain table lands covered with timber.

The county has a population of only about 5,000. It could easily support many times that number. The assessment roll now foots over five and a half millions. The county has no debt, and the tax rate is only about $1.60 per $100 valuation. The people are generally well-to-do and prosperous. The bank at Susanville, with a capital of $50,000, has more than $300,000 on deposit, which shows a condition of easy finances.

The principal present industries are farming and stock raising. There are paying mines in the county, but as a whole Lassen is not mineral. Timber lands which are not in forest reserves are now generally held in private ownership, but as yet the manufacture of lumber has not been commenced.

But farming and stock raising will always be the principal industries of the county. Climate and soil are particularly adapted to them.

The altitude of the largest, most fertile and most productive valleys, such as Honey Lake Valley, Big Valley, and Long Valley, is a little over 4,000 feet. Other large valleys, like Madeline Plains, Willow Creek Valley, and Secret Valley, are in the neighborhood of 5,000 feet above sea level. While the high valleys are not as well adapted to general farming as the lower ones, they are quite productive, and well suited to the stock-raising business. The climate generally is similar to that of the northeastern states, so far as range of temperature is concerned, but our summer season is quite dry, making irrigation necessary as a rule. With irrigation, where the altitude is not too great, any of the ordinary products of the temperate zone can be produced in abundance and of fine quality. Apples, pears, cherries, peaches, apricots, and berries of all kinds do splendidly. Of farm products, alfalfa is probably the most important, though native grasses, timothy, and redtop are extensively raised.

Good hay and grass and pure cold water make the county an ideal one for dairying. There are a number of creameries in the county, and their product commands the top price in city markets.

Improved farm lands range in price from $25 to $100 or more per acre.

District schools are scattered all over the county. A county high school is located at Susanville. There are quite a number of churches in the county, including Methodist, Baptist, Catholic, and others. Three weekly newspapers are published—the Lassen Advocate and Lassen Weekly Mail at Susanville, and the Big Valley Gazette at Bieber.

Susanville is the largest town, with a population of about 1,000. It has a good and abundant water supply and good facilities for fighting fire. Its stores are well stocked, and goods are sold at reasonable prices. Business buildings, as a rule, are substantial, and residences handsome.

Lassen County has a range of temperature wide enough to give a pleasing variety to the seasons. Health conditions are fine. Pulmonary diseases are very rare, and malaria almost unknown. There are still large quantities of land open for entry, which, with water for irrigation, will make good farms and homes. There is plenty of water to irrigate these lands.

STATISTICS OF LASSEN COUNTY, 1907-8.

General Statistics.

Area, 4,690 square miles, or 3,001,105 acres.

Number of farms	675
Number of acres assessed	721,847
Value of country real estate	$3,920,499
Of improvements thereon	$410,985
Of city and town lots	$76,468
Of improvements thereon	$217,845
Of personal property	$1,169,360
Total value of all property	$5,930,808
Expended on roads, last fiscal year	$20,000
Expended for bridges, last fiscal year	$15,000
Number of miles of public roads	1,200
Road levy per $100, 1908	40c
Value of county buildings	$45,000
Irrigating ditches—miles, 100: cost	$40,000
Railroads, steam—miles, 128.44: assessed value	$505,227
Number of acres irrigated	27,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	12,000	7,000	$200,000
Barley	3,000	1,200	45,000
Oats	4,000	1,500	45,000
Rye	1,500	400	10,000
Corn	50	.....	......
Total cereals	20,550	10,100	$300,000
Alfalfa hay	10,000	40,000	$120,000
Grain hay	700	2,100	10,500
Grass hay	90,000	160,000	600,000
Total hay	100,700	202,100	$730,500

Wines, Brandies, Etc.

	Quantity.
Beer, barrels	500
Cider, barrels	300

Number of breweries, 1.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	4	......	......
Butter, pounds		230,000	$75,900
Cheese, pounds		64,000	7,680

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	12,000	2,000	14,000
Apricot	200	200	400
Cherry	500	200	700
Nectarine	200	100	300
Peach	1,600	500	2,100
Pear	350	200	550
Plum	500	150	650
Prunes	500	350	850
Total fruit trees	15,850	3,875	.....
Walnut	100	.....	.....

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	195,500	$4,000
Apricots	500	20
Blackberries	3,000	300
Beans	500	20
Beets	21,000	......
Cabbage	50,000	......
Cauliflower	1,000	......
Corn	15,000	......
Currants	2,500	......
Cherries	500	......
Gooseberries	1,000	......
Loganberries	1,000	......
Onions	20,000	800
Pears	15,000	......
Peaches	1,000	......
Peas	5,000	......
Plums	15,000	......
Irish potatoes	220,000	4,400
Prunes	1,000	30
Raspberries	10,000	......
Strawberries	1,000	......
Tomatoes	10,000	300
Totals	576,500	$9,870

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,200	$6,000
Ducks	15	135
Geese	10	240
Turkeys	100	2,400
Total value		$8,775

STATISTICS OF LASSEN COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	2,241	$78,435
Stock	21,280	425,600
Dairy cows—Graded	80	2,400
Calves	9,250	46,250
Swine	1,500	15,000
Horses—		
Thoroughbred	15	45,000
Standard-bred	60	30,000
Common	7,697	769,970
Colts	1,250	25,000
Jacks and jennies	60	33,000
Mules	283	30,000
Sheep	150,000	40,000
Lambs	12,000	20,000
Common goats	500	1,500
Wool, pounds	20,000	......

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 700	.....	$700
Honey	75,000	7,500
Alfalfa seed	300,000	36,000

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	240,000	$2,000,000
Sawmills, number	11	33,000
Lumber, feet	5,000,000	60,000
Posts, pieces	14,000	1,120
Railroad ties, pieces	200,000	3,000
Sash and door factories, number	1	......
Shakes, thousand	30	200
Shingles, thousand	1,500	5,000

Power used for mills and manufactories in county—Steam, 16; water, 3.

Manufactories.

Wood boxes, 1; confectionery, 1; flouring mills, 3; jewelry, 2; leather goods, 2; planing mills, 3.

Manufactured Output.

	Production.	*Value.*
Flour, barrels	5,000	$20,000

LOS ANGELES COUNTY.

In wealth, population, and resources Los Angeles is the most important county in Southern California. There are two rivers in the county: the Los Angeles and the San Gabriel. During a large part of the year these are dry beds of sand, what little water they contain finding its way through the porous sand to the bedrock. In the winter they are dangerous streams. The Los Angeles River rises in the western part of the San Fernando Valley, about 12 miles northwest of the city, and flows easterly 18 miles to the Los Angeles Pass. Its stream is fed all along by springs. Two other "rivers," the Pacoima and the Tejunga, join it in the San Fernando Valley. Turning south, it flows through the Los Angeles Pass, and on through the city.

Los Angeles County embraces within its limits a great variety of scenery and climate. Within its territory may be found the climate and scenery of almost every part of the State, from the cool and breezy seashore to the warm inland plains and bracing mountain tops. Of the area of the county, about four fifths is capable of cultivation, the remainder being mountainous. The shore line is 85 miles in length. Nine tenths of the population is within thirty miles of the ocean.

The marvelous growth which has been made during the past few years may be seen from the statement that, within the space of twenty-four years, the population of the county has increased more than tenfold, and the assessed valuation of property in proportion.

The chief industry is horticulture, the list of products including everything that can be grown in the State, and most everything that can be raised in semi-tropic countries. The area of land devoted to horticultural purposes is being rapidly extended as the large tracts are subdivided and improved.

The county is well provided with transportation facilities. A dozen lines of railroad center in Los Angeles City, tapping almost every section of the county, while coast steamships call regularly at the leading seaports.

Perhaps the most important enterprise for Los Angeles is the big breakwater by the Federal Government at San Pedro. By means of this breakwater the depth of water over the bar will be so increased as to permit ocean-going vessels to come to the wharves, and Los Angeles will then be able to compete for its share of the growing Oriental trade. Other shipping points of the county are Port Los Angeles, near Santa Monica, and Redondo.

The San Gabriel Valley, a choice section of Los Angeles County, has the Sierra Madre range on the north. The mountains are grand and precipitous, inclosing the valley like a wall. This valley is the best known of any portion of Southern California. Even before there was any "boom" here worthy of mention, lands in the valley commanded a comparatively high price. As with most attractive sections, the level-headed mission fathers discovered its advantages, and founded the San Gabriel Mission—whose church is still in good preservation—in 1771. Now railroads traverse the valley, and the land is rapidly being transformed into a succession of small homes and thriving little cities. The valley contains 100 square miles of territory. The San Gabriel contains some of the choicest fruit lands in Southern California, and is largely devoted to the raising of oranges and lemons, as well as deciduous fruits.

Pasadena, a beautiful city, is located at the foot of the Sierra Madre range, about seven miles from Los Angeles. Within twenty years Pasadena has grown from a sheep pasture to a city of beautiful homes, with a world-wide reputation. Other settlements in the valley are Alhambra, Monrovia, Duarte, and Azusa, all of which are mainly supported by horticulture.

Adjoining San Gabriel Valley on the east is Pomona Valley. Irrigation is cheaply supplied to this section from the San Antonio River. The soil and climate are peculiarly adapted to the culture of citrus fruits. Railroad facilities are very good, and increasing, which has caused the valley to settle up rapidly. It contains a number of flourishing towns, the chief of which is Pomona, one of the most thriving cities of Southern California. For miles in every direction around Pomona extend continuous orchards of oranges, lemons, apricots, peaches, prunes, olives, and other fruit trees, a specialty being made of olive culture.

Other important sections of the county are Los Nietos Valley, a well-watered district, noted for corn, alfalfa, and dairy products; the stretch of country between Los Angeles City and the ocean; San Fernando Valley, north of Los Angeles, in which a large amount of fine wheat is raised; and Antelope Valley, an elevated region in the northern part of the county, where land is cheap and, with water, very productive.

Los Angeles enjoys railroad competition in the shape of three transcontinental lines. The Pacific Coast Steamship Company runs vessels every few days from Los Angeles County ports to San Francisco and San Diego.

There is a great variety of soil in Los Angeles County, varying from light sandy loam to heavy adobe.

A mistaken idea prevails to some extent that farming is only carried on in Los Angeles County by means of irrigation, and that without it crops would be a failure. For grains and winter crops irrigation is not employed. Corn is irrigated in some localities, being a summer crop, but is successfully grown in many places without irrigation. Upon some lands, after a crop raised without irrigation has been harvested, another is raised by means of irrigation. On irrigated land two or three crops a year are frequently raised. With an artificial supply of water, the farmer is rendered independent of the season's rain, while the product of his lands is enormously increased.

The development of the horticultural industry during the past few years has been remarkable. The most important horticultural product is the orange. Besides the orange and lemon, the principal fruits raised are the almond, fig, prune, apricot, walnut, peach, pear, and berries.

Deciduous fruits are shipped fresh, canned, dried, and crystallized. An active demand for our dried fruits has grown up in Europe.

Alfalfa, which is largely grown for hay, is a most remarkable forage plant. It is cut from three to six times a year. Large quantities of wheat and barley are raised. Corn sometimes grows to a height of twenty feet. Pumpkins have been raised weighing over 400 pounds. There is a beet sugar factory at Alamitos. Los Angeles honey is celebrated all over the country. In the neighborhood of Los Angeles calla lilies, tuberoses, carnations, and other flowers are grown by the acre. Hundreds of acres are devoted to the cultivation of celery, which is shipped East by the trainload. Winter vegetables, such as string beans, tomatoes, green peas, and chili peppers, constitute a big business.

Until only a few years ago, most of the butter consumed in Southern California was imported from the North and East. This is no longer the case, a number of creameries having been established during the past few years, with most successful results.

Poultry does well in Los Angeles County when it is given the same attention it receives in the East. Eggs always command a good price.

Ostriches are raised for their plumes, and the industry is profitable. There is a large ostrich farm at South Pasadena.

Among the game found in the country are wild geese, ducks, snipe, rabbits, squirrels, foxes, deer, wildcats, California lions, and bear, the latter being found in the northern part of the county.

The angler finds plenty of trout in the mountain canyons. In the ocean there is excellent fishing, both with line and seine, and some remarkable catches are made. The yellowtail, ranging from 15 to 80 pounds, is very numerous in the waters of the Pacific. The tuna attains a length of five feet or more, and a weight of from 100 pounds upward. "Jewfish" are sometimes caught weighing 400 pounds.

Although Los Angeles County is chiefly noted as a horticultural section, its mineral wealth is by no means unimportant. Including petroleum, it ranks fourth in mineral products among the counties, and is the only one which leads in five mineral products. Los Angeles is the center of a number of rich mineral fields in Southern California which annually produce many millions of dollars.

One of the most remarkable features of development in Los Angeles County has been the greatly increased production of petroleum. For over twenty-five years petroleum has been produced on a limited scale in Los Angeles and Ventura counties, but it is only within the past few years that the industry has assumed great importance. The oil produced in California differs from that of the Eastern States, being of a heavier grade, with an asphaltum base, and it is used almost exclusively for fuel. It has been adopted by most of the leading factories of this section, and is used largely by the railroads. A careful test made with a locomotive showed that oil at $1 a barrel is equivalent to coal at $4 a ton.

The school facilities of Los Angeles are especially good. Besides the complete system of public schools, private schools and colleges abound in Los Angeles, Pasadena, and other towns. Many Eastern people avail themselves of the opportunity to send children with a tendency to weak lungs to a country where plenty of out-of-door exercise is a possibility every day in the year. Most of the leading religious denominations are represented, not only by scores of churches, but also by one or more religious colleges. The work of the schools is further supplemented by an army of specialists in music, painting, and every department of art. The Chautauqua has an active membership of nearly a thousand, and meets annually at Long Beach. Lectures and other entertainments, by home and foreign talent, are of almost daily occurrence. The educational and social facilities afforded by Los Angeles are, in the widest sense of the word, unsurpassed. Public libraries are numerous and well stocked with the latest works.

Catalina Island is a most attractive and popular resort in the Pacific, just off the coast of Los Angeles County. Between this resort and Los Angeles City there is a most excellent rail and boat service.

STATISTICS OF LOS ANGELES COUNTY, 1907-8.

General Statistics.

Area, 3,880 square miles, or acres.	2,483,200
Number of farms	8,394
Number of acres assessed	508,392
Value of country real estate	$43,242,945
Of improvements thereon	$9,332,820
Of city and towns lots	$190,702,485
Of improvements thereon	$88,645,655
Of personal property	$67,849,012
Total value of all property	$399,772,917
Expended on roads, last fiscal year	$371,576
Expended for bridges, last fiscal year	$42,422
Number of miles of public roads	4,113
Road levy per $100, 1908	60c
Value of county buildings	$4,126,634
Irrigating ditches—miles, 230; cost	$327,000
Railroads, steam—miles, 684⅞; assessed value	$14,709,632
Railroads, electric — assessed value	$25,216,043
Electric power plants, assessed value	$1,263,480
Electric power lines, assessed value	$15,369,980
Number of acres irrigated	71,840

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	119,118	26,421	145,539
Apricot	152,737	20,873	173,610
Cherry	1,784	463	2,247
Fig	22,077	1,573	23,650
Lemon	453,815	21,685	475,500
Nectarine	2,500	250	2,750
Olive	271,524	34,873	306,397
Orange	2,007,762	176,814	2,184,576
Peach	204,590	625	205,215
Pear	60,484	500	60,984
Plum	49,656	428	50,084
Prunes	54,075	316	54,391
Quince	5,000	......	5,000
Total fruit	3,405,122	284,821	3,689,943
Almond	146,657	......	146,657
Pecan	1,225	......	1,225
Walnut	261,260	31,875	293,135
Total nut	409,142	31,875	441,017
Grapevines	5,125,000	......	5,125,000
Berries, acres	3,910	......	3,910

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines	1,560,000	$312,000
Sweet wines	1,363,500	454,500
Beer, barrels	209,380	1,202,900
Brandy	30,000	15,000
Vinegar	20,000	2,000

Number of wineries and distilleries, 60; breweries, 4.

Fish Industry.

	Pounds.	Value.
Various kinds	5,466,021	$261,301

Fruits, Vegetables, Etc.

Green—	*Production. Total Pounds.*	*Value.*
Apples	2,777,770	$44,665
Apricots	4,116,420	82,329
Asparagus	10,000	1,000
Blackberries	1,000,000	60,000
Beans	1,250,000	32,000
Beets	245,000	1,500
Cabbage	6,000,000	60,000
Celery, dozen	100,000	20,000
Cauliflower	6,000,000	120,000
Corn, dozen	300,000	40,000
Cherries	15,000	750
Figs	551,920	16,547
Grapes	45,000,000	390,000
Grape fruit, boxes	20,000	40,000
Lemons, boxes	917,630	1,815,260
Loganberries	250,000	20,000
Nectarines	60,000	1,200
Onions	137,500	4,000
Oranges, boxes	1,955,320	2,617,093
Pears	700,000	18,000
Peaches	5,950,870	94,240
Peas	2,000,000	45,000
Persimmons	10,000	500
Plums	1,734,320	35,000
Irish potatoes	5,000,000	53,000
Sweet potatoes	1,675,600	36,500
Prunes	716,860	18,000
Quinces	22,000	2,000
Raspberries	90,000	9,000
Strawberries	10,000,000	400,000
Tomatoes	14,875,650	145,600
Totals	110,188,910	$6,223,184

Dried—	*Pounds.*	*Value.*
Almonds	175,000	$21,000
Apricots	762,825	52,397
Beans	8,100,000	400,000
Onions	1,250,000	33,000
Peaches	567,950	56,995
Peanuts	6,000	400
Prunes	120,000	11,000
Raisins	580,000	22,200
Walnuts	8,265,268	1,074,484
Totals	21,827,043	$1,671,476

Canned—	*Cases.*	*Value.*
Apricots	12,000	$36,000
Beans	18,000	34,000
Corn	1,500	2,250
Pears	6,000	18,000
Peaches	10,000	25,000
Plums	6,000	18,000
Strawberries	35,000	105,000
Tomatoes	80,000	120,000
Chili, tons	2,500	125,000
Totals	168,500	$483,250

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	14	......	......
Skimming stations	6	......	......
Butter, pounds		3,866,403	$1,159,921
Cheese, pounds		225,000	......
Fresh milk, lbs		132,889,271	1,988,261

STATISTICS OF LOS ANGELES COUNTY, 1907-8—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	35,435	19,785	$542,970
Barley	93,174	36,259	725,192
Corn	12,913	12,950	324,000
Total cereals	141,532	68,994	$1,592,162
Alfalfa hay	18,670	93,350	$633,450
Grain hay	132,485	165,647	1,656,470
Total hay	151,155	258,997	$2,289,920

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	3,840	$119,400
Stock	.....	446,940
Dairy cows—Graded	.....	1,326,000
Guernsey	50	5,000
Herefords	50	5,000
Holsteins	500	50,000
Jersey	300	30,000
Calves	9,960	107,080
Swine	12,378	160,536
Horses—		
Thoroughbred	1,258	251,600
Standard-bred	23,000	1,700,000
Common	5,000	200,000
Colts	6,000	125,000
Jacks and jennies	500	5,000
Mules	2,508	188,100
Sheep	42,023	200,115
Lambs	18,305	41,485
Angora goats	600	6,000
Common goats	3,137	15,665
Total stock all kinds	170,741	$5,022,921
Wool, pounds	320,184	$41,624

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	38,580	$211,480
Ducks	3,643	21,858
Geese	516	4,128
Turkeys	5,125	128,125
Eggs	.....	713,810
Total value		$1,079,401

Forest Products.

	Amount.	*Value.*
Area, of timber lands, cedar, oak, pine, mesquite, and redwood, acres	587,520	......
Fuel, wood, cords	7,500	$52,500
Total value		$52,000

Power used for mills and manufactories in county—Steam, 156; electrical, 229.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 6,000	....	$180,000
Beeswax	40,000	10,000
Flowers and plants, acres	600	450,000
Honey	1,000,000	55,000
Alfalfa seed	10,000	1,000
Sugar beets, tons	75,000	450,000
Petroleum, barrels	2,814,000	908,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	12	185	$310,652
Paper boxes	4	214	309,598
Wood boxes	4	88	186,500
Brick	12	777	826,861
Brooms	5	58	135,000
Carriages and wagons	18	506	968,300
Cement	1	20	43,200
Cigars	50	216	350,776
Clothing	15	554	641,800
Coffee, spices, etc.	10	70	542,725
Confectionery	20	470	1,059,815
Cooper-shops	3	60	263,820
Crackers	3	127	407,847
Electrical supplies	6	161	393,500
Flouring mills, feed and cereals	9	250	3,692,138
Foundries and iron works	29	1,640	4,749,223
Furniture	30	397	630,000
Jewelry	9	70	198,172
Leather goods	12	116	322,406
Lime	1	18	27,000
Machinery	26	256	326,455
Malt (Sumas beer)	3	.....	200,000
Meat products—			
Hides	5	670	446,737
Lard	..	.....	723,756
Meat packed	..	.....	4,781,017
Tallow	..	.....	141,528
Olive oil	5	68	275,000
Paper	2	42	220,000
Pickles	7	164	408,800
Pickled olives	4	70	450,000
Iron pipe	6	286	1,047,286
Sewer pipe	3	161	353,609
Planing mills	40	1,662	3,998,130
Potteries	7	121	243,641
Salt	2	65	97,086
Soap	4	81	410,770
Artificial stone	2	20	54,700
Granite	7	26	85,000
Marble	2	11	14,000
Syrups and extracts	10	85	240,320
Tanneries	2	32	251,700
Tiling	1	50	50,000
Tin and galvanized iron	40	217	475,250
Willow and wooden ware	2	102	98,000
Wood turning and carving	3	12	28,265
Miscellaneous	49	1,269	2,155,284

Manufactured Output.

	Quantity.
Brick, thousand	127,965
Brooms, dozen	53,862
Cement, tons	9,600
Cigars, thousand	7,155
Crackers, pounds	4,000,000
Flour, barrels	410,000
Lime, barrels	18,000
Malt, tons	5,000
Hides, pounds	5,424,100
Lard, pounds	7,751,858
Meat packed, pounds	43,463,600
Tallow, barrels	5,828
Olive oil, gallons	137,500
Paper, pounds	8,000,000
Pickles, gallons	820,800
Salt, tons	11,796
Soap, pounds	12,398,025

MADERA COUNTY.

The geographical position of Madera County is in the center of the San Joaquin Valley, and it is bounded on the north by Merced and Mariposa and on the east, south and west by Fresno counties. The eastern portion is mountainous, being traversed by the Sierra Nevada Mountains. From the foothills to the San Joaquin River, a distance of about 40 miles, the land is level and adapted to all kinds of agricultural pursuits. There are many small creeks that rise in the mountains, fed by the melting snows, that serve as feeders for the San Joaquin River. While the larger portion of the mountainous region is heavily timbered with valuable woods—chiefly sugar and white pine—there are many valleys and meadows, and in the lower mountains a great deal of the land is well suited to the production of fruits, particularly apples. The level plains are in part watered by the Fresno and Chowchilla rivers, and in the southern and the western part by the San Joaquin. Lumbering, stock raising, mining, and farming are the principal industries. There are two large wineries in the county. All kinds of fruits yield heavy crops on irrigated lands. The minerals are iron, copper, gold, and silver. Madera is the county seat; the other towns of the county are Raymond, Grub Gulch, Berenda, North Fork, Sugar Pine, O'Neals, Gold, Coarse Gold, Fresno Flats, Minturn, and Knowles.

The large power works of the San Joaquin Light and Power Company, with their large storage reservoirs, are near North Fork, in this county.

STATISTICS OF MADERA COUNTY, 1907-8.

General Statistics.

Area, 2,200 square miles, or acres.	1,408,000
Number of acres assessed	731,752
Value of country real estate	$4,964,320
Of improvements thereon	$537,085
Of city and town lots	$365,070
Of improvements thereon	$267,000
Of personal property	$1,324,010
Total value of all property	$7,457,485
Expended on roads, last fiscal year	$26,665
Expended for bridges, last fiscal year	$26,470
Number of miles of public roads	700
Road levy per $100, 1908	40c
Value of county buildings	$160,000
Irrigating ditches—miles, 130; cost	$45,000
Railroads, steam—miles, 76½; assessed value	$88,080
Electric power plants—1; assessed value	$88,610
Number of acres irrigated—	
Canal	15,000
Pump plant	1,000

Fruits, Vegetables, Etc.

	Total Production.	
Green—	*Pounds.*	*Value.*
Apples	400,000	$10,000
Blackberries	100,000	6,000
Olives	130,000	3,750
Totals	630,000	$19,750
Dried—	*Pounds.*	*Value.*
Almonds	81,000	$10,530
Apricots	200,000	12,000
Figs	......	4,000
Grapes	500,000	5,000
Peaches	715,000	28,600
Raspberries	3,000,000	60,000
Totals	4,496,000	$120,130

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	100,000	$15,000
Sweet wines	1,200,000	300,000
Brandy	10,000	5,000

Number of wineries, 2; distilleries, 2.

STATISTICS OF MADERA COUNTY, 1907-8—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	115,000	7,700	$254,100
Barley	125,000	25,000	625,000
Oats	3,100	450	13,050
Total cereals	243,100	33,150	$892,150
Alfalfa hay	8,000	30,000	$300,000
Grain hay	2,500	1,000	20,000
Total hay	10,500	31,000	$320,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	10,000	.....	10,000
Apricot	20,000	.....	20,000
Fig	1,500	1,000	2,500
Lemon	100	.....	100
Olive	5,500	2,500	8,000
Orange	400	1,000	1,400
Peach	61,800	35,000	96,800
Prunes	1,100	.....	1,100
Quince	25	.....	25
Other kinds	10	.....	10
Total fruit trees	100,435	39,500	139,935
Almond	2,550	.....	2,550
Walnut	50	.....	50
Total nut trees	2,600	.....	2,600
Grapevines	5,535	2,200	7,735
Berries, acres	100	.....	100

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	75,000	$1,875,000
Cedar, acres	4,000	......
Pine, acres	71,000	......
Sawmills, number	2	1,200,000
Lumber, feet	32,000,000	930,000
Sash and door factories, number	1	60,000
Total value		$4,065,000

Power used for mills and manufactories in county—Steam, 2; electrical, 1; water, 1.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	2,500	$75,000
Stock	28,523	337,715
Dairy cows—Graded	3,000	90,000
Calves	4,663	26,945
Swine	3,618	32,562
Horses—Common	2,811	210,825
Colts	908	19,070
Jacks and jennies	27	2,295
Mules	2,270	227,000
Sheep	10,000	30,000
Lambs	3,850	1,925
Common goats	180	450
Total stock all kinds	62,350	$1,053,787

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	......	......
Butter, pounds		800,000	$240,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	10,000	$30,000
Ducks	500	3,000
Turkeys	500	12,000
Total value		$45,000

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives	.....	$3,000
Honey	50,000	4,500

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	1	70	$100,000
Brick	1	.....	2,430
Granite	2	350	......
Saw and planing mill	1	900	900,000
Sash and door	1	50	250,000

Manufactured Output.

	Quantity.
Brick, thousand	270

MARIN COUNTY.

Marin County is decidedly one of water frontage, being bounded on the west and south by the Pacific Ocean and by the Golden Gate, which separates it from San Francisco by only a mile and a half at its nearest point, and on the east by San Francisco Bay.

The topographical features are rolling hills and numerous small valleys. A part of the Coast Range crosses Marin in a northwesterly and southeasterly direction, and much of the surface of the county is broken and hilly, but a considerable portion immediately on the shore is composed of marsh and overflowed lands. The highest land is Mount Tamalpais, which has an elevation of 2,608 feet.

The soil varies from the rich adobe clay of the salt marshes to the sharp, gravelly loam of the higher foothills. In the valleys it is composed of heavy black loam with an admixture of gravel; in the foothills a reddish loam prevails, sharper, and carrying less adobe. It is all easily worked, heavily charged with the elemental constituents of plant life, admirably suited to horticultural purposes, and wherever worked to fruit yields heavily. Irrigation is not required. The depth of the soil, its retentive nature, and ample rainfall in winter, render artificial watering unnecessary.

Annual average rainfall at Point Reyes, 17.56; Point Bonita, 25.39; San Rafael, 39.58. Mean summer temperature of San Rafael, 76 degrees for June, July, August, and September; for the other months, 61 degrees.

The principal industry is dairying, but of late years attention has been paid to fruit growing. Some of the finest apples grown in the State are produced. On the dairy lands of the Novato ranch there are ten orchards. On every rented subdivision of this, and the Burdell ranch, are apple, pear, quince, fig, pomegranate, persimmon, apricot, peach, plum, and other fruit trees, the thrifty growth and large yield from which prove the superior adaptability of the soil and climate of this portion to fruit growing. On the Novato ranch is one of the largest fruit orchards, including one of the oldest and most celebrated apple orchards in the State.

The land is generally held in large tracts, and rented out for dairying purposes. As a result there is but a sparse population, and but little advance is made in horticulture, although the greater part of the county is eminently fitted for this industry. The DeLong orchard was planted in 1857, and has been in continuous bearing from the beginning.

Immense amounts of vegetables are shipped from the lowlands.

The shipments of butter are enormous, and the quality is first class.

Most of the large ranches are stocked by the owners, and divided into tracts, which are leased at annual rentals, according to the number of cows.

San Rafael is the county seat. It has many fine buildings, public and private, elegant hotels, banks, fine churches, schools, electric lights, and a perfect sewerage system. It is a noted place of residence for San Francisco business men, and its hotels are a favorite resort for invalids and tourists. Its climate is regarded as very favorable for those with pulmonary complaints. Its private dwellings are elegant and its drives most beautiful and romantic. The road to the summit of Mount Tamalpais is a continuous and easy grade. San Rafael, in a sheltered valley, is secure from ocean fogs and winds. It is in constant communication with San Francisco by rail and ferry at Point Tiburon.

Sausalito is also a favorite place of residence for San Francisco business men, possessing features similar to San Rafael. Novato is the center of the fruit district; Point Reyes of the dairy interests.

At San Quentin is located one of the State prisons. It is situated on San Francisco Bay, about 12 miles north of San Francisco, with which it is connected by ferry.

MENDOCINO COUNTY.

Mendocino County has 100 miles of coast line. In general topography it is mountainous, with valleys lying between the mountain chains and along the coast. It, together with the counties of Humboldt and Trinity, embodies the greater part of the northern Coast Range Mountains, and contains their highest peaks and deepest canyons, fertile valleys, wooded slopes, rushing rivers, and picturesque scenery. It shares with Sonoma, Humboldt, and Del Norte the glory of the great redwood belt.

The county has a length of 85 miles from north to south, and the width is 45 miles from east to west. It is traversed the entire length by the Coast Range, which is composed of two parallel ridges. These mountains vary in height from 1,000 to 3,000 feet. Their lower slopes have a gentle declivity, while the higher portions are generally precipitous and furrowed with ravines and gulches. There are many small productive valleys throughout the county.

Mendocino is well watered with the numerous streams which take their rise in the mountain chain which intersects her territory. The Eel River, running north, and the Russian River, running south, have their sources in this county, and are the principal streams. A large number of tributaries connect with them, while down the slope of the western ridge large numbers of creeks, some of which might aspire to the dignity of rivers, find their way to the Pacific.

Almost the entire coast section is composed of valleys, in some places extending inland five miles, and the soil is very fertile and productive. The towns are all short distances apart, and most of the larger ones have large sawmills and are the shipping points for large quantities of lumber, ties, tanbark, etc.

In Ukiah Valley there is the greatest variety of soil, even on a small tract. All of the best lands are under cultivation. Holdings are not large, 200 acres of valley land being an exceptional farm, and the tendency is to subdivision.

The soil in Yorkville Valley is a rich, black loam, and well adapted to the growing of vegetables, fruits, grains, and hogs. The soil of the hillsides and mountains is well suited to the growing of grass, vines, and fruits, and in some places grain.

Anderson Valley is a long, narrow strip of land lying between two chains of mountains. It extends 17 miles southeast and northwest, and is from 1 to 2 miles in width. The soil in this valley is a rich alluvium, and is well adapted to the growing of vegetables, fruits, and cereals. The soil of the hills is a rich, black loam, except in a few places, where there is adobe and gravel.

In Potter Valley the soil is mostly a sedimentary deposit, but a variety exists—some clay, a small amount of adobe, and some lands well adapted to fruit raising.

In little Lake Valley the soil generally is a rich, sandy loam, but in a few places a black loam is found. The soil is very productive, and never in the history of the valley has there been anything approaching a failure.

Wheat, barley, oats, and corn are the principal grains raised. Hops, beans, potatoes, and garden vegetables of various kinds are raised profitably in several localities. Fruits of widely varied nature are grown in gradually increasing quantities, oranges, lemons, figs, prunes, peaches, plums, apricots, apples, and pears being cultivated. The apples have been noted for their excellence for nearly twenty years. The Bartlett pears are eagerly sought by the canning companies. The planting of pear orchards has been encouraged of late years by the demonstration repeatedly given that this fruit tree is a reasonably certain bearer, and the returns are large. Strawberries, blackberries, and loganberries are cultivated increasingly, with good results.

There are extensive horse and cattle ranges. Dairying is a remunerative occupation, and with railroad facilities this line of production will be vastly increased. The making of cheese is followed with profit in Upper Lake.

Along the coast from Hardy south to Gualala there is a strip of farming and dairy land, varying in width from ½ to 5 miles, and comprising as rich and productive soil as can be found anywhere. Around Manchester, Bridgeport, and Point Arena are located a number of creameries that stand at the head of the California list in competition.

The principal agricultural industries are wool growing, dairying, poultry and stock raising, and the growing of hops, grain and other cereals, potatoes, apples, and fruits of almost all descriptions. Wine making is very thriving, and new vineyards are constantly coming into bearing.

Dairying is one of the leading interests. There are some up-to-date creameries, with numerous skimming stations. The butter produced is of a very high grade, and finds a ready market.

Stock raising, grazing, and wool growing are very much in evidence. There are about 1,000,000 acres of land specially adapted for grazing purposes. The shipments of wool, of a grade second to none, amount to about 1,000,000 pounds per annum.

The Angora goat thrives well, the mountains being an ideal pasture.

Hops are a very prolific crop and of the finest grade.

Crops of wheat, oats, and barley are always certain.

Potatoes and apples of a very fine quality are raised and bring renumerative prices. The apples excel in size and flavor.

The Bartlett pear, nectarine, peach, and fig are grown very successfully. Berries of all descriptions grow abundantly and are of large size and fine flavor.

No irrigation is required, and crops do not suffer from drought at any time.

In the county are large tracts of redwood, covering over 600,000 acres, the lumber cut from which amounts to 100,000,000 feet annually. The lumber mills, in addition to having their logs floated on the streams on which they are situated, have modern railroads extending into the heart of the redwood belt. The largest mill in the interior is at Willits. All employ a large number of persons in the woods, about the shipping points, on their railroads, and in their mills. Shingles, boxes, and other lumber products are manufactured and shipped in large quantities.

Ukiah, the county seat, is located on the California Northwestern Railroad.

Most of the trade is carried by vessels from coast points to San Francisco. The California Northwestern Railroad, connecting with San Francisco, runs 60 miles through the county from south to north.

All the streams abound in trout. Game—quail, grouse, pigeons and deer—is abundant.

Land suitable for agricultural purposes, fruit growing, etc., can be obtained at reasonable prices.

The Snow Mountain Water and Power Company is now furnishing electric light and power from the waters of Eel River, brought through the mountains by tunnel into Potter Valley, and the line supplies both these valuable adjuncts to town and county south to San Francisco. With this power supplied at any point throughout the fertile Russian River Valley, intensive farming can be engaged in, and unique, effective, and cheap facilities for manufacturing may be had at any desirable location.

STATISTICS OF MENDOCINO COUNTY, 1907-8.

General Statistics.

Area, 3,460 square miles, or acres.	2,214,400
Number of acres assessed	1,561,851
Value of country real estate	$8,731,670
Of improvements thereon	$1,207,559
Of city and town lots	$609,272
Of improvements thereon	$874,909
Of personal property	$2,404,550
Total value of all property	$13,827,960
Expended on roads, last fiscal year	$47,233
Expended for bridges, last fiscal year	$46,532
Number of miles of public roads	1,160
Road levy per $100, 1908	40c
Value of county buildings	$81,000
Railroads, steam—miles, 185; assessed value	$1,353,697
Electric power plants—10; assessed value	$100,000
Number of acres irrigated	2,450

Forest Products.

	Amount.	Value.
Area of timber lands acres	850,000	......
Cedar, acres	100,000	......
Pine, acres	110,000	......
Redwood, acres	640,000	......
Sawmills, number	27	$435,000
Fuel, wood, cords	595,000	2,677,500
Laths, thousand	13,000	......
Lumber, feet	175,190,019	......
Paper pulp, tons	16,268	244,020
Pickets, pieces	5,000,000	......
Piles	2,400	......
Posts, pieces	160,000	......
Railroad ties, pieces	4,059,500	......
Shakes, thousand	550,000	......
Shingles, thousand	6,755,600	......
Grape stakes	1,290,000	......

Power used for mills and manufactories in county—Steam, 27; electrical, 1.

Dairy Industry.

	No.	Production.	Value.
Creameries	13	......	......
Butter, pounds		521,550	$156,465

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	212,000	162,000	374,000
Apricot	100	.....	100
Cherry	5,000	400	5,400
Fig	400	50	450
Lemon	50	.....	50
Nectarine	35	.....	35
Olive	15,300	.....	15,300
Orange	400	50	450
Peach	15,100	1,500	16,600
Pear	196,000	30,000	226,000
Plum	100	.....	100
Prunes	410,000	.....	410,000
Quince	100	.....	100
Other kinds	10	.....	10
Total fruit	854,595	194,000	1,048,595
Almond	200	.....	200
Chestnut	150	500	650
Walnut	15,900	.....	15,900
Total nut trees	16,250	500	16,750
Loganberries	44,000	.....	......
Blackberries	31,000	.....	......
Raspberries	19,000	.....	......
Strawberries*	.....	.....	.....

*About 20 acres.

Live Stock Industry.

	Number.	Value.
Cattle—Beef	10,020	$300,600
Stock	15,800	237,000
Dairy cows—Graded	6,400	128,000
Calves	5,000	25,000
Swine	16,000	32,300
Horses—		
Standard-bred	6	500
Common	5,050	252,500
Colts	619	15,475
Jacks and jennies	2	150
Mules	283	11,603
Sheep	116,076	348,228
Angora goats	4,000	10,000
Total stock all kinds	179,256	$1,361,356
Wool, pounds	530,250	$42,420
Mohair, pounds	16,000	3,200

STATISTICS OF MENDOCINO COUNTY, 1907-8—Continued.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,600,000	$16,000
Apricots	2,000	60
Blackberries	10,000	800
Beans	12,500	250
Beets	5,212,550	26,063
Cabbage	356,200	3,562
Celery	3,500	175
Cauliflower	5,000	250
Corn	2,000	50
Currants	1,250	50
Cherries	1,200	48
Figs	3,500	140
Gooseberries	300	15
Grapes	11,000,000	110,000
Loganberries	8,000	560
Onions	500,000	7,500
Pears	1,200,000	12,000
Peaches	15,400	616
Peas	152,150	1,525
Plums	1,600	16
Irish potatoes	2,000,000	30,000
Prunes	5,400,000	54,000
Quinces	800	16
Raspberries	7,500	450
Strawberries	65,750	4,602
Tomatoes	256,200	2,562
Carrots	1,000,000	10,000
Totals	28,817,400	$281,286

Dried—	*Pounds.*	*Value.*
Almonds	200	$20
Apples	85,000	4,250
Beans	500	15
Onions	4,000	100
Pears	300,000	13,500
Prunes	1,800,000	31,500
Walnuts	10,000	1,600
Totals	2,199,700	$49,385

Canned—	*Cases.*	*Value.*
Beans	140	378
Pears	1,150	4,600
Peaches	200	880
Tomatoes	1,800	2,700
Totals	3,290	$8,558

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	900,000	$270,000
Beer, barrels	2,300	4,600
Cider	5,000	750
Vinegar	2,000	200

Number of wineries, 6; breweries, 2.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives	550	$1,650
Flowers and plants, acres	7	4,800
Honey	8,000	800
Hops	1,753,060	122,714

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	2,900	1,632	$48,960
Barley	1,260	391	11,730
Oats	1,970	956	38,240
Corn	1,000	.....	......
Total cereals	7,130	2,979	$98,930
Alfalfa hay	1,450	5,000	$70,000
Grain hay	13,500	14,500	217,500
Total hay	14,950	19,500	$287,500

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	12,000	$36,000
Ducks	120	480
Geese	5	90
Turkeys	500	9,000
Eggs	800,000	200,000
Totals	812,625	$246,570

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	1	10	$6,000
Brick	6	30	33,000
Cigars	2	6	40,000
Flouring mills	2	7	48,000
Planing mills	3	30	120,000
Tanneries	4	12	6,000

MERCED COUNTY.

Merced County possesses as good land as is to be found anywhere in the San Joaquin Valley for fruit and alfalfa, but its development has been retarded by large land holdings, and grain growing has been the principal occupation. Within the past twelve months, however, thousands of acres have been subdivided into colony lots and placed on the market, and vigorous advertising campaigns organized. This, of course, means immigration, development, and prosperity.

The good roads movement is receiving its due amount of consideration in the county, and the different supervisorial districts have built several miles of new roads, with the expectation of extending them as fast as possible. The county is particularly fortunate in being able to secure a high grade of road material from the nearby rock crusher at Jasper, on the line of the Yosemite Valley Railroad, and at reasonable cost.

The new Yosemite Valley Railroad has its terminal facilities in the city of Merced, which include a general office building and depot, roundhouse, turntable, and switch yards. It is a standard guage steam road. The line connects at Merced with the trunk lines of the Santa Fe and Southern Pacific, and extends to El Portal at the Yosemite National Park line, a distance of 78 miles. It is a picturesque route, following the course of the Merced River Canyon.

The road was built to handle the immense tourist travel to and from the celebrated Yosemite Valley, and Merced has become known as the Gateway to Yosemite, on account of the thousands of tourists who pass through annually. Leaving the little city of Merced, the traveler is soon on the open plains, headed for the snow-capped Sierras that arise abruptly to the eastward. We get our first view of the beautiful Merced River and cross it just before reaching Hopeton. Another stretch of tangent track and a curve or two, and we round the outskirts of the old town of Snelling. This is the rich farming district of the Merced, as is shown by the herds of cattle and hogs, the orchards, the fields of alfalfa and Indian corn. The next stop is Merced Falls. Here we see a broad, smooth expanse of the river, and hear the roar as the water rolls over the falls.

On leaving this point we enter the Merced Canyon, and the ascent through the narrow gorge has commenced. We begin at once to notice the signs of the mining days of old, for the Merced was famous in that respect, and, for that matter, still has gold and other mineral along its course which is being actively mined. The Exchequer power plant and dam is the next mark of modern improvement and just beyond a short distance is Pleasant Valley, so named from its surroundings. A bend in the river is passed, and we again cross the river. Of the many interesting sights in the canyon, the several waterfalls or dams are sure to atract attention. Bagby may be called the halfway station, and this pretty little mountain retreat, with its broad sheet of water pouring over the dam, the stamp mill and the power plant, has some history that takes us back to the early days when General Fremont erected here a stamp mill and christened it Benton Mill in honor of Senator Benton of Missouri. A wagon bridge also spans the river here on the old road that connects Coulterville and Mariposa.

We now begin to realize more fully that we are penetrating deeper and deeper into the mountains, for the canyon walls shut us in completely and tower skyward, and we see nothing but huge mountain walls ahead and behind us. The track curves about each projecting abutment with the exact precision of the river. The water rushes over great bowlders and forms into many rapids and cataracts. Along here we see the mouth of the North and South Fork tributaries empty their rushing torrents from the distant snow-capped mountains and lakes and wonder at the awful chasms whence they issue.

We round another curve, completing almost a full circle of what is known as the "Hogback," when plainly up the canyon ahead of us, on the face of the mountain wall, we see the filmy sheet of water called the Chinquapin Fall, and opposite which and far below on the river's edge is El Portal, the end of the first part of the journey, and the commencement of the exciting and romantic stage ride of fourteen miles through the Yosemite Park. Away up in the mountains, an altitude of nearly two thousand feet, we find this picturesque, secluded resort, a fine large hotel with wide verandas, shut in on all sides by the mountains, with the wild rushing river before us. Here we may stop for rest and enjoyment, and proceed to Yosemite when we are ready to do so.

The stage ride through the Yosemite Park from El Portal is one of the principal features of the entire trip, for its beauty and grandeur are unsurpassed by any other road of equal length in America. The road continues along the ever-present river to the Portal of Yosemite, and the traveler is in a measure prepared for the sublimities of California's Wonderland, which burst on the view as the stages halt on the bank of the river for the first general view of the valley, where El Capitan rises abruptly three thousand three hundred feet high, the mighty guardian of the valley, with the beautiful Bridal Veil Fall to the right with its nine hundred and forty feet of mist and rainbow effect. Ere we reach our hotel or camp, we have received our first general impression of the great valley. Its beauty and grandeur grows upon you. It is indescribable; it must be seen to be appreciated.

Lake Yosemite, the reservoir into which the canal empties, covers about a square mile with the average depth of 36 feet. The canal on the west side is 40 miles in length with over 100 miles of lateral ditches, literally making an otherwise dry section "blossom as a rose."

The creamery industry has developed so rapidly that Merced County is now near the head of the list in the production of cream.

Merced County excels in the quantity and quality of its sweet potatoes. The fig industry is yet in its infancy, but it has been proven that the soil and climatic conditions are very favorable, for the Government expert has pronounced this soil best for figs and olives. Also the peaches and grapes of Merced County have a State reputation.

The flour mills are producing an extra good quality of flour, so are rapidly increasing their outputs.

Merced County is located about the center of the State and also about the center of the San Joaquin Valley. Numerous rivers and creeks traverse the county, furnishing a natural water supply, while the county's system of artificial irrigation is one of the finest in the world. It has two systems, one on the east side and the other on the west side of the San Joaquin River. The main canal on the east side is 65 feet wide at the bottom and 100 feet wide on top and 10 feet deep, the carrying capacity being 4,000 cubic feet per second. The length of the canal is about 50 miles, with something over 250 miles of subsidiary canals built as a part of the system, and these are constantly being added to as the demands require.

STATISTICS OF MERCED COUNTY, 1907-8.

General Statistics.

Area, 2,000 square miles, or acres.	1,280,000
Number of farms	2,500
Number of acres assessed	1,175,596
Value of country real estate	$9,913,082
Of improvements thereon	$977,137
Of city and town lots	$593,874
Of improvements thereon	$878,836
Of personal property	$2,328,646
Total value of all property	$14,691,576
Expended on roads and bridges, last fiscal year	$65,206
Number of miles of public roads	1,000
Road levy per $100, 1908	40c
Value of county buildings	$187,000
Irrigating ditches—miles, 151½; cost	$335,331
Railroads, steam—miles, 154.12; assessed value	$3,264,901
Electric power plants—1; assessed value	$20,450
Electric power lines — miles, 18½; assessed value	$21,537
Number of acres irrigated	150,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	12,790	1,532	$49,024
Barley	87,767	16,363	392,712
Oats	20,250	3,998	119,940
Rye	7,500	462	13,860
Corn	3,000	1,263	31,575
Total cereals	131,307	23,618	$607,111
Alfalfa hay	21,000	32,850	$262,800
Grain hay	25,700	9,000	90,000
Total hay	46,270	41,850	$352,800

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	800	$28,000
Stock	35,450	531,750
Dairy cows—Graded	18,175	727,000
Calves	7,125	71,250
Swine	24,000	192,000
Horses—		
Thoroughbred	29	23,200
Standard-bred	2,409	240,900
Common	2,503	150,180
Colts	1,193	23,860
Jacks and jennies	115	11,500
Mules	2,599	389,850
Sheep	76,961	230,883
Lambs	43,155	86,310
Angora goats	2,200	4,400
Total stock all kinds	219,714	$2,718,583
Wool, pounds	615,688	$55.411

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	269,325	$3,375
Apricots	200,000	2,000
Asparagus	4,500	225
Blackberries	120,650	6,032
Beans	48,100	962
Beets	50,000	500
Cabbage	71,250	712
Celery	9,975	199
Cauliflower	51,200	1,024
Corn	166,720	3,334
Figs	60,250	602
Grapes	6,021,460	22,462
Grape fruit	1,100	35
Lemons, boxes	512	2,048
Loganberries	128,250	5,130
Nectarines	6,125	61
Onions	16,185	323
Oranges, boxes	2,326	3,489
Olives	79,120	1,582
Pears	119,350	900
Peaches	2,465,550	19,712
Peas	25,000	1,000
Persimmons	1,500	60
Plums	77,060	770
Irish potatoes	492,300	4,923
Sweet potatoes	11,025,000	137,812
Quinces	21,250	318
Raspberries	5,000	300
Strawberries	26,800	1,608
Tomatoes	101,750	508
Tomatoes shipped, boxes	24,000	9,600
Totals	....	$231,606

Dried—	*Pounds.*	*Value.*
Almonds	80,000	$10,400
Apples	3,000	150
Apricots	60,850	2,434
Beans	151,250	5,292
Figs	483,100	16,940
Nectarines	500	25
Onions	95,000	1,200
Pears	14,200	852
Peaches	460,168	16,404
Peanuts	3,500	280
Prunes	107,100	3,023
Raisins	49,700	1,232
Walnuts	7,000	700
Pecans	600	66
Totals	1,515,968	$58,998

Canned—	*Cases.*	*Value.*
Apricots	8,000	$20,000
Peaches	54,000	135,000
Plums	500	1,500
Sweet potatoes	2,500	5,000
Totals	65,000	$161,500

STATISTICS OF MERCED COUNTY, 1907-8—Continued.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	4,750	2,780	7,530
Apricot	6,603	7,867	14,470
Cherry	403	1,911	2,314
Fig	7,513	7,600	15,113
Lemon	500	250	750
Nectarine	600	50	650
Olive	3,333	3,000	6,333
Orange	2,127	4,887	7,014
Peach	81,000	365,978	446,978
Pear	3,486	4,200	7,686
Plum	6,000	1,200	7,200
Prunes	10,500	2,200	12,700
Quince	350	150	500
Other kinds	56	35	91
Total fruit.	127,221	402,108	529,326
Almond	19,757	5,950	25,707
Chestnut	25	......	25
Pecan	50	......	50
Walnut	923	1,000	1,923
Other nuts	5	......	5
Total nut	20,760	6,950	27,710
Grape vines	1,178,100	1,072,600	2,250,700
Blackberries	25	7	32
Mammoth	10	2	12
Dewberries	3	1	4
Loganberries	20	8	28
Strawberries	10	3	13
Raspberries	2	1	3

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	5,128	$20,512
Ducks	155	1,240
Geese	35	315
Turkeys	856	30,016
Eggs	256,400	53,145
Total value	262,574	$105,228

Forest Products.

Power used for mills and manufactories in county—Steam, 1; electrical, 1; water, 1.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines (claret)	29,650	$3,700
Sweet wines (port)	65,000	17,550
Brandy	20,500	20,500
Vinegar	1,100	220

Number of wineries, 1; distilleries, 1.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	3	5,551,282	$1,387,821
Skimming stations	6	......	......
Butter, pounds		270,100	81,030

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives	2,250	$4,500
Beeswax	150	52
Broomcorn	6,000	195
Honey	126,676	12,360

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	2	.....	$7,280
Flouring mills	2	.....	96,360
Meat products—			
Hides		.....	32,000
Lard		.....	9,000
Tallow		.....	2,500
Olive oil		.....	1,400
Pickled olives		.....	1,836
Cereals		.....	3,500

Manufactured Output.

	Quantity.
Brick, thousand	910,000
Flour, barrels	17,520
Hides, pounds	320,000
Lard, pounds	60,000
Tallow, barrels	200
Olive oil, gallons	700
Pickled olives, gallons	2,450
Cereals, pounds	120,000
Macaroni	24,000

MODOC COUNTY.

Modoc County lies in the extreme northeastern corner of California. The county is a succession of mountain ranges and valleys branching off from the Sierra Nevada Mountains, the principal spur of which is the Warner Range. It is principally drained by Pitt River, which flows into the Sacramento, near Redding, Shasta County. The lava-bed section occupies over one half the total area. The county has two large lakes, but barring the lakes and the large cattle ranges it is sparsely settled.

The valleys are the principal features, the leading ones being Surprise, Goose Lake, Hot Springs, Jess, Big, and Little Hot Springs.

Wheat, barley, fruit, vegetables, and hay are the leading staples. Thousands of acres are in alfalfa, and the stock and dairying industries are thriving. Every ranch has a fine orchard, and ranch houses and barns, costing $5,000 or $6,000 in total improvements, are not uncommon. Trees, both shade and ornamental, abound around every place.

The climate is that of the temperate zone, and the products are those of the great intermountain region which stretches from the Sierra to the western plains of Kansas. Snow falls in the valleys and much deeper in the mountains, forming the principal supply of moisture for the development of the country. Stock is usually fed for several months through the winter, although it is not always necessary to do so. The thermometer will sometimes run below zero for a few days in the winter, but not for very long, and 90 degrees is extreme heat for summer. Even in summer the evenings are cool and delightful.

The county is well watered. Surprise Valley has nearly twenty streams, which run both winter and summer. Goose Lake Valley is equally fortunate, while Pitt River supplies water for many farms and ranches. Many springs exist, especially in the mountains; and in Surprise Valley there are many artesian wells.

The timber of the county is pine and fir in the Warner Range, and sugar pine in the western part.

Horticulture has had but a small place in the industries, only sufficient fruit for home uses being raised. However, the gradual approach of the railroad running north from Reno, Nevada, will increase the productivity in this line immensely, as the county is well adapted to apples, pears, and berries. The wild plum is about the only native fruit. The cultivated fruits were brought in the earlier days from Eastern States by the immigrants who came across the plains. A great deal of orchard planting has been done within the last few years.

The last five years has seen a great deal of reservoir work undertaken throughout the county and its tributary valleys. The rains come in time to insure abundant harvests year after year.

The nearest railroad point to Alturas, the county seat, is Madeline, in Lassen County. Daily trains are run from Madeline to Reno, Nevada.

There are flouring mills located at Bidwell, Lake City, Cedarville, New Pine Creek, Alturas, and Adin. There are sawmills located at Bidwell, Cedarville, Eagleville, Willow Ranch, Davis Creek, Jess Valley, Alturas, Adin, and Willow Valley.

STATISTICS OF MODOC COUNTY, 1907-8.

General Statistics.

Area, 4,100 square miles.	
Number of acres assessed......	634,925
Value of country real estate....	$2,939,693
Of improvements thereon.......	$433,726
Of city and town lots...........	$108,453
Of improvements thereon......	$258,763
Of personal property...........	$1,294,129
Total value of all property......	$5,168,098
Expended on roads, last fiscal year........................	$17,240
Expended for bridges, last fiscal year........................	$11,000
Number of miles of public roads	700
Road levy per $100, 1908, 30c....	$18,550
Value of county buildings......	$14,450
Irrigating ditches—miles, 480; cost........................	$19,130
Railroads, steam—miles, 8; assessed value..................	$33,600
Electric power plants, number..	3

Live Stock Industry.

	Number.	Value.
Cattle—Beef	10,003	$229,763
Stock	38,211	473,657
Dairy cows—Graded....	1,405	36,450
Shorthorns	281	23,400
Calves	8,837	61,877
Swine	11,232	41,239
Horses—		
Thoroughbred	63	70,900
Standard-bred	37	3,400
Common	9,935	465,215
Colts	1,704	28,985
Jacks and jennies.......	105	34,600
Mules	972	37,415
Sheep	82,108	256,779
Lambs	15,664	32,525
Angora goats...........	193	2,737
Common goats	1,945	7,780
Wool, pounds...........	426,147	$4,333,477
Mohair, pounds..........	2,040	481

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines..............	2	......
Beer, barrels...........	27,000	$10,000
Vinegar	540	132
Number of breweries, 10.		

Manufactories.

	No.	No. of Employes.	Value of Product.
Flouring mills.....	7	13	$54,180
Leather goods.....	2	3	13,000
Planing mills.......	4	2	7,700

Poultry and Eggs.

	Dozen.	Value.
Chickens	2,370	$5,444
Ducks	46	42
Geese	19	72
Turkeys	578	2,546
Eggs	23,450	3,766

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	5,236	6,292	$54,147
Barley	5,040	3,476	64,603
Oats	134	3,173	4,425
Rye	55	2,322	480
Corn	11	330	......
Alfalfa hay......	5,113	12,795	69,128
Grain hay......	156	1,572	15,092
Grass hay......	40,119	60,814	266,566

Fruits, Vegetables, Etc.

	Production. Total Pounds.	Value.
Green—		
Apples	975,280	$3,358
Apricots	132,000	120
Blackberries	11,064	287
Beans	32,555	1,627
Beets	134,250	1,549
Cabbage	89,940	1,493
Celery	530	40
Corn	4,350	115
Currants	490	34
Cherries	6,100	50
Gooseberries	1,249	94
Loganberries	5,593	399
Onions	87,645	1,746
Pears	36,450	417
Peaches	16,025	85
Peas	2,800	112
Plums	6,665	21
Irish potatoes........	755,550	16,253
Prunes	7,580	33
Raspberries	15,265	545
Strawberries	9,970	320
Tomatoes	49,600	1,040
Turnips	10,050	301
Radishes	600	30
Spuash	34,450	1,033
Dried—	*Pounds.*	*Value.*
Apples	1,750	......
Beans	5,885	......
Canned—	*Cases.*	*Value.*
Corn	60	180
Gooseberries	25	75
Raspberries	75	300
Strawberries	44	176
Tomatoes	100	40
Totals	304	$771

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	23,991	3,649	27,640
Apricot	686	275	961
Cherry	900	314	1,214
Nectarine	10	10	20
Peach	1,994	461	2,455
Pear	1,667	424	2,091
Plum	2,737	377	3,114
Prunes	617	92	709
Quince	2	.....	2
Total fruit trees.	.....	.....	31,049
Walnut	60	.....	60
Berries, acres.....	1,010	.....	1,024

Manufactured Output.

	Quantity.
Brick, thousand...............	25,000
Flour, barrels.................	270,130
Hides, pounds.................	750
Lard, pounds..................	5,860
Meat packed, pounds..........	60,425
Salt, tons....................	75
Soap, pounds..................	5,000

Forest Products.

	Amount.	Value.
Area of timber lands, acres	48,050	$40,250
Sawmills, number.......	10	......

Dairy Industry.

	No.	Production.	Value.
Creameries	3	......	$3,500
Butter, pounds.....		30,780	760
Cheese, pounds.....		7,400	360

MONO COUNTY.

Mono is a long, narrow county lying on the eastern slope of the Sierras, its greatest length bordering on the State of Nevada, which forms its northeastern boundary, its general direction being southeast and northwest.

The general contour is mountainous and very rough, all but 400 square miles, or less, being mountainous. The western portion lies among the Sierra Nevada Mountains, along their summit, the heights being clad in snow, and the slopes of the range being covered with forest trees.

Among the highest peaks are Mount Dana, 13,627 feet; Mount Lyell, 13,217 feet; and Castle Peak, 13,000 feet. The greater portion of the population is in the eastern part, in the valleys and the mining camps in the surrounding mountains. This portion, which has always been considered a strange, mysterious country, is of a desert-like, volcanic character, abounding in salt pools, alkali, and volcanic table-lands, its character being significantly indicated by some of the local names, such as Hot Springs, Geysers, Sulphur Springs, Black Lake, Soda Pond, Volcano, Obsidian Mountain, Deep Canyon, Volcanic Tableland, Red Crater, Adobe Meadows, and Oasis.

Mono Lake, the "Dead Sea of America," is one of the attractions, and situated in the center of the county; it is about 12 miles long and 8 miles wide; its waters are a somewhat unusual compound, various chemical substances being found in solution in them. Several attempts have been made to utilize this water without success. This lake has all the appearances of having once been the scene of volcanic action. The country surrounding it, as Bodie, Aurora, Lundy, Tioga, and Benton, abounds in minerals. The lake has a number of small streams flowing into it, but is without a perceptible outlet.

Owens River in the south, which takes its rise in a high peak in the Sierras, and Kitten and Walker rivers in the north, are the principal streams. One passes through the southern part into Inyo County. The other, after rising in Mono County, continues its course into the State of Nevada. These two streams with their branches, together with the small streams that flow into Mono Lake, furnish the principal water supply for irrigation.

The retaining of the snow in the high mountains, at the sources of the streams used for irrigation, until later in the season, assures an abundance of pasturage on the mountain ranges, which are thronged with vast herds of cattle and bands of horses and sheep that are brought from the lower sections to graze during the summer.

That portion of the valley soil lying contiguous to the streams is very rich. A great deal of the sagebrush land, formerly considered barren, is found to be very productive when placed under cultivation. Thus the area of tillable land has been vastly increased within the last few years, and wherever water can be got on the land, even well up on the foothills, there are farms that are making comfortable homes for their owners.

The agricultural resources are chiefly confined to the raising of hay and the hardier cereals and vegetables for home consumption. The small surplus finds a ready market in the mining camps. Apples raised in the lower valleys are of superior quality and flavor and thrive well. Plums and peaches are grown on a limited scale. Berries also do well, considering the high altitude.

Grazing is the leading industry, and the pasturage is good and plentiful. Herds of dairy cattle are moved from the valleys during the summer, and an excellent product of butter is made. Large bands of sheep are also driven to its mountains for summer pasturage. Goats, hogs, horses, poultry, and mules are raised in large numbers.

The timber belt is very large and the product of good marketable quality, but as there is no means of transportation to market, the development of the lumber interests is retarded, although considerable quantities are used for local mining purposes.

Bridgeport is the county seat, and is located in a prosperous farming section.

Considerable mining for precious metals is carried on, the leading camp being Bodie. This industry is prosperous. The introduction of the cyanide process, and the installing of electric power plants on the several streams of the county, thereby furnishing cheap power, make it possible to work at a profit large bodies of low-grade ore that heretofore were of no value, on account of cost of reduction.

STATISTICS OF MONO COUNTY, 1907-8.

General Statistics.

Area, 2,796 square miles, or acres.	1,789,440
Number of farms	170
Number of acres assessed	170,531
Value of country real estate	$562,550
Of improvements thereon	$157,775
Of city and town lots	$17,230
Of improvements thereon	$78,315
Of personal property	$397,945
Total value of all property	$1,202,695
Number of miles of public roads	292
Value of county buildings	$4,560
Railroads, steam—miles, 68; assessed value	$90,015
Electric power plants, assessed value	$26,000
Electric power lines—miles, 28; assessed value	$14,000
Number of acres irrigated	10,900

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	1,660	.....	1,660
Apricot	5	.....	5
Cherry	38	.....	38
Nectarine	10	.....	10
Peach	35	.....	35
Pear	100	.....	100
Plum	210	.....	210
Quince	5	.....	5
Total fruit trees.	2,063	.....	2,063
Grapevines, acres.	2	.....	2
Berries, acres	1	.....	1

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	40	30	$1,500
Barley	40	30	1,200
Oats	20	15	600
Total cereals	100	75	3,300
Alfalfa hay	2,225	6,675	$44,050
Grass hay	6,750	10,125	60,750
Total hay	8,975	16,800	$100,800

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	258	$6,450
Stock	2,300	23,000
Dairy cows—Graded	220	5,400
Calves	700	3,500
Swine	140	560
Horses—		
Thoroughbred	7	1,900
Common	980	36,200
Colts	250	6,000
Jacks and jennies	5	425
Mules	45	1,920
Sheep	4,250	10,625
Total stock all kinds	9,155	$95,980

Fruits, Vegetables, Etc.

There is no fruit grown in Mono County for the market. It is practically all consumed by the grower.

STATISTICS OF MODOC COUNTY, 1907-8—Continued.

Poultry and Eggs.

	Dozen.	Value.
Chickens	160	$800

Forest Products.

	Amount.	Value.
Sawmills, number.......	4	$5,100
Fuel, wood, cords.......	5,000	15,000
Lumber, feet............	500,000	7,500

Power used for mills and manufactories in county—Steam, 1; electrical, 2; water 2.

Dairy Industry.

No record; all used by producer.

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 250..........		$250

Manufactories.

	No.	No. of Employes.	Value of Product.
Lime	1	2	$2,000

MONTEREY COUNTY.

Monterey County is situated about 100 miles south of San Francisco, and 500 miles north of Los Angeles, on the Pacific coast. It is 124 miles long and 45 miles wide, its extreme length being from north to south.

Owing to the peculiar topography, with its rough mountains and broad plains, its great river running from south to north, with tributaries from either side, its rolling hills and rugged mountains, it is found to be a miniature of the State, with its entire diversity of climate and soil, enabling it to yield everything produced in the State, and rendering it one of the most desirable regions for settlement.

Its rivers furnish a never-failing supply of water for irrigation, and the mountains abound in minerals—gold, silver, copper, coal, bitumen, and oil.

The county is divided into three sections—the mountains and hills on the east, mountains and hills on the west, and the great Salinas Valley situated between these range of mountains.

The portion of Pajaro Valley lying south of the Pajaro River, and running to Monterey Bay on the southwest, is in Monterey County, and is about 15 miles long, and from 6 to 8 miles wide. The land is exceedingly fertile and under a thorough system of cultivation, producing immense crops of all kinds of vegetables, grain, fruit, and berries. Well-tilled farms greet the eye, and villages, schoolhouses, churches, and picturesque residences dot the landscape in every direction. The foothills are covered with flocks and herds, and the lower ranges are timbered with live oak. The Pajaro River flows southwesterly and finds an outlet in Monterey Bay, near the mouth of the Salinas River.

The great Salinas Valley opens out on Monterey Bay and extends southward 100 miles, with an average width of 10 miles; therefore its area is about 1,000 square miles, or 640,000 acres. The Salinas River flows through its entire length. The land may be divided into three classes, viz: First, the heavy, rich bottom lands, which produce almost everything, the soil being sediment and black adobe, which often contains just enough sand to make it work easily. Second, the mesa or table-lands, particularly adapted to growing wheat, barley, and other cereals. Third, the uplands and slightly rolling hills, some of which are the finest fruit lands in California, and will produce oranges, lemons, grapes, peaches, apricots, almonds, walnuts, figs, apples, plums, pears, berries and all other fruits common to the State.

Nearly all semi-tropical fruits do well in some part of this county, especially in the thermal belt along each side of Salinas Valley. A number of orange and lemon trees in yards of Salinas City hang full of fruit each year and are never injured by frost.

In barley, beets, and carrots, this valley can not be surpassed.

Going south, wheat excels; and grapes, peaches, prunes, apricots,

cherries, and almonds grow to perfection in the foothills, canyons, and small valleys, and figs do well in sheltered places.

Olive trees flourish with all the vigor they possess in their native country. Currants, gooseberries, blackberries, loganberries, and raspberries grow luxuriantly. Strawberries are in the market all the year round, and are shipped from Pajaro by carloads. Grapes grow to perfection everywhere in the county, except in the heavy bottom lands of the lower Salinas Valley.

As to potato raising, the Salinas Valley has no equal; here is the home of the famous Salinas Burbanks that are in such great demand all through the northwest, and thousands of sacks are shipped to the Philippine Islands. As high as four hundred bushels to the acre have been raised near Salinas.

Dairying is a very prominent, if not a leading industry, most of the dairies being devoted to butter making. Some of the finest dairies in the State are in Monterey County, and some of the best butter in the State is made here. They have the latest and best improved machinery, and have found their business very profitable.

Extensive work has been done in the last few years in bringing the valley under a thorough system of irrigation. Opposite Soledad, on the south side of Salinas River, considerable irrigation is done around Fort Romie on lands purchased by the Salvation Army, and sold on most favorable terms to worthy poor in need of homes. This is one of the most prosperous colonies in America. Around the Spreckels sugar factory, four miles from Salinas City, a great deal of land has been irrigated for raising beets. This is the largest beet-sugar factory in the world.

The main transcontinental line of the Southern Pacific Railroad enters this county through Pajaro Valley on the north, and runs southeast through its entire length, paralleling the Pajaro and Salinas rivers.

Pajaro is the great shipping point for apples, berries, all fruits, and dairy products of its section.

Hotel Del Monte, "the queen of American watering places," including the main structure and two annexes, together with the connecting wings, is simply immense, and everything connected with the establishment is on the same magnificent scale. The grandeur of the hotel is repeated in the grounds, which cover 140 acres, laid out in lawns, flower beds, parks, and groves, and the landscape gardening is a marvel of beauty.

A little farther on is Monterey, situated on the beach of Monterey Bay, lying back on her sloping hills, and overlooking the placid waters of the bay—one of the grandest and most beautiful townsites nature ever formed.

Two miles farther on is Pacific Grove. Nestled among the pines is this little town, with beautiful streets, magnificent cottages, fine churches and schoolhouses, charming drives, and with never a saloon in its sacred limits.

The harbor of Monterey Bay is second in importance on the coast. The largest battleships of our navy find anchorage within 100 feet of the shore, and during heavy storms at sea it is not unusual to see many ships of different nations anchored in the calm waters of the bay. The fishing is incomparable for quantity and variety, and two canneries are located at Monterey. There is an abalone canning factory located at Point Lobos, and one at Point Sur. Monterey Bay contains about one hundred and fifty species of food fish, and many are annually taken for market. There is a whaling company at Monterey, and some seasons many whales are captured.

Salinas City, the county seat, is in the heart of the best portion of Salinas Valley, the head of the first division of the railroad, near the Spreckels sugar factory, and contains extensive gas and water works, a large flouring mill, a large creamery, a planing mill, and shops, banks, churches, and schoolhouses. There are many magnificent residences and well-improved streets. Fraternal societies are well represented.

Soledad, named for Soledad Mission, is in another wheat belt, and is an important shipping point for grain and dairy products. It is the nearest point to Paraiso Springs, whose waters contain medicinal properties of a high order.

The narrow-gauge railroad from Pajaro to Salinas parallels the main line on the west, taps Monterey Bay at Moss Landing—where there are extensive warehouses and lumber yards, and where the coast vessels stop regularly for grain and merchandise—then continues to Spreckels' sugar factory, and is used principally for hauling beets to the factory and lime rock from the quarries, though considerable grain is shipped by it from the region west of Salinas.

STATISTICS OF MONTEREY COUNTY, 1907-8.

General Statistics.

Area, 3,600 square miles, or acres.	2,304,000
Number of farms	5,000
Number of acres assessed	1,590,312
Value of country real estate	$11,325,708
Of improvements thereon	$1,645,550
Of city and town lots	$2,502,645
Of improvements thereon	$2,236,535
Of personal property	$2,590,413
Total value of all property	$20,300,851
Expended on roads, last fiscal year	$82,772
Expended for bridges, last fiscal year	$58,348
Number of miles of public roads	1,500
Road levy per $100, 1908	50c
Value of county buildings	$115,000
Irrigating ditches—miles, 221; cost	$184,000
Railroads, steam—miles, 171; assessed value	$2,938,155
Railroads, electric—miles, 6; assessed value	$10,000
Electric power plants—4; assessed value	$73,000
Electric power lines—miles, 35; assessed value	$5,000
Number of acres irrigated	20,550

Wines, Brandies, Etc.

	Gallons.	Value.
Beer, barrels	8,000	$50,000

Number of breweries, 2.

Fish Industry.

	Pounds.	Value.
Salmon, salted	50,000	$16,250
Other kinds	296,750	17,865
Totals	346,750	$34,115

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	333,037	125,622	478,659
Apricot	37,650	6,222	43,872
Cherry	2,690	400	3.090
Fig	350	150	500
Lemon	125	50	175
Nectarine	175	50	225
Olive	6,040	250	6,290
Orange	300	100	400
Peach	8,930	2,000	10,930
Pear	11,190	3,560	14,750
Plum	1,800	800	2,600
Prunes	22,200	300	22,500
Quince	250	100	350
Other kinds	1,000	500	1,500
Total fruit trees	425,737	140,104	585,841
Almond	2,500	500	3,000
Chestnut	150	50	200
Walnut	1,500	300	1.800
Other nuts	50	20	70
Total nut trees	4,200	870	5,070
Grapevines	12,780	1,700	14.480
Berries, acres	950	20	970

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	36,000	12,000	$360,000
Barley	55,000	33,000	792,000
Oats	2,500	2,500	100,000
Corn	.....	250	5,000
Total cereals	93,500	47,750	$1,257,000
Alfalfa hay	5,000	4,500	$31,500
Grain hay	20,000	30,000	300,000
Total hay	25,000	34,500	$331,500

STATISTICS OF MONTEREY COUNTY, 1907-8—Continued.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	30,000,000	$750,000
Apricots	995,000	3,800
Asparagus	10,000	800
Blackberries	1,200,000	40,000
Beans	360,000	14,400
Beets	320,000,000	800,000
Cabbage	20,000	400
Celery	20,000	600
Cauliflower	10,000	300
Corn	500,000	5,000
Currants	1,000	30
Cherries	30,600	1,224
Grapes	130,000	1,300
Loganberries	600,000	24,000
Onions	200,000	4,000
Olives	400,000	12,000
Pears	3,357,000	33,570
Peaches	1,400,000	28,000
Peas	200,000	4,000
Plums	3,600	36
Irish potatoes	30,000,000	300,000
Prunes	1,110,000	11,100
Quinces	25,000	500
Raspberries	500,000	25,000
Strawberries	3,500,000	75,000
Tomatoes	100,000	750
Totals	393,772,200	$2,235,810

Dried—	*Pounds.*	*Value.*
Almonds	20,000	$2,000
Apples	100,000	8,000
Apricots	3,000	300
Beans	360,000	14,400
Onions	200,000	4,000
Peaches	2,000	160
Plums	2,000	100
Prunes	4,000	200
Walnuts	2,000	220

Canned—	*Cases.*	*Value.*
Apples	600	$1,400
Apricots	350	1,550
Blackberries	200	600
Cherries	200	600
Grapes	400	800
Nectarines	100	200
Pears	300	600
Peaches	800	1,600
Plums	200	350
Raspberries	100	300
Strawberries	200	600
Tomatoes	400	600
Sardines, tons	900	8,170
Totals	3,850	$16,800

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	53	......	......
Skimming stations	15	......	......
Butter, pounds		574,840	$143,710
Cheese, pounds		2,118,500	296,590
Condensed milk, cases	1	28,213	98,745

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	9,500	$332,500
Stock	32,000	640,000
Dairy cows—Graded	10,000	315,000
Calves	11,900	119,000
Swine	13,500	108,000
Horses—		
Thoroughbred	200	60,000
Standard-bred	3,500	350,000
Common	11,400	570,000
Colts	3,000	90,000
Jacks and jennies	40	3,600
Mules	600	66,000
Sheep	25,000	75,000
Lambs	8,000	14,000
Angora goats	1,800	7,200
Common goats	650	1,625
Total stock all kinds	131,090	$2,751,925
Wool, pounds	200,000	$30,000
Mohair, pounds	18,500	3,700

Forest Products.

	Amount.
Sawmills, number	1
Fuel, wood, cords	35,000
Lumber, feet	50,000
Pickets, pieces	95,000
Posts, pieces	50,200

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 7,350	.....	$22,050
Beeswax	3,675	1,029
Honey	441,000	44,000
Sugar beets, tons	160,000	800,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product*
Brick	1	7	$15,000
Cigars	6	36	......
Confectionery	10	40	......
Flouring mills	1	26	666,345
Lime	1	100	540,000
Planing mills	8	64	......
Artificial stone	2	10	......
Sugar, beet	1	400	1,500,000
Sardine canneries	2	100	8,100

Manufactured Output.

	Quantity.
Brick, thousand	1,500,000
Cigars, thousand	1,980,000
Lime, barrels	80,866
Hides, pounds	369,000
Tallow, barrels	410

Poultry and Eggs.

	Dozen.
Chickens	16,420
Ducks	250
Geese	150
Turkeys	300
Eggs	656,800

NAPA COUNTY.

Napa County lies in a northeasterly direction from San Francisco, its county seat, Napa, being about 40 miles from San Francisco and about 70 miles southwesterly from Sacramento. Though one of the smallest, it is one of the most important counties of the State, on account of its proximity to the great market of San Francisco, with which it has several lines of rail and water communication, the variety and wealth of its agricultural, mineral, and manufactured products, the fertility of its soil, the salubrity of its climate, and the excellence of its educational facilities. The length is about 50 miles, and its width varies from 30 to 35 miles.

Spurs of the Coast Range Mountains having a northwesterly trend divide the county into several valleys and afford a variety of scenery of unsurpassed beauty. The westerly boundary runs for its entire length from San Pablo Bay to Mount St. Helena, along the top of one of these ridges. The only valley of importance intersecting the slope of this western range is Brown's Valley, a productive glen that lies west of Napa City and contains many pretty suburban homes. East of this range, extending for almost the entire length of the county, lies the beautiful Napa Valley, varying in width from 1 to 5 miles, and opening at its lower end into a wide, fanlike expanse of tule land. Mount St. Helena, at the head of this valley, rears its summit nearly 4,500 feet above the level of the sea. The valley is watered by numerous streams that flow from the mountains and find their way into Napa River, which flows the entire length of the valley, and is navigable for steamers and sailing craft as far as Napa City.

The northwestern half of the county is broken by ranges of high mountains into several valleys, of which Berryessa, the most easterly, is the largest.

The rainfall averages so well that a shortage of crops is unknown. The influence of the ocean breeze is felt during the summer to an extent amply sufficient to temper the sun's heat, while the hills act as a barrier against the fogs. The foothills are especially famed for their climatic features, and here are some of the most noted health resorts in the State.

The soil may be divided into five classes. The first class, termed argillaceous, is common to the mountains on the east side of the county, and is not very productive. The second class, adobe, does not exist to any great extent. The best soil is the loam, which may be found in all the valleys, but principally in Napa. Tule soil is found from Napa City southward, and along the margin of the bay. The last class is lava, a decomposed volcanic formation, and is excellent for vineyards. It is found in the vicinity of Howell Mountain.

As the climate of Napa Valley corresponds strikingly in its main features to that of the south of France, grape growing, wine making, and horticulture are followed with great success. The olive, which requires a temperate climate, and dreads equally excessive hot or cold weather, thrives remarkably, and has been largely planted on stony hillsides that would be almost useless for other fruits. The oil and pickled olives manufactured are not excelled by any other domestic or imported product.

Napa County at one time led the State in the amount of wine produced, but the ravages of the phylloxera caused the death of many of the finest vineyards, and curtailed the production of grapes. Some of these vineyards have been replanted with resistant vines, and thus the output of wine is increasing.

The raising and curing of French prunes has been brought to a high state of excellence. Cherries and peaches are successful crops, and walnuts, almonds, apricots, pears, and apples thrive in all sections. While Napa County makes no claims to general adaptability to the culture of citrus fruits, there are few orchards that do not contain a number of orange and lemon trees to provide for the use of the family and for local sale. The output is uniformly of fine quality. Berries of all kinds thrive, and form a very material part of the produce.

Diversified farming is carried on on a large and profitable scale, the nature of the crops raised depending upon the character of the soil. The hay crop is generally large, and, being near to market, finds a profitable sale. Wheat, oats, barley, and corn are raised on a large scale, particularly in the eastern valleys. Potatoes, asparagus—in fact, vegetables of all kinds—do well. All the crops are raised without irrigation, the rainfall being ample, even in the driest years, to insure a good crop.

More and more attention is being paid, year after year, to dairying and stock raising, and also to poultry raising.

Napa County has always been noted for the fine horses that its farms produce. The most complete establishment devoted exclusively to the breeding of thoroughbred horses, the Napa Stock Farm, has several high-class imported stallions, and over sixty thoroughbred mares.

Quicksilver, magnesite, mineral waters, and building stone are produced in large quantities.

Napa City is situated at the head of navigation on Napa River. It is chiefly interested in the manufacture of leather and leather goods. There are tanneries, glove factory, shoe factory, woolen mill, and many other industries. It has excellent streets and buildings, fine schools and numerous churches. The State Hospital is located a short distance from the city. At Yountville, 9 miles from Napa, is the State home for volunteer soldiers.

St. Helena, farther up the valley, is the second town in size, and is chiefly devoted to the wine-making industry. It is also the business center for Pope Valley. Here is situated the St. Helena Sanatorium and the health-food factory.

Napa County is famous for the excellence of its roads and the size and number of its stone bridges. All the main county roads are sprinkled in the summer, and rural delivery routes carry the daily mail to the doors of the country people.

STATISTICS OF NAPA COUNTY, 1907-8.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	3,000,000	$420,000
Brandy	14,790	7,395

Number of wineries, 38; distilleries, 2; breweries, 3.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	2,000	$9,200
Turkeys	190	4,560
Eggs	120,000	30,000
Total value		$43,760

STATISTICS OF NAPA COUNTY, 1907-8—Continued.

General Statistics.

Area, 800 square miles, or 512,000 acres.

Number of farms	3,600
Number of acres assessed	411,596
Value of country real estate	$5,070,280
Of improvements thereon	$2,659,095
Of city and town lots	$1,591,600
Of improvements thereon	$2,499,610
Of personal property	$2,475,535
Total value of all property	$14,296,120
Expended on roads, last fiscal year	$31,829
Expended for bridges, last fiscal year	$15,000
Number of miles of public roads	453
Road levy per $100, 1908	36c
Value of county buildings	$13,000
Railroads, steam—miles, 54.10; assessed value	$1,140,043
Railroads, electric — miles, 36.165; assessed value	$269,163
Electric power and gas plants—1; assessed value	$64,210
Electric power lines—miles, 9; assessed value	$5,400
Telephone lines—7; assessed value	$27,900

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	320	$8,000
Stock	5,340	80,100
Dairy cows—Graded	1,560	54,600
Jersey	205	8,200
Calves	3,785	18,952
Swine	2,335	11,675
Horses—		
Thoroughbred	2	1,000
Standard-bred	160	40,000
Common	200	10,000
Colts	150	7,500
Jacks and jennies	2	100
Mules	40	2,000
Sheep	3,040	9,120
Lambs	1,000	1,500
Common goats	160	320
Total stock all kinds	19,299	$253,040

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	5	......	......
Butter, pounds		150,000	$37,500

Forest Products.

	Amount.	*Value.*
Charcoal, sacks	130,000	$5,200
Fuel, wood, cords	4,720	25,960
Posts, pieces	250	35
Four-foot wood, cords	780	5,460
Total value		$36,655

Power used for mills and manufactories in county—Steam, 25; electrical, 14.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	2,900	2,030	$62,930
Barley	4,900	1,960	48,400
Oats	5,600	1,680	45,360
Corn	3,500	3,781	85,306
Total cereals	16,900	9,451	$241,996
Alfalfa hay	540	2,700	$27,000
Grain hay	20,000	24,000	288,000
Total hay	20,540	26,700	$315,000

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	2,000,000	$13,000
Apricots	1,280,000	8,960
Blackberries	20,000	800
Cherries	382,000	19,100
Grapes	41,500,000	249,000
Loganberries	7,000	350
Pears	2,520,000	21,160
Peaches	3,360,000	21,840
Plums	643,400	6,369
Irish potatoes	240,500	2,405
Prunes	10,640,500	106,405
Strawberries	25,000	1,800
Totals	68,409,000	$450,189
Dried—	*Pounds.*	*Value.*
Apples	14,000	$770
Apricots	160,000	8,000
Pears	360,000	18,000
Peaches	560,000	22,400
Prunes	3,000,870	116,100
Totals	4,964,000	$165.270
Canned—	*Cases.*	*Value.*
Blackberries	28,125	......
Cherries	1,600	......
Grapes	5,000	......
Pears	28,125	......
Peaches	28,125	......
Plums	16,500	......
Clings	28,125	......
Totals	150,000	......

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Paper boxes	1	10	$10,000
Cement	1	200	2,650,000
Cooper-shops	2	8	20,000
Foundries and iron works	2	10	10,000
Leather goods	1	3	2,000
Planing mills	1	25	25,000
Tanneries	3	185	600,000
Gloves	2	281	510,000
Shoes	1	100	200,000
Shirts	2	115	180,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	47,000	8,450	55,430
Apricot	15,000	2,500	17,500
Cherry	31,000	2,380	33,380
Fig	2,000	230	2,230
Lemon	1,140	325	1,465
Nectarine	400	130	530
Olive	43,450	700	44,150
Orange	3,950	1,345	5,295
Peach	114,000	8,400	122,400
Pear	68,280	1,240	69,520
Plum	128,740	34,000	162,740
Prunes	130,000	46,050	176,050
Quince	6,500	400	6,900
Total fruit trees	581,460	106,130	697,590
Almond	50,000	1,800	51,800
Walnut	9,750	1,785	11,530
Total nut trees	59,750	3,585	63,330
Grapevines, acres	9,340	6.200	15,540

NEVADA COUNTY.

Nevada County is situated in that part of the State of California generally known and designated as the northern portion, although its county seat, Nevada City, is but 60 miles from the city of Sacramento. It has an area of about 1,000 square miles and is bounded on the north by Sierra County, on the east by the State line between California and Nevada, on the south by Placer County, and on the west by Yuba County. From the Yuba County line, Nevada County is hemmed in by the Middle Yuba and the Bear rivers, until their sources are reached. The South Yuba River heads in the high Sierras and runs across the county almost its entire length from east to west.

The climate is more varied than any other part of the State. On the rolling foothills of the western portion, where snow and frost are seldom seen, the elevation is slightly above sea level, while on the eastern boundaries are the snow-capped peaks of the Sierra Nevadas, with an elevation of nearly 8,000 feet.

The Southern Pacific Railroad skirts the southern boundary line of the county for over 30 miles from west to east. From Colfax, on the line of the Southern Pacific Railroad, a narrow gauge railroad leads through Grass Valley, the metropolis of the county, to Nevada City, the county seat, a distance of 22 miles. This line passes through some of the finest Bartlett pear and grape land in the West. Grass Valley and Nevada City, being only four miles apart, are also connected by an electric railroad.

The principal industries are farming, stock raising, fruit growing, and mining. Nevada County has two of the largest and best equipped electric power plants in the State, has a water supply system which is unexcelled, and which is essential to the mine operator, the farmer, and the fruit grower. It has a network of ditches, flumes, and water ways aggregating 1,000 miles in length.

In the production of gold, Nevada County has for the past forty years been unsurpassed. It has been a continual producer since the year 1849, during which period of time it has added to the circulating medium of the world the gross amount of $265,000,000, yielding for a number of years past an annual average of $2,250,000. For the year of 1907 the output was for gold $2,162,083, and for silver $17,505. Some of the mines of the county are working at a depth of 4,000 feet and have proven conclusively that in every instance where depth has been attained, the ore bodies and the values are equally distributed.

Copper deposits are also found within the county, and which are being prospected at present, and undoubtedly in course of time this county will take its place among the large copper producing counties of the State.

STATISTICS OF NEVADA COUNTY, 1907-8.

General Statistics.

Area, 1,016 square miles, or 650,240 acres.

Number of farms	520
Number of acres assessed	490,454
Value of country real estate	$2,528,555
Of improvements thereon	$1,562,055
Of city and town lots	$414,715
Of improvements thereon	$1,295,185
Of personal property	$986,445
Total value of all property	$6,786,955
Expended on roads, last fiscal year	$28,847
Expended for bridges, last fiscal year	$9,307
Number of miles of public roads	650
Road levy per $100, 1908	50c
Value of county buildings	$100,000
Irrigating ditches—miles, 1,000; cost	$4,223,760
Railroads, steam—miles, 53.63; assessed value	$1,199,853
Railroads, electric—miles, 5.7; assessed value	$47,200
Electric power plants—4; assessed value	$194,810
Electric power lines—miles, 76; assessed value	$37,550
Number of acres irrigated	340

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Alfalfa hay	200	500	$9,000
Grain hay	5,000	4,200	84,000
Grass hay	150	250	3,000
Total	5,350	4,950	$96,000

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	200,000	$5,000
Apricots	5,000	100
Blackberries	35,000	1,750
Beans	15,000	750
Beets	20,000	400
Cabbage	140,000	2,100
Celery	7,500	375
Corn	22,000	330
Currants	800	64
Cherries	20,000	1,200
Figs	18,500	370
Grapes	14,000	2,800
Loganberries	1,200	96
Nectarines	800	24
Onions	2,600	65
Oranges, boxes	90	180
Olives	600	30
Pears	900,000	18,000
Peaches	130,500	3,260
Peas	12,480	495
Plums	60,000	1,200
Irish potatoes	300,000	4,500
Prunes	145,000	2,900
Quinces	5,000	75
Raspberries	5,250	420
Strawberries	4,750	380
Tomatoes	25,000	625
Totals	2,217,070	$47,489

Dried—	*Pounds.*	*Value.*
Prunes	1,400	700
Walnuts	6,000	900
Totals	20,000	$1,600

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	13,380	1,245	14,625
Apricot	160	30	190
Cherry	290	90	380
Fig	310	30	340
Lemon	5	10	15
Nectarine	30	5	35
Olive	50	50	100
Orange	60	140	200
Peach	13,160	1,190	14,350
Pear	31,370	8,500	39,870
Plum	1,200	1,800	3,000
Prunes	6,170	460	6,630
Quince	150	.....	150
Total fruit trees	66,335	13,550	79,885
Almond	100	300	400
Chestnut	21	40	61
Pecan	5	.....	5
Walnut	250	900	1,150
Total nut trees	376	1,240	1;616
Grapevines	600	250	850
Berries, acres	30	10	40

Wines, Brandies, Etc.

	Gallons.	*Value.*
Sweet wines	8,500	$8,000
Beer, barrels	4,500	42,525
Vinegar	2,500	625

Number of wineries, 2; breweries, 5.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	......	......
Butter, pounds		86,544	$27,228

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	600	$18,000
Stock	3,085	61,700
Dairy cows—Graded	650	26,000
Jersey	80	4,800
Calves	1,383	13,850
Swine	450	3,150
Horses—		
Standard-bred	200	30,000
Common	1,450	145,000
Colts	180	9,000
Mules	45	4,500
Sheep	4,650	13,950
Lambs	1,500	3,750
Angora goats	350	875
Common goats	150	300
Total stock all kinds	14,773	$334,875

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	700	$3,500
Turkeys	20	600
Eggs	25,565	6,390
Total value		$10,490

Miscellaneous Products.

	Pounds.	*Value.*
Natural ice, tons	122,500	$306,250
Gold (1907)	.....	2,162,083
Silver	.....	17,505
Copper	22,082	4,418
Granite, cubic feet	12,840	9,300

STATISTICS OF NEVADA COUNTY, 1907-8—Continued.

Manufactories.

	No.	No. of Employes.	Value of Product.
Wood boxes	1	50	$55,746
Cigars	6	16	48,000
Confectionery	4	4	5,500
Foundries and iron works	3	30	100,000
Meat products—			
Hides		.....	11,600
Lard		.....	7,000
Paper	1	170	475,000

Manufactured Output.

	Quantity.
Cigars, thousand	1,000
Hides, pounds	110,476
Lard, pounds	56,000
Paper, pounds	15,830,000

Forest Products.

	Amount.	Value.
Area of scantily timbered lands, acres	19,000	......
Cedar, acres Pine, acres Fir, acres	19,000	......
Sawmills, number	5	......
Fuel, wood, cords	30,250	$151,250
Laths, thousand	1,200	2,800
Lumber, feet	26,995,092	458,720
Paper pulp, tons	9,000	247,500
Pickets, pieces	15,000	320
Posts, pieces	5,000	1,250
Shakes, thousand	880	8,800
Total value		$1,066.640

Power used for mills and manufactories in county—Steam, 20; electrical, 40.

ORANGE COUNTY.

Orange County is one of the youngest counties, having been organized in 1889 from a portion of Los Angeles County. Its area is divided into mountains, 65; foothills, 150, and valleys, 550 square miles.

The Santa Ana range of mountains is the line between Orange and San Bernardino counties at the northeast corner of the former county. It is also the dividing line between Orange and San Diego counties on the east. This range also sends up a line of foothills westwardly along the seashore nearly halfway across the county. All of the western portion of the county is included in the Santa Ana plain, or valley. There are also several small valleys among the foothills and along the mountain streams. The Santa Ana plain is covered with a rich loam, and, with the exception of some patches of alkali, is very productive. The highest point of land is what is locally known as Saddleback, or Santa Ana Peak, with an elevation of 5,675 feet.

There is an abundant water supply. The Santa Ana River enters near the northeast corner, and traverses the entire Santa Ana plain, flowing into Newport Bay. Besides this stream there is Santiago Creek; also Aliso, Trabuco, Mission Vieja, San Juan, and Coyote creeks, and other streams. The last-named creek forms the boundary between Orange and Los Angeles counties on the west. The artesian belt running through Orange County furnishes a plentiful and cheap water supply, and makes the section as nearly independent of rainfall as it is possible to be. Much artesian water has been developed; more in the artesian belt west of the river than in any other portion. There hundreds of artesian wells have been sunk, and the farmers have installed pumping plants and organized irrigation districts.

In the foothills a sharp, gravelly loam of a reddish color prevails. Descending into the valleys, this loam loses its color and its sharpness and becomes black, with a large admixture of adobe and frequent streaks of alkali. West of the Santa Ana River large deposits of peat are found, the product of tule roots and other swamp vegetation. This varies in depth from a few inches to sixteen feet. This land is considered the best for agricultural purposes, and is held at a high figure.

All the fruits do well. Many varieties of oranges and several of lemons are grown. Oranges are shipped from the last of December until June, and the bulk in March and April.

There are some portions where apples are grown which vie with those of the Eastern States in size, flavor, and appearance. It was only during the past few years that much fruit besides oranges and grapes was grown. Now, however, large orchards are annually being planted to almost every known variety.

Apricots, peaches, apples, oranges, lemons, figs, prunes, and walnuts do well, apricots especially holding front rank, with walnuts in the second place.

The larger amount of fruit produced finds a market in the East, the citrus fruits and walnuts being shipped entirely out of the county. The deciduous fruits are very largely disposed of to the drying establishments and packing houses, and by them shipped, both dried and green, to Eastern States.

The rich bottom lands yield immense crops of corn, and large portions grow the finest alfalfa and natural grasses.

The mesa, or uplands, are of the finest quality, and admirably adapted to barley, oats, wheat, flax, hemp, and the vine, as well as all the ordinary northern fruits.

Every character of soil that is found in California can be duplicated in these lands, and every product grown in the semi-tropics can be successfully raised.

Celery raising has grown to a very large industry, the output reaching 1.800 carloads.

While celery growing is occupying much attention, other sources of income are not neglected, and of these the most important are the dairy interests and the rearing of cattle and hogs.

The shipping of vegetables, consisting of early onions, potatoes, cauliflower, cabbage, etc., is a growing and profitable business.

The sugar beet is raised extensively, and a factory is located at Los Alamitos. This factory runs four months, and consumes the product of over four thousand acres, turning out millions of pounds of sugar ready for table use. The big sugar factories at Chino and Oxnard draw extensively from the soil of this county, thousands of tons of beets being shipped to these places from the vicinity of Anaheim, Buena Park, Garden Grove, Westminster, and Bolsa every year.

No business has developed more rapidly than the oil industry. North and east of Fullerton thousands of dollars have been expended in sinking wells, several of which have turned out to be gushers.

Santa Ana is the county seat. Anaheim is next in size, Orange following. Tustin is a charming suburb of Santa Ana, with splendid orchards, attractive homes and people of refinement. Fullerton is a place of much business and the headquarters of the oil industry of that section. El Toro is made up in a large measure of English settlers of wealth and progressive ideas. San Juan Capistrano, in the extreme south, is the seat of one of the largest and most interesting old missions.

STATISTICS OF ORANGE COUNTY, 1907-8.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	13,840	1,050	14,890
Apricot	174,220	273,370	447,590
Fig	2,500	.....	2,500
Lemon	77,250	33,370	110,620
Olive	23,000	.....	......
Orange	627,800	210,100	837,900
Peach	35,000	14,550	49,550
Pear	5,050	750	5,800
Plum Prunes	20.100	.....	20,100
Total fruit	978,760	533,190	1,511,950
Walnut	137.000	85,250	222,250
Grapevines	600	.....	......
Berries, acres	300	.....	......

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	5,225	2,870	$14,350
Barley	59,000	13,000	325,000
Oats	4,350	1,100	27,500
Corn	2,250	1,125	28.065
Total cereals	50,825	18,095	$394,915
Alfalfa hay	3,750	15,000	$150,000
Grain hay	24,300	24,300	243,000
Total hay	28,050	39,300	$393.000

Fish Industry.

	Pounds.	*Value.*
Various kinds	697,895	$27,916

STATISTICS OF ORANGE COUNTY, 1907-8—Continued.

General Statistics.

Area, 780 square miles, or 439,261 acres.

Number of farms	4,783
Number of acres assessed	439,261
Value of country real estate	$7,846,665
Of improvements thereon	$1,851,290
Of city and town lots	$3,055,395
Of improvements thereon	$2,166,470
Of personal property	$2,509,165
Total value of all property	$17,562,280
Expended on roads, last fiscal year	$56,008
Road levy per $100, 1908	40c
Value of county buildings	$121,000
Irrigating ditches, miles	125
Railroads — 3; steam, miles, 115.08; assessed value	$184,128
Railroads, electric—miles, 46.16; assessed value	$273,761
Electric power plants—1; assessed value	$56,230
Number of acres irrigated	35,685
Santa Clara Valley Irrigation Co., acres	17,121
Sierra, acres	1,600
Anaheim W. W. Co., acres	8,500
By pumping plants and artesian wells	8,464
239 plants	51,670

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	622,800	$6,228
Apricots	1,225,000	20,000
Blackberries, crates	5,860	8,790
Cabbage	6,552,000	16,380
Celery	1,903	402,896
Grapes, tons	5,400	81,000
Loquats, tons	70	4,900
Lemons, boxes	68,016	102,024
Loganberries	2,000	2,300
Oranges, boxes	753,675	1,135,130
Olives	550,000	37,500
Peaches	4,900,000	98,000
Plums	1,100,000	22,000
Irish potatoes, sacks	300,000	330,000
Sweet potatoes, sacks	40,000	50,000
Raspberries, crates	8,400	8,900
Strawberries, crates	21,030	23,133
Tomatoes, tons	7,184	57,472
Total		$2,406,653
Dried—	*Pounds.*	*Value.*
Apricots	2,820,000	$112,800
Beans, sacks	202,500	......
Peanuts	1,116,000	37,700
Walnuts*	6,624,575	294,950
Canned—	*Cases.*	*Value.*
Peaches	1,534	$3,068
Peas	750	3,000
Tomatoes	20,000	30,000
3-pound tins	775	1,550
Gallons	1,000	2,500
Taylor's assorted	11,000	85,000

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*Estimated 15 per cent raise over 1907.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	36,000	$9,000
Sweet wines	30,300	15,150
Beer, barrels	7,500	60,000
Brandy	1,960	2,940

Number of wineries, 5; distilleries, 1.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	......	......
Skimming stations	5	......	......
Butter, domestic, pounds		371,710	$101,513
Cheese, creamery, pounds		200,831	70,291
Condensed milk, cases		27,000	64,500
Cream shipped, gallons		85,120	127,680
Milk shipped, lbs.		2,515,564	37,734
Milk, domestic use, pounds		3,534,341	44.181

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	283	$5,660
Stock	9,038	132.970
Dairy cows—Graded	1,089	12.810
Devon Dutch Belted Guernsey Herefords Holsteins Jersey Polled Angus Red Polled	4,717	118.000
Heifers	515	5,150
Calves	2,825	14,075
Swine	2,500	20.000
Horses—		
Thoroughbred	48	9,600
Standard-bred	1,530	11,400
Common	2,813	140,700
Colts	1,635	49,050
Mules	1,186	53,370
Sheep	26,900	53,800
Lambs	8,250	4,125
Total stock all kinds	63,329	$630,710
Wool, pounds	260,000	$32.100

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	18,000	$90,000
Ducks	200	1,200
Geese	150	3,000
Turkeys	250	5,000
Eggs	2,520,000	630,000
Total value		$729,200

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 8,000	......	$14,000
Beeswax	5,000	1,250
Hops	500,000	30.000
Alfalfa seed	4,000	600
Sugar beets, tons*	29,000	......
Chili peppers, green, tons	300	30,000
Chili peppers, dry, tons	200	27,500
Bell peppers, tons	21	10,500
Green peas	1,540,000	87,000
Green beans	560,000	44,800
Crude oil, barrels	2,564,281	1,487,283
Apricot kernels	1,000,000	......

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*Los Alimitos sugar, 20,000 tons beets: factory acreage contracted, 2,782 acres: sugar made, 5,600,000 pounds; number of employees, 170.

About 9,000 tons of beets shipped to Oakland and Chino.

STATISTICS OF ORANGE COUNTY, 1907-8—Continued.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	1	.....	......
Brick	1	20	$33,750
Cigars	2	.....	......
Confectionery	3	.....	......
Flouring mills	1	10	215,000
Foundries and iron works	2	.....	......
Ice plant	1	10	*3,698,000
Nurseries	10	.....	......
Planing mills	4	69	......
Artificial stone and pipe	7	45	......

Manufactories—Continued.

	No.	*No. of Employes.*	*Value of Product.*
Marble	1	4	......
Sugar beet	§1	.....	......
Tiling	2	.....	18,000
Peat fuel	1	20	......

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*Pounds.

§Also one under construction.

Manufactured Output.

	Quantity.
Brick, thousand, per diem	15,000

PLACER COUNTY.

Placer County lies between latitude 38° 70′ and 39° 30′. Its direction is northeast and southwest. It is about 100 miles long and of varying widths, from 10 to 30 miles, the course and distance being defined by the course of the rivers which mark its boundaries. It extends from about 8 miles from the Sacramento River to the summit of the Sierra Nevada Mountains. Just above Auburn, between the Bear and American rivers, the county is very narrow, being but about 8 miles across. Above Auburn it widens out into the two divides lying between the Bear River and the Middle Fork of the American River. These are known as the Dutch Flat or Railroad Divide, and the Forest Hill Divide. The southwestern portion is more regular in shape than the part just described. This section contains the foothill and level agricultural lands. Its shape is nearly a parallelogram, the southwest two thirds being on the plains proper, and the southeast one third being the foothill and fruit district.

Of the area, 810 square miles are mountainous, 450 foothills, and the remainder valleys. The entire extent faces toward the west, extending from an altitude of some 40 feet on the plains in the western portion to over 7,000 feet at its eastern boundary line, embracing nearly every variety of climate known in the State. At the eastern boundary, separating it from the State of Nevada, is Lake Tahoe, one of the most picturesque lakes in America. The topography of Placer County is as irregular as is its shape. Imagine the whole Atlantic coast from Labrador to Tallahassee incorporated into one county, and one will have a fair idea of what may be found in Placer, exaggerated as to size, but not as to the great variety of climate, elevations, soils, and resources. As to the latter, the whole Atlantic seaboard can hardly equal the endless variety to be found within the borders of this county, which rivals Florida in the quality of its oranges, excels New Jersey in peaches, equals the New England States in its granite quarries, and compares favorably with Maine in the quality of its lumber.

From an elevation of about 2,500 feet up to the summit of the mountains snow falls in the winter, light at the lower edge of the line, and increasing in depth as it ascends the Sierras. Here is a strip of territory from the snow line up to an elevation of 3,000 feet, particularly well adapted to the apple, the pear, and a great variety of vegetables.

The soil of the western or valley portion is of the same general alluvial composition as all the soil in the Sacramento Valley, and is well adapted to the growth of grain. Over 30,000 acres are annually devoted to wheat, barley, oats, and hay. The low foothills back of Lincoln are excellent for the grape.

The soil of the valley lands is mostly a red loam, mixed with considerable clay in spots; that of the foothills is a gravelly red loam, in places light and sandy, and is excellent for the production of fruits.

Further up the soil changes to a red character, with a slate bedrock. This, too, is very fertile. The agricultural region includes the valley and foothill lands all the way from the western boundary to an elevation above Colfax. The foothills everywhere possess a soil which only needs cultivation. The granite soils around Newcastle are composed largely of clay, sand, soda, potash, lime, phosphorus, iron, and manganese. The constant decomposition that is going on appears to be of nearly endless duration, and of such a nature as to render the soil almost inexhaustible. Artificial fertilization has not yet been found necessary.

For an irrigation water supply, Placer has three sources—the Yuba, Bear, and American rivers. Including its branches, the Bear River irrigation ditch is 200 miles in length. This system has been increased in its capacity, and brings water from the Yuba River, so that an abundance is assured. There are several other canals, originally built for mining, but now used for irrigation.

Placer County holds a foremost position among the fruit producers, and it is the most easterly of the counties in California. With the Central Pacific Railroad running the entire length of her territory, she is one day nearer the Eastern market than any other part of the State, a very large item in the shipping of green fruit. In her thermal belt fruit ripens earlier than in most other places in the State, another large advantage, Pears, plums, prunes, apples, apricots, cherries, persimmons, pomegranates, quinces, and figs all do well. Peaches have been grown for the past twenty-five years, and failure of a crop is unknown. Fine oranges are produced, and Placer holds a position beside Butte in the northern citrus belt. In the production of small fruits, berries, and table grapes, Placer holds a foremost place.

The largest cherry trees in the world are at the ranch of Robert Hector, from one of which has been picked as high as 3,000 pounds in one season. At the Pan-American Exposition Placer won gold medals for peaches, oranges, and grapes. An exhibit of fifty oranges averaged twenty-four ounces in weight.

A lemon that was on exhibition at the Sacramento Chamber of Commerce measured 22 inches in circumference the small way, and weighed three and a half pounds.

Olive growing is a profitable industry. The principal orchards are provided with manufacturing plants and are producing a very fine quality of oil.

Dairying and stock and poultry raising are extensive industries. Butter making is carried on in the summer, the mountain ranges providing plenty of natural feed; the butter is of a very fine quality.

Considerable quantities of vegetables are raised, not only for local consumption, but also for shipment abroad.

Much sugar and yellow pine, fir, spruce, and cedar are found in the mountains, and the lumber output from that section has been very large for many years. Oak and scrub pine abound all over the foothills, and fuel is plentiful.

Placer County ranks well up among the mining counties. Her average yearly contribution to the world's wealth is something above the million mark. The total production since the discovery of gold at Auburn, May 16, 1848, is estimated at much over $75,000,000. The mining methods include drift, river, placer, and quartz. Placer's drift mines are among the largest in the world.

The granite quarries rank with the best in the United States. Nearly all the street curbing in San Francisco is from the Placer quarries, while the State Capitol is an example of the value and beauty of foothill granite.

Potter's clay is found in abundance at Lincoln, from which is manufactured sewer pipe, tiling, pressed brick, architectural terra cotta, and glazed brick for interior decoration.

Placer County is a natural sanatorium. As a resort for patients suffering from pulmonary diseases, leading physicians say it has no equal on the Pacific coast. It is here patients find relief, and some of them are cured. The altitude is just right for people suffering from asthma or bronchial diseases.

STATISTICS OF PLACER COUNTY, 1907-8.

General Statistics.

Area, 1,390 square miles.

Number of farms	679
Number of acres assessed	657,200
Value of country real estate	$3,711,435
Of improvements thereon	$1,187,225
Of city and town lots	$777,765
Of improvements thereon	$1,079,580
Of personal property	$1,141,395
Total value of all property	$7,993,695
Expended on roads, last fiscal year	$43,000
Expended for bridges, last fiscal year	$12,900
Number of miles of public roads	890
Road levy per $100, 1908	40c
Value of county buildings	$260,000
Irrigating ditches—miles, 195; cost	$149,915
Railroads, steam—miles, 131.47; assessed value	$3,888,730
Electric power plants—3; assessed value	$35,400
Electric power lines—miles, 80; assessed value	$45,000
Number of acres irrigated	13,940

Live Stock Industry.

	Number.	Value.
Cattle—Beef	1,500	$30,000
Stock	1,765	24,400
Dairy cows—Graded	2,719	70,580
Jersey	190	4,790
Calves	840	4,290
Swine	765	2,360
Horses—		
Thoroughbred	9	4,680
Standard-bred	7	1,750
Common	1,657	59,500
Colts	370	6,430
Jacks and jennies	47	890
Mules	260	10,100
Sheep	28,410	58,200
Lambs	2,600	2,470
Total stock all kinds	136,000	$278,440

Dairy Industry.

	No.	Production.	Value.
Creameries	4	76,200	$19,000
Butter, pounds		4,800	1,440

Miscellaneous Products.

	Value.
Flowers and plants, acres, 30	$30,000

Fruits, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples	245,000	$4,155
Apricots	531,075	15,621
Blackberries	105,500	3,375
Currants	2,350	220
Cherries	492,500	39,400
Figs	9,780	210
Grapes	1,794,300	53,829
Lemons, boxes	950	950
Loganberries	79,400	3,176
Nectarines	10,000	200
Oranges, boxes	69,790	68,700
Pears	3,964,200	59,463
Peaches	12,904,300	244,068
Persimmons	15,600	475
Plums	9,742,600	292,288
Quinces	17,900	179
Raspberries	36,750	1,470
Strawberries	129,890	6,494
Tomatoes	172,500	3,450
Dried—	*Pounds.*	*Value.*
Figs	8,990	$450
Peaches	29.470	1,070
Canned—	*Cases.*	*Value.*
Apples	470	$900
Apricots	160	320
Blackberries	600	1,200
Pears	940	1,880
Peaches	3,940	7,880
Tomatoes	4,000	6,000

Forest Products.

	Amount.	Value.
Area of timber lands, acres	100,000	......
Cedar, acres	1,250	$12,250
Pine, acres	7,150	66,550
Sawmills, number	3	38,000
Lumber, feet	13,400,000	132,500
Posts, pieces	20,000	1,600

Power used for mills and manufactories in county—Steam, 5; electrical, 4.

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines	131,250	$34,900
Sweet wines	122,900	30,400
Brandy	7,900	6,450
Vinegar	9,400	850

Number of wineries, 2.

STATISTICS OF PLACER COUNTY, 1907-8—Continued.

Manufactories.

	No.	No. of Employes.	Value of Product.
Cigars	2	10	$17,400
Confectionery	2	6	2,000
Olive oil	2	10	5,700
Pickles	..	.....	1,000
Sewer pipe	..	.....	300,000
Planing mills	2	10	20,000
Potteries	1	400	360,000
Granite, carloads	..	.....	390

Manufactured Output.

	Quantity.
Brick, thousand	2,000
Olive oil, gallons	2,500

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	18,400	4,200	$124,600
Barley	10,960	2,040	40,600
Oats	6,980	1,670	32,700
Total cereals	36,340	7,910	$197,900
Grain hay	31,300	38,740	$353,200

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	19,200	5,700	24,900
Apricot	12,100	7,190	19,290
Cherry	20,400	9,100	29,500
Fig	6,700	2,300	9,000
Lemon	1,140	275	1,415
Nectarine	7,490	2,700	10,190
Olive	41,200	10,100	51,300
Orange	37,080	12,160	49,240
Peach	989,100	586,200	1,575,300
Pear	104,300	49,700	154,000
Plum	617,100	168,900	786,000
Prunes	7,490	2,000	9,490
Quince	2,100	280	2,380
Other kinds of prunes	14,200	4,900	19,100
Total fruit	1,879,600	861,505	2,741,105
Almond	7,900	3,200	......
Walnut	790	180	......
Total nut	8,690	3,380	......
Grapevines	4,250	1,560	......

No information obtainable on acreage of berries, as all are in small tracts.

RIVERSIDE COUNTY.

Riverside is one of the youngest counties, having been formed in 1893 from the southwestern part of San Bernardino and the northern part of San Diego.

The progress of the county is practically confined to its northwest corner, embracing the largest orange-growing district in the world. The rest is largely an undeveloped desert region, believed to be a storehouse of useful minerals and metals.

The county recently has had exceptional progress and prosperity, and a considerable area of new land has been brought under cultivation. Many new orchards, both citrus and deciduous, have been set out.

Alfalfa has also been planted on a large scale.

The orange crop in the county is the largest in the State. The growing of citrus fruits is the main industry, although deciduous fruits of most kinds do well, particularly apricots and prunes. The olive thrives, and a very fine grade of oil is produced. Melons and cantaloupes are extensively grown and mature early.

Diversified farming is quite a feature in several sections. Alfalfa grows luxuriantly; broomcorn does well, and is a very prominent and profitable crop. The sugar beet thrives, and considerable new land has recently been put under cultivation.

Dairying is profitable, and modern creameries with the latest appliances are located in different sections. The stock used for dairying purposes is of a very high grade, mostly pure-bred representatives of the milk strains.

Considerable stock and hogs are fattened for market, and poultry raising receives considerable attention.

Bee keeping is another growing industry, and a fine grade of honey is produced.

In 1901 the city of Riverside completed a $40,000 steam-power plant, to generate electricity for power and lighting purposes. The sewer system has been extended and the streets extensively improved.

The Riverside Water Company is the chief of the companies that supply Riverside with its fine water system, that has a continuous and ample flow.

The rapid development of Strawberry Valley as a health resort has done much to stimulate local trade.

The importance of Perris has been increased by the rapid development of water and the consequent large acreage of new land put under cultivation. Thousands of acres in this vicinity have been planted to alfalfa.

Hemet has a large flouring mill, fruit-drying plant, and broom factory in successful operation. The shipments of olives are large. Fine raisins are produced in this section, and the grain industry is flourishing.

At Elsinore coal mines are successfully operated, and a superior quality of potter's clay is obtained in the vicinity. The domestic water system is owned by the city. Fine apricots, prunes, olives, and other fruits are raised. Seven miles distant is the Good Hope gold mine, with a stamp mill and cyanide plant. During the open season Lake Elsinore abounds with wild ducks of various kinds, making it an attractive place for sportsmen.

A modern and progressive colony has been established at Ethance, possessing what is undoubtedly the most perfect and complete private irrigation system in the State. The colony has an electric plant of the most modern type, which is utilized to generate power for pumping and lighting purposes. Broomcorn, sugar beets, and alfalfa produce profitable crops.

Indio is a little health resort that lies below sea level. A number of artesian wells have been developed, and much land in the vicinity has been placed under cultivation. Watermelons and cantaloupes are extensively grown.

STATISTICS OF RIVERSIDE COUNTY, 1907-8.

General Statistics.

Area, 7,000 square miles, or acres.	4,480,000
Number of acres assessed......	1,112,952
Value of country real estate....	$27,314,793
Of improvements thereon......	$7,469,759
Of city and town lots...........	$6,350,364
Of improvements thereon.......	$6,811,862
Of personal property...........	$6,052,674
Total value of all property.....	$53,999,452
Expended on roads, last fiscal year	$71,127
Expended for bridges, last fiscal year	$9,123
Road levy per $100, 1908........	50c
Value of county buildings......	$354,942
Irrigating ditches—miles, 130; cost	$2,500,000
Electric power plants—3; assessed value..................	$22,595
Number of acres irrigated......	35,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	3,659	.....	......
Apricot	66,952	.....	......
Cherry	1,502	.....	......
Fig	609	.....	......
Lemon	112,500	48,000	160,500
Olive	68,431	207,300	1,810,800
Orange	1,603,500	.....	......
Peach	59,084	.....	......
Pear	11,697	.....	......
Prunes	41,391	.....	......
Total fruit...	1,969,325	255,300	2,224,625
Almond	29,239	.....	......
Walnut	9,158	.....	......
Total nut.....	38,397	.....	......
Grapevines, acres	3,600	.....	......
Berries, acres....	30	.....	......

Forest Products.

	Amount.	Value.
Sawmills, number.......	2	$5,000
Fuel, wood, cords.......	10,250	61,500
Total value..................		$66,500

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	400,000	$8,000
Apricots	4,128,500	31,300
Blackberries	60,000	2,000
Cabbage	312,000	1,500
Grapes	907,000	18,000
Grape fruit...........	2,500	5,000
Lemons, boxes........	285,685	542,861
Loganberries	......	1,000
Oranges, boxes.......	2,017,440	3,502,431
Olives	1,767,000	35,000
Pears	660,000	13,000
Peaches	1,900,000	19,000
Plums	75,000	1,500
Irish potatoes........	4,400,000	44,000
Sweet potatoes.......	300,000	6,000
Strawberries	120,000	6,000
Tomatoes	200,000	15,000
Melons	......	50,000
Miscellaneous vegetables	......	75,000
Total		$4,376,532

Dried—	*Pounds.*	*Value.*
Almonds	53,700	$4,733
Apricots	473,650	28,419
Beans	120,000	4,800
Onions	5,000,000	75,000
Pears	56,000	3,360
Peaches	381,770	22,906
Plums .... Prunes	842,000	29,470
Raisins	210,000	8,410
Walnuts	95,000	9,500
Total		$186,598

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	5	.....	......
Skimming stations.	5	.....	$60,000
Butter, pounds...... ..		380,000	115,000
Cheese, pounds...... ..		70,000	1,050
Condensed milk, cases		60,000	24,000

STATISTICS OF RIVERSIDE COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	Value.
Cattle—Beef	3,500	$100,000
Stock	5,294	185,290
Dairy cows—Graded	772	57,900
Common	3,500	175,000
Calves	2,145	26,712
Swine	2,475	22,275
Horses—		
Common	6,154	549,270
Jacks and jennies	20	3,500
Mules	994	124,250
Sheep	11,114	44,446
Wool, pounds	89,062	9,850

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines	7,000	$5,250
Sweet wines	400,000	260,000
Brandy	75,000	120,000

Number of wineries, 5; distilleries, 1.

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 12,041	.....	$36,100
Beeswax	4,250	1,050
Honey	247,000	20,000
Alfalfa seed	53,000	9,300

Poultry and Eggs.

	Dozen.	Value.
Chickens	9,700	$58,200
Ducks	150	900
Geese	50	600
Turkeys	50	20,000
Eggs	700,000	175,000
Total value		$254,700

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	23,800	5,320	$176,240
Barley	76,700	19,204	537,712
Oats	3,117	1,003	45,162
Corn	250	230	6,440
Total cereals	103,867	25,757	$765,554
Alfalfa hay	11,700	72,000	$720,000
Grain hay	54,000	27,630	335,500
Total hay	65,700	99,630	$1,055,500

Manufactories.

	Value.
Brick	$23,200
Pressed brick	56,000
Carriages and wagons	7,500
Cigars	16,000
Foundries and iron works	125,000
Lime	21,000
Olive oil	18,000
Pickles	2,800
Pickled olives	1,250
Sewer pipe and potteries	265,000
Planing mills	150,000
Ice	75,000
Granite, 75,000 tons	75,000
Miscellaneous (10)	30,000
Total	$865,750

Manufactured Output.

	Quantity.
Brick, thousand	3,800
Cigars, thousand	400
Lime, barrels	16,800
Olive oil, gallons	10,000
Pickles, gallons	6,000

SACRAMENTO COUNTY.

Sacramento County is among the largest in the Sacramento Valley. It was organized by the first Legislature; within its confines is the seat of State government; the annual fairs of the State Agricultural Society are held in and near Sacramento City.

Its cities and towns are Sacramento, Folsom, Galt, Elk Grove, Florin, Oak Park, Walnut Grove, Isleton, Franklin, Cosumnes.

The area is almost all a rich alluvial plain from 30 to 75 feet above sea level, gradually rising from the rivers to meet the low rolling foothills of the Sierra Nevada Mountains; these foothills commence at the extreme eastern part, and are from 6 to 8 miles wide. There are no mountains, and aside from this foothill belt the surface has only gentle undulations.

The Sacramento River traverses the western boundary tortuously for about 90 miles across the rich bottoms, cutting them up at the lower part into numerous small and several large islands. The Sacramento is the longest and largest river in the State, and is navigable from Red Bluff to San Francisco Bay.

The American River rises in the upper Sierras, and enters the county at the northeast corner, among the low foothills. It flows in a southwest direction through the entire width, a distance of some 35 miles, and empties into the Sacramento just north of Sacramento City.

Geological indications prove that in remote ages the entire Sacramento Valley and a section of the foothills to an altitude of several hundred feet were portions of the bed of a vast inland sea or lake, and that into this lake the washings of the surrounding mountains were poured to form the present soils, which are made up of all the fertile mineral and vegetable elements in almost inexhaustible quantities. Many analyses have been made of these soils from the alluvial valleys, the upper lands, and the foothills; these analyses have demonstrated that the soils of this valley are unexcelled for fertility.

In addition to the numerous rivers and streams there is, underlying the entire area of the county, an inexhaustible supply of pure and excellent water for domestic and irrigating purposes. Throughout the greater portion this subterranean supply is easily appropriated by means of a light lifting power.

The first venture in agriculture in the Sacramento Valley was by General John A. Sutter in 1839. He received a concession of a large tract of land from the Mexican Government, and located his fort near the junction of the American with the Sacramento River. His first wheat field was a portion of the land now covered by Sacramento City.

He planted the first grape vines and fruit trees, and practically demonstrated the unsurpassed fertility of the soil of the great valley in the north.

Thousands of acres along the river bottoms and on the islands are used for the production of all kinds of vegetables, which are shipped

East by the carload and at times by the trainload. A great deal of this product is disposed of to the canneries in this and other counties.

Alfalfa grows luxuriantly without irrigation on all the rich bottom lands, producing from four to eight tons to the acre.

Fruits of all kinds are produced on any of the lands of the county, and particularly on the river bottoms and the islands.

The winter fruits are oranges, lemons, pomegranates, olives, and persimmons, which all ripen in November, December, and January. The Japanese persimmons grow to the size of apples. Olives are very profitable, both for pickling and for oil.

The spring fruits that mature and are marketed in April, May, and June embrace strawberries, raspberries, blackberries, and cherries.

At Florin, on the western division of the Southern Pacific Railroad. 9 1-3 miles south of Sacramento City, is the most productive strawberry belt in the State. Its product has a reputation for excellence all over the Western States. Tokay grapes from this district are shipped to Eastern markets through the local associations.

Apricots ripen early, and of all countries in the world, California is the only one that has made a thorough success of that fruit, and in this county it reaches its very finest development in size. flavor and productiveness.

A large number of varieties of pears are grown, chief among them the renowned Bartlett.

Plums are very profitable. They grow to large size, and are shipped in vast quantities to the Eastern and home markets.

Nectarines do well, and are cultivated to a considerable extent.

In the fall the fruit products are apples, pears, grapes. quinces, prunes, and peaches.

Sacramento County is preëminently the home of the grape, and on the red lands of the plains it reaches its highest perfection, particularly with irrigation. The table varieties include the Tokay, Muscat. Black Prince, Morocco, Emperor, and Cornichon. They always bring first-class prices for shipment to the Eastern markets. The wineries of the State handle quantities of some of these varieties.

French, or petite, prunes are a leading fruit. They are remarkably prolific, and when cured excel the imported article, and bring a much higher price in the markets of the world.

Figs grow in any part of the county, but on the river bottoms they reach great size, and are remarkably prolific. The Smyrna. or "fig of commerce," has been introduced and successfully grown.

Raisins are easily cured, the climate being peculiarly favorable.

Almonds have long been found a reliable and profitable crop. They can be grown in any part of the county.

The English soft-shell walnut has been demonstrated to be a profitable crop. Black walnut trees are extensively grown for shade and ornament.

Broomcorn is grown, as is also Egyptian corn—the latter making an excellent and cheap food for stock.

Hundreds of tons of beans of all kinds are produced on the river and island lands. The interior of Grand and Tyler islands is to a great degree devoted to their production.

Potatoes, both sweet and Irish, are grown in large quantities on the

bottom lands; of the latter, the average yield per acre is from 100 to 150 sacks.

Sacramento City, by reason of natural advantages, geographical relations to various producing sections, and admirable transportation facilities, deservedly bears the reputation of being the largest fruit and vegetable shipping point in the State. It is the recognized outlet for the products of the Sacramento Valley.

The dry atmosphere is specially suited for the drying of fruits, and the article so produced is regarded as first class in the markets of the world.

The California Fruit Canners' Association possesses at Sacramento one of the largest and most modern fruit and vegetable canneries in the world. This cannery is in operation during more months each year than any other in the State, beginning on asparagus the latter part of March, and running steadily for the succeeding eight months, ending the latter part of November on tomatoes and beans.

Sacramento County presents great opportunities to the livestock breeder and the dairyman. The climate is so even, temperate, and mild that animals remain in the open air, practically unsheltered, the year round without hardship. The soil, because of its richness, is peculiarly adapted to the growth of forage crops, especially alfalfa, which is at the same time one of the best and the cheapest of stock feeds. There are quite a number of creameries. Th average character of the dairy stock is fair, and is being constantly improved by the introduction of well-bred animals.

Hogs are raised generally by the farmers, and several breed pedigreed Poland-China, Berkshire, and Essex swine quite extensively. The breeding of pedigreed hogs has been very profitable.

The poultry business has steadily increased in importance in the last few years. Elk Grove, 15 miles south of Sacramento City, on the line of the railroad, and but 5 miles east of the Sacramento River, is the principal poultry district.

Near Sacramento City the raising of poultry is made a specialty by many, and with profit.

Along the Sacramento, American, and Cosumnes rivers are the most productive hop fields in the United States. Hop culture on this coast dates back to 1858. It was early demonstrated that the soil and climate of Sacramento County are unsurpassed for hop culture, and that it is the only place known where a crop of from 1,000 to 2,000 pounds per acre can be grown the first year the roots are planted. It is a common occurrence to grow 2,000 or 3,000 pounds on an acre of ground, and in some instances 4,000.

There are quite a number of wineries in the county. The output is shipped all over the world, and is principally disposed of in the United States, Central America, and the Islands. The port is not heavy in body nor dark in color, but is rather more delicate and lighter, having great character, and resembling closely the light, high-grade ports of Portugal. The county has a great reputation for fine sherry.

Few counties contain a greater mileage of railroads than does Sacramento. From the capital city the Central Pacific leads eastward across the continent; the California and Oregon passes to the north into Oregon, and thence to Washington, and also to the Eastern States. At

Galt a branch line runs up into the county of Amador; the California Pacific runs on the west of the Sacramento River to Oakland; and the Sacramento and Placerville passes along the American River through Folsom, and thence into the county of El Dorado. From most all of these roads branches extend into the various counties of the Sacramento Valley. The Western Pacific, a new transcontinental line, now being constructed, will run through Sacramento from north to south. From its geographical position Sacramento City is the natural railroad center of the central and northern portions of the State.

The Southern Pacific Company operates two steamboats that make daily trips between Sacramento and San Francisco, touching at the various towns and farm landings to receive and discharge freight. The Sacramento Transportation Company operates eight steamboats and twenty-five barges that are run between Red Bluff and San Francisco. They touch at all landings, and move a great part of the grain that is produced in the up-river counties, as well as all other kinds of freight. The Farmers' Transportation Company is controlled by an association of farmers. Its steamboats run between Colusa and San Francisco, making weekly trips.

Sacramento City, being the center and metropolis of a rich portion of the State, the heart of a vast railroad system, the point from which steamers pass to the north and to the south, and with unlimited water and electrical power at her very doors, presents advantages in manufactures excelled by no other city on the coast. Here are located the extensive shops of the Southern Pacific Company. For years the great power of the swift-flowing American was allowed to go to waste, but in 1888, at the Folsom State Prison. 22 miles from Sacramento City and in the county, a mighty granite dam was constructed across the river. At that point solid bluffs of rock rise on either side, affording a splendid site. The natural fall of the American gives as great a force as any other stream west of the Rocky Mountains, and the artificial assistance rendered by the dam creates added power. From the canal the water falls upon turbine wheels. Five generators produce the electric power, and it is transmitted to Sacramento City by four circuits on two sets of poles, so as to guard against breakages and accidents. The distance of the generators from Sacramento is 22.4 miles. The Sacramento Electric, Gas and Railway Company receives and controls this power. Each of the five generators produces 1,000 horsepower. In addition, the company receives current at 40,000 volts from the Bay Counties Company's power plant that is located on the North Yuba, 35 miles above Marysville. This power is transmitted to Sacramento over a circuit 64.2 miles in length. With the combined power so received the street car lines of the company in Sacramento City and suburbs are operated. The lighting of the city is from this source. It also furnishes an aggregate of over 3,000 horsepower for manufacturing purposes in and about the city.

The Central California Electric Company derives its power from abrupt drops in the canals of the South Yuba Water Company, located in Placer and Nevada counties. The water company has an immense storage system for municipal supply, irrigation, and water power, and maintains twenty reservoirs on the divide, or in the upper foothills. thirteen distributing reservoirs in the lower foothills, and four hundred miles of canal.

The natural fish in the rivers are salmon, sturgeon, pike, perch, hardheads, and dace. Those planted are striped bass, black bass, shad, and three kinds of catfish. The only fish propagated is the salmon, in the headwaters of the Sacramento. All of the planted fish have multiplied satisfactorily. In the open season large numbers of salmon and other fish are taken and sold in the local and San Francisco markets.

In the line of game, there are geese, ducks, quail, curlew, doves, and larks. All but the geese are protected. The ducks are mostly migratory. Of the non-migratory species are the mallard, spoonbill, and wood duck.

One can drive in any direction at any time of the year, with no inconvenience, over roads that favorably compare with the streets in many towns elsewhere in the State. All of the bridges and roads are free for travel.

On the American River, in what is called the Folsom District, dredge mining is being carried on. The area of gravel so far acquired for dredge purposes is about 5,000 acres. These mining operations are in the hands of people with plenty of capital and skilled engineers.

Sacramento City, the capital of California and the county seat of Sacramento County, is situated on the east bank of the Sacramento River. The distance by rail from San Francisco is 90 miles. The imposing State capitol building, that cost about $3,000,000, is one of the finest of its kind in the United States. It stands in the middle of a park of thirty-eight acres, almost in the heart of the city. The Federal building, of red sandstone, costing $150,000, accommodates the postoffice, the revenue and land offices, and the weather bureau station. The waterworks are the property of the city. The natural gas wells in the city yield an abundance of gas for domestic purposes—heating and cooking.

STATISTICS OF SACRAMENTO COUNTY, 1907-8.

General Statistics.

Area, 987.66 square miles, or 632,108 acres.	
Number of farms	1,800
Number of acres assessed	609,600
Value of country real estate	$15,066,580
Of improvements thereon	$1,757,320
Of city and town lots	$18,418,810
Of improvements thereon	$11,434,720
Of personal property	$8,512,311
Total value of all property*	$55,189,745
Expended on roads and bridges, last fiscal year	$123,867
Road levy per $100, 1908	33c
Value of county buildings	$473,150
Irrigating ditches, cost	$117,500
Railroads, steam—miles, 102.95; assessed value	$2,498,331
Railroads, electric—miles, 35; assessed value	$112,000
Electric power plants, number	2
Electric power lines — miles, 60; assessed value	$888,000
Number of acres irrigated	375,000

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*Does not include valuation of railroads amounting to $2,498,331 by the State Board of Equalization.

Forest Products.

	Amount.	*Value.*
Charcoal, sacks	30,250	......
Fuel, wood, cords	40,050	......

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	25,000	1,500	26,500
Apricot	60,000	30,000	90,000
Cherry	235,000	10,000	245,000
Fig	1,700	3,500	5,200
Lemon	5,000	1,500	6,500
Olive	20,000	7,500	27,500
Orange	35,000	28,000	63,000
Peach	350,000	20,000	370,000
Pear	325,000	51,000	376,000
Plum Prunes	350,000	90,000	440,000
Other kinds	25,000	2,000	27,000
Total fruit	1,431,700	245,000	1,476,700
Almond	71,000	32,500	103,500
Walnut	2,500	1,500	4,000
Total nut	73,500	*34,000	107,500
Grapevines	350,000	15,000	......
Berries, acres	2,000	.....	......

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*Under four years old.

Fish Industry.

	Pounds.
Salmon	1,034,250
Other kinds	1,102,725

STATISTICS OF SACRAMENTO COUNTY, 1907-8—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*
Wheat	49,000	20,075
Barley	14,250	7,065
Oats	105,600	21,240
Corn	900	538
Total cereals	169,750	48,918
Alfalfa hay	7,500	50,000
Grain hay	72,000	77,500
Total hay	79,500	127,500

Fruits, Vegetables, Etc.

Green—	*Total Production Pounds.*
Apples	401,200
Apricots	2,550,000
Asparagus	18,500,000
Blackberries	92,300
Beans	168,755,000
Beets	1,555,000
Cabbage	3,005,000
Celery	250,000
Corn	90,000
Currants	243,500
Cherries	100,000
Grapes	25,785,000
Grape fruit	4,000
Nectarines	15,525
Onions	30,025,500
Oranges, boxes	30,000
Pears	7,754,250
Peaches	13,750,000
Peas	270,500
Plums and prunes	13,500,250
Irish potatoes, sacks	1,278,500
Sweet potatoes, sacks	4,000
Strawberries*	28,907,525
Tomatoes	6,005,000

*Including raspberries and loganberries.

Dried—	*Pounds.*
Almonds	700,000
Apples	41,250
Apricots	425,500
Beans	130,005,000
Figs	47,250
Nectarines	13,000
Onions	30,005,000
Pears	275,000
Peaches	1,862,500
Peas	137,250
Plums and prunes	2,305,000
Walnuts	26,500

Canned—	*Cases.*
Apples	975
Apricots	30,875
Blackberries	1,600
Beans	460
Cherries	1,700
Grapes	10,000
Plums	3,680
Strawberries	2,500
Tomatoes	44,550

The above is a fair estimate of canned goods, as it was impossible to obtain records from canneries.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 2,000	......	$6,000
Beeswax	1,850	450
Flowers and plants, acres	35	......
Honey	70,240	5,620
Hops	5,387,642	......

Live Stock Industry.

	Number.
Cattle—Beef	32,550
Dairy cows—Graded	12,750
Calves	8,500
Swine	40,500
Horses—Thoroughbred	800
Standard-bred	1,500
Common	16,000
Colts	3,800
Mules	2,975
Sheep	74,000
Lambs	15,400
Wool, pounds	267,525

Wines, Brandies, Etc.

	Gallons.
Dry wines	1,537,500
Sweet wines	1,205,250
Beer, barrels	167,850
Brandy	400,500
Cider	250
Vinegar	300

Number of wineries, 8; distilleries, 8; breweries, 2.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	275,525	$1,502,100
Ducks	380	2,280
Geese	210	2,520
Turkeys	1,600	40,000
Eggs	1,006,575	200,000

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	10	......	......
Skimming stations	25	......	......
Butter, pounds		1,992,475	......
Cheese, pounds	14	743,850	......

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	2	15	......
Paper boxes	1	5	......
Brooms	2	18	......
Carriages and wagons	4	100	......
Confectionery	8	200	$100,000
Cooper-shops	2	8	20,000
Crackers	2	35	100,000
Electrical supplies	1	7	......
Flouring mills	4	130	790,000
Foundries and iron works	3	40	60,000
Furniture	2	60	100,000
Machinery	11	170	460,000
Malt	5	25	140,000
Meat products—			
Hides	..	.....	70,000
Meat packed	3	60	200,000
Tallow	..	.....	175,000
Olive oil	..	.....	70,000
Pickles	2	8	18,350
Pickled olives	..	.....	16,500
Iron pipe	1	50	250,000
Sewer pipe	2	12	25,000
Planing mills	7	150	400,000
Artificial stone	6	40	......

Manufactured Output.

	No.	*No. of Employes.*	*Quantity.*
Brick, thousand	1	80	22,600
Brooms, dozen	2	.....	10,000
Cigars, thousand	17	110	4,500

SAN BENITO COUNTY.

San Benito is larger in area than Rhode Island, with its population of half a million; this county has a population of about 6,000.

San Benito County is 95 miles south of San Francisco. It lies 25 miles inland east of the quaint old town of Monterey, and 15 miles east of Moss Landing, on Monterey Bay. The average precipitation is 12 inches annually, which all falls between November and April. In some of the valleys the rainfall is never less than 18 to 20 inches.

The county is 70 miles in length, and averages about 21 miles in width. From Tres Pinos south, the county opens out like a fan, stretching away for miles, following the course of the Tres Pinos Creek and the San Benito River. It is inclosed on two sides by mountains; on the east by the Mount Diablo or Mount Hamilton range, and on the west by the Gabilan range. From these ranges the surface slopes to the valley of the San Benito River, which flows northwesterly through the middle of the county and empties into the Pajaro River, which in turn empties into Monterey Bay, winding through a gap that gives to the county the refreshing ocean breezes.

Hollister, the county seat, is a beautiful town. It is well laid out with cement walks, graded streets, and magnificent shade trees; it has a sewer system, gravity system of water works, and electric light and gas works. The town is well supplied with schools and religious facilities. All the standard fraternal orders are represented by lodge meetings in fine lodge rooms supported by the town.

San Benito County has many elements vitally necessary to be considered in the selection of a home or place of business. Climate is one of its chief attractions. Proximity to the coast makes it a pleasant one, and the fact that it is not right on the coast renders it suitable for those who can not live too near the ocean. Sufferers from asthma, lung trouble or catarrh can here find a climate that will at least benefit, if not cure. Mineral springs of different kinds abound, and beautiful mountain scenery can be enjoyed from every front door.

The soil of San Benito County is chiefly sediment, light and loamy. The soil in the valleys is mostly a rich, deep, sediment or alluvium. This is particularly true around Hollister, in the San Juan Valley, and at San Felipe. Good public highways lead in and out of Hollister to the west, to the north, to the south, to the southeast, and to the east. These roads are all hard, well graded, and in good condition the year round.

In the southern part of the county are situated the famous New Idria quicksilver mines, the largest producer in the world.

In the way of gorgeous mountain scenery the county presents the Vancouver Pinnacles, the largest conglomerate mass of bowlders in the world, covering seven sections of land and rivaling in beauty the famous Yosemite Valley or the Grand Canyon of the Colorado.

In the Hollister and San Juan valleys poultry raising has become one of the leading industries, and it is successful beyond anticipation by reason of climatic conditions. The capital required for a start in the poultry business is infinitesimal. Newcomers, even though not experienced, have no difficulty in meeting with success.

The climate is peculiarly adapted to the successful raising of poultry. The trade winds reach the valley after passing over the distance from the coast shorn of their chill, yet cooling the heat of summer so that it is free from extremes, fog and winds. A person can take five acres in the San Juan or Hollister Valley, embark in the raising of poultry, give the business intelligent attention, and be in possession of a cash income three months after he has finished his improvements.

Hay is the main export. Hollister is the largest single shipping point in the State, the average shipments amounting to 25,000 tons annually. Hollister hay is shipped east to Chicago, New York, St. Louis, Cincinnati, Memphis, Lexington, and other points. The fine quality is due to superior climatic conditions—absence of fogs, extreme heat or cold, making a perfect sun-cured hay. The largest hay warehouses in the world are at the Hollister station, furnishing steady employment to several crews the year round.

Large quantities of grain are shipped, in addition to the large quantities retained at home for use as poultry food. Barley and oats are among the principal products.

There is also shipped a large amount of fruit, consisting principally of prunes, apricots, and pears. Walnuts and almonds are receiving some attention.

Other shipments are wine, hogs, cattle, horses, poultry, and eggs.

With San Benito recognized as the section preëminent for successful poultry raising, the already large business is bound to increase. The demand for incubators, brooders, and other appliances will justify the establishment of a factory here. The poultry business is a demonstrated success.

A thousand acres can profitably be set out in strawberries and other small fruits to fill the demand from nearby markets. For the vineyardist there is land at a low figure. Land can be rented on shares, the renter only taking the risk of labor and seed. Many of our prosperous farmers to-day secured their start by renting land.

The San Benito River furnishes winter irrigation to about 3,000 acres in Hollister Valley. This water is used in orchards and on dairy farms; one flooding generally suffices for the former, and two floodings generally keep the pastures green late into the summer. Where land can not be irrigated from the river, pumping from wells is resorted to. The average cost of pumping irrigation can be figured at $1.25 per acre. In almost every section a supply of water can be reached at an average depth of 80 feet. Fifteen miles south of Hollister is the site of an immense storage reservoir. This reservoir, catching and holding the flood water of the San Benito River, will furnish sufficient for summer irrigation.

In the foothills there is room for a hundred thousand beehives. The sagebrush bloom and countless varieties of wild flowers furnish nectar the greater part of the year.

Thousands of acres in the Hollister and San Juan valleys are suitable for seed farms. The seed farms now under cultivation in the vicinity of Hollister show conclusively that the industry is practical and successful.

Orchards are fast supplanting the hay and grainfields, and adding materially to the wealth of the county. Orchardists are making money wherever they give attention to the business. The San Juan Valley has 10,000 acres especially adapted to the raising of apples, with a market at every man's door. Apricots, prunes, peaches, walnuts, almonds, in fact every fruit, save tropical, can be grown with profit in any section that can be reached with water.

Among the varied industries of the county, that of dairying is rapidly forging to the front, adding to the wealth of the community generally, and making the dairymen independent. The standard feed is alfalfa, which grows to perfection. Underground streams of water are abundant in all sections of the county, and to the extension of the pumping system is largely due the development of the dairy business.

Scattered all through the county are innumerable cheese factories, some of them worked upon the coöperative plan, but others are individual enterprises. All are meeting with success. In one of the suburbs of Hollister there has recently been established the Alpine Evaporated Cream Factory. This installation requires many tons of milk daily to meet the demand for its product:

A careful estimate is given of the number of cows that can be kept upon an acre of alfalfa. Where the growth is vigorous and constant, a cow and a half to the acre will give the animal plenty of feed and allow of storing for winter, but the average is one cow to the acre. The best cows will net a profit of from $4 to $5 per month, or $50 a year upon the average. The climate of the county is ideal for this business.

Vegetable growing for markets outside of the State is an assured and popular occupation. All varieties of vegetables are grown to perfection with and without irrigation. The green vegetable shipments are principally cabbage, cauliflower, celery, onions, and potatoes. Truck gardeners plant and harvest every month in the year.

The raising of beets has met with success. It is one of the most important branches of agriculture, and gives promise of still greater development. The advantages are: early maturity of the beets, earlier opening of the campaign, longer season for harvesting, longer run of the factory, greater yield per acre, greater per cent of saccharine, immunity from frost and rain at critical periods. The sale of beets is contracted for at the time of planting. The tops are sold to dairymen.

In the artesian belt hop growing is quite an important industry, and the business is profitable. In the same section tobacco has been successfully grown.

The county produces quicksilver, lime, antimony, hematite, manganese, gypsum, coal, asbestos, and copper. Traces of gold and silver have been found in the mountain ranges. Within three miles of Hollister is an immense bed of pottery clay. In the eastern range ledges of copper have been found which have been pronounced by experts to be another Iron Mountain.

The Southern Pacific Company runs passenger trains daily between San Francisco and Hollister, also one freight.

Tres Pinos, 6 miles south of Hollister, is reached by two trains daily on the Southern Pacific. It is one of the most important shipping points of the county, being the depot for the product of the New Idria quicksilver mines, and the Cienega limekilns. It is the site of immense hay and grain warehouses. The shipments also include live stock, poultry, fruit, and general merchandise.

STATISTICS OF SAN BENITO COUNTY, 1907-8.

General Statistics.

Area, 1,056 square miles, or 676,000 acres.

Number of farms	1,160
Number of acres assessed	576,004
Value of country real estate	$3,968,085
Of improvements thereon	$674,255
Of city and town lots	$356,305
Of improvements thereon	$473,480
Of personal property	$1,295,940
Total value of all property	$6,768,065
Expended on roads, last fiscal year	$19,500
Expended for bridges, last fiscal year	$2,500
Number of miles of public roads	414
Road levy per $100, 1908	33c
Value of county buildings	$107,000
Irrigating ditches — miles, 20; cost	$50,000
Railroads, steam—miles, 24.45; assessed value	$398,858
Electric power plants—1; assessed value	$15,335
Number of acres irrigated	3,500
Pullman cars	1,173

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	6,500	1,260	$37,000
Barley	13,450	2,750	68,700
Oats	3,000	350	11,000
Corn	200	100	3,200
Total cereals	23,150	4,460	$119,900
Alfalfa hay	.....	2,500	$25,000
Grain hay	.....	26,000	283,800
Grain hay	.....	5,000	50,000
Total hay	.....	33,500	$358,800

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	17,000	.....	17,000
Apricot	36,000	.....	36,000
Cherry	2,200	.....	2,200
Peach	10,000	4,300	14,300
Pear	8,000	.....	8,000
Prunes	125,000	.....	125,000
Total fruit trees	198,200	4,300	201,500
Almond	4,500	.....	4,500
Walnut	400	.....	400
Total nut trees	4,900	.....	4,900
Grapevines	1,190,000	.....	.....
Berries, acres	100	.....	.....

Dairy Industry.

	No.	Production.	Value.
Creameries	2	......	......
Butter, pounds		14,460	$3,615
Cheese, pounds	5	340,000	44,370
Condensed milk, cases	1	95,000	760,000

Live Stock Industry.

	Number.	Value.
Cattle—Stock	16,116	$241,740
Dairy cows—Graded	2,483	62,000
Calves	6,880	68,800
Swine	3,190	8,870
Horses—		
Standard-bred	31	6,750
Common and American	4,262	167,030
Colts	1,590	36,325
Jacks and jennies	2	300
Mules	54	3,325
Sheep	15,400	38,500
Lambs	6,560	6,560
Common goats	40	40
Total stock all kinds	56,608	$638,240
Wool, pounds	80,000	$12,000

Fruits, Vegetables, Etc.

	Total Production. Pounds.	Value.
Green—		
Apples	2,000,000	$15,000
Apricots	50,000	625
Blackberries	20,000	1,000
Beans	4,000	120
Beets	6,000	80
Cabbage	200,000	2,000
Celery	20,000	400
Corn	150,000	3,000
Currants	20,000	1,000
Cherries	40,000	2,000
Grapes	4,800,000	28,000
Loganberries	25,000	1,200
Pears	1,000,000	7,500
Peaches	1,200,000	18,000
Plums	30,000	1,200
Irish potatoes	600,000	9,000
Raspberries	5,000	250
Strawberries	100,000	5,000
Tomatoes	2,000,000	5,000
Totals	12,270,000	$100,375

Dried—	Pounds.	Value.
Almonds	80,000	$7,200
Apricots	140,000	85,000
Onions	20,000	300
Prunes	3,200,000	90,000
Walnuts	40,000	4,000
Totals	3,480,000	$186,500

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines	78,000	$24,400
Beer, barrels	1,800	13,500
Brandy	1,000	1,600

Number of wineries, 1; distilleries, 1; breweries, 1.

Forest Products.

	Amount.	Value.
Fuel, wood, cords	4,000	$32,000

Power used for mills and manufactories in county—Steam, 10; electrical, 1; water, 1; gas and gasoline, 30.

STATISTICS OF SAN BENITO COUNTY, 1907-8—Continued.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	7,000	$35,000
Ducks	210	1,250
Geese	40	480
Turkeys	75	1,800
Eggs	821,000	240,000
Total value		$279,530

Manufactured Output.

	Quantity.
Cigars, thousand	300,000
Lime, barrels	500
Malt, tons	100
Hides, pounds	52,000
Lard, pounds	52,000
Tallow, barrels	100

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 150	.....	......
Honey	10,000	$1,200
Garden seed	275,000	100,000
Sugar beets, tons	7,200	36,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	2	4	$12,000
Confectionery	3	6	3,500
Lime	2	.....	500
Malt	1	.....	6,000
Meat products—			
Hides	4	9	6.000
Lard		.....	7,000
Tallow		.....	400

SAN BERNARDINO COUNTY.

San Bernardino is not only the largest county in California, but it is the largest in the United States. It is larger than New Hampshire, Vermont, and Rhode Island combined; larger than New Jersey, Delaware, Massachusetts, and Rhode Island combined; very nearly as large as Massachusetts, Connecticut, and New Jersey. There are eight states whose area is less than that of this county.

San Bernardino County is in the southeastern part of the State. The greater portion is desert. In the north is the Mojave Desert, and in the east, the northern end of the Colorado Desert; the arable portion being confined to the southwestern part—the San Bernardino Valley. This valley forms an almost perfect amphitheater, encircled by mountains and hills, open only on the west, allowing the sea breeze from the ocean to sweep its entire length.

Mount San Gorgonio is perpetually snow-capped, and from it is derived much of the water used for irrigation in the summer in the valley below, the remainder coming from the mountain range, giving a bountiful supply for irrigators. The combined waters of the streams, springs, and artesian wells make this valley one of the best watered in Southern California.

The forests on the mountain ranges furnish the supply of lumber and timber used in the valley.

Mount San Bernardino, from its distinctive cone, has been adopted by the United States surveyors as the initial point for land surveys in Southern California, both base and meridian starting from its peak.

The northern and eastern parts of the county are almost absolutely sterile. Yet, along the Mojave River, where it debouches from the mountains to the desert, and for many miles, the land on both sides is fertile, easily worked, and produces abundantly as long as the water supply is available.

The soil of San Bernardino Valley varies greatly with locality. In the eastern part it is a sharp gravel or sand, with a large admixture of alluvial deposits. West the soil changes to a heavy, dark loam, with occasional patches of adobe. Still farther west, the soil is of a lighter character, and possesses much more of the soda and potash constituents. Immediately about the city of San Bernardino the soil is a strong adobe, with appearances here and there of soda salts. Along the river bottoms the soil is a heavy clay, and in some places a black adobe. It is cold and damp, and not as suitable for fruit culture as for grazing and the growing of hay.

The rainfall varies a great deal, as does the climate. Passing from the lower levels to the high altitudes the rainfall increases. On the north and east of the mountain ranges, on the Mojave and Colorado deserts, the larger portion of the rainfall comes in July and August, with no rains during the winter. The rains are short, sharp, and heavy, frequently accompanied by thunder and lightning, which latter is almost unknown south of the mountains.

In the number and character of irrigation enterprises, the county stands in the front rank. It has been justly called the "Mother of Irrigation," because here was dug the first irrigation ditch in the State, and here were raised the first crops by irrigation. It is over a hundred years since the mission fathers of San Gabriel established an outlaying post, or sub-mission, just west of Redlands, and employed Indian labor to dig what is known as the zanja. This ancient ditch is still in use and within the same banks that were first thrown up by Indian labor almost a century ago.

There are hundreds of miles of canals and pipe lines, with thousands of miles of laterals and individual pipe lines. In addition to this, hundreds and hundreds of wells have been bored, each producing a flowing stream without other or further expense, which volume is sufficient not only to irrigate many thousands of acres, but also furnishes the magnificent supply which fructifies and renders fertile the great plain on which the city of Riverside stands.

Almost every variety of fruit can be produced in some part of this county. The only exceptions are those strictly tropical. In the mountain valleys and upon the upper plateaus, apples and cherries are grown. On the lower levels, all the deciduous fruits are produced. The production of oranges, lemons, and pomelos is large, these fruits being grown to perfection. The production of oranges has increased rapidly during the last few years. The first planting of orange trees were two set out by Anson Van Leuven in his dooryard in Old San Bernardino in the early sixties, and by M. H. Crafts at Crafton, at about the same time or a little later.

In the western part of the Rialto, Etmanda, and Cucamonga neighborhoods there is produced a large quantity of raisins. Another section of the county especially adapted to the culture of grapes is that about Hesperia, which lies along the Mojave River.

In the southwest corner of the valley is located the Chino Ranch, on which is the third largest beet-sugar factory in the world. The acreage devoted to sugar-beet culture is in the neighborhood of 20,000. The factory has a capacity of about 12,000 tons of refined sugar annually. The culture of sugar beets has been a profitable industry for the farmers. On this ranch are fattened thousands of head of cattle upon the beet pulp, which is siloed for that purpose.

Along the slope of the mountains, and in the mountain valleys and canyons, are numerous bee ranches, from which is produced a large amount of honey.

The raising of cattle and sheep is carried on along the mountain ranges and in the upper mountain valleys. Several large bands of sheep are grazed on the ranges. Dairying is carried on in both the upper and lower valleys. Pure-bred or grades of high-class dairy cattle are in general use. A stock company for the breeding of the most desirable classes of horses has a large ranch at Victor to be devoted exclusively to their raising.

Wheat, oats, and barley are grown in considerable quantities, and alfalfa is raised with profit.

Vegetables of nearly all descriptions are raised, the yield being large, and a growing shipping trade to outside markets has been established.

The northern and eastern portions are heavily mineralized, and although prospecting has been carried on for fifty years, new and greater finds are being made every year. Almost every known mineral has been discovered. Gold, silver, copper, iron, tin, lead, borax, soda, and nitrates are found in abundance and scattered over a wide area. Some of the richest silver mines in the State are in this county. Copper exists in great abundance. The high cost of freight; the scarcity of water, which renders the life of the prospector precarious, as well as interfering with the working of the mines; the scarcity and high cost of fuel—all combined have limited prospecting and retarded mining development. The building of railroads across the desert has partially removed some of these obstacles, and mining recently has been prosecuted with more vigor.

STATISTICS OF SAN BERNARDINO COUNTY, 1907-8.

General Statistics.

Area, 20,160 square miles, or 12,902,400 acres.	
Number of farms	5,300
Number of acres assessed	640,000
Value of country real estate	$8,542,455
Of improvements thereon	$4,161,440
Of city and town lots	$2,626,230
Of improvements thereon	$3,395,750
Of personal property	$1,965,290
Total value of all property	$20,691,165
Expended on roads, last fiscal year	$116,512
Expended for bridges, last fiscal year	$44,834
Number of miles of public roads	2,000
Road levy per $100, 1908	60c
Value of county buildings	$450,000
Irrigating ditches—miles, 420; cost	$3,675,000
Railroads, steam — miles, 916; assessed value	$13,319,530
Railroads, electric—miles, 50½; assessed value	$95,220
Electric power plants—5; as- assessed value Electric power lines—miles, 188; assessed value	$545,625
Number of acres irrigated	44,900

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	900	200	$6,000
Barley	6,300	2,800	70,000
Oats	100	75	2,650
Corn	1,050	500	15,700
Total cereals.	.....	.....	$94,350
Alfalfa hay	4,600	29,000	$406,000
Grain hay	21,000	24,000	369,000
Straw	.....	950	5,700
Total hay	.....	.....	$780,700

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines	1,085,000	$119,350
Sweet wines	365,000	73,000
Brandy	152,000	45,600
Vinegar	35,000	2,800
Grape juice	95,000	70,000
Total value		$310,750
Number of wineries, 10.		

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	3,010,000	$85,270
Apricots	6,640,000	59,750
Blackberries	83,000	8.125
Beans	......	25,500
Beets	......	19,500
Cabbage	......	58,500
Corn	......	28,500
Cherries	195,000	12,000
Figs	17,500	1,675
Grapes	94,000,000	398,800
Grape fruit	135,000	48,250
Lemons, boxes	294,300	729,128
Loganberries	17,000	1,700
Nectarine	7,000	220
Onions	325,000	6,000
Oranges, boxes	3,844,920	7,247,674
Olives	400,000	10,400
Pears	100,000	3,000
Peaches	10,450,000	78,375
Peas	......	18,000
Plums	160,000	4,200
Irish potatoes	5,520,000	51,950
Sweet potatoes	92,000	1,800
Prunes	400,000	5,000
Raspberries	15,500	1,550
Strawberries	145,000	12,200
Tomatoes	3,400,000	13,600
Melons	1,200,000	6,600
Total		$8,937,267

Dried—	*Pounds.*	*Value.*
Almonds	4,500	$680
Apricots	480,000	37,400
Beans	10,000	350
Figs	2,000	300
Nectarines	2,000	250
Onions	180,000	3,000
Peaches	506,000	18,975
Prunes	64,000	2,240
Raisins	3,600,000	101,650
Walnuts	20,000	2,900
Total		$167,745

Canned—	*Cases.*	*Value.*
Apricots	57,000	$131,100
Cherries	600	2,100
Pears	500	1,500
Peaches	114,000	285,000
Plums	3,000	7,500
Tomatoes	2,500	4,500
Miscellaneous	14,000	26,000
Total		$457,700

STATISTICS OF SAN BERNARDINO COUNTY, 1907-8—Continued.

Manufactories.

	No.	No. of Employes.	Value of Product.
Bookbinderies	1	2	$3,000
Wood boxes	3	52	174,000
Brick	3	9	18,600
Cement	1	200	720,000
Cigars	3	8	18,000
Clothing	10	32	61,100
Confectionery	8	21	55,600
Electrical supplies	1	150	180,000
Flouring mills	1	20	375,000
Foundries and iron works	7	57	180,000
Leather goods	4	11	25,000
Lime	..	.....	150,000
Machinery	..	.....	502,300
Meat products—			
Hides	..	.....	55,000
Lard	..	.....	17,275
Meat packed	..	.....	11,900
Tallow	..	.....	17,700
Olive oil	..	.....	25,000
Pickled olives	..	.....	30,100
Sewer pipe	7	17	21,300
Planing mills	9	45	165,000
Potteries	1	1	1,000
Soap	1	1	500
Artificial stone	4	5	14,200
Refined oil	1	.....	623,400
Granite	..	.....	3,000
Marble	..	.....	29,950
Sandstone	..	.....	2,500
Sugar, beet	..	.....	1,017,500
Tin and galvanized iron	15	39	95,800
Miscellaneous	..	.....	88,125
Feed mills	..	.....	372,500
Fertilizer	..	.....	375,000
Ice	..	.....	431,825
Total value			$5,861,175

Miscellaneous Products.

	Pounds.	Value.
Bees, hives	12,000	$36,000
Beeswax	5,000	1,250
Flowers and plants, acres	87	101,500
Honey	600,000	30,000
Alfalfa seed	8,000	1,200
Sugar beets, tons	16,500	84,150
Gold	.....	825,000
Silver	.....	82,000
Borax	.....	210,300
Crushed rock	.....	125,000
Marble dust	.....	12,500
Plaster	.....	27,000
Total value		$1,538,400

Forest Products.

	Amount.	Value.
Area of timber lands, acres	287,000	......
Cedar, acres	28,000	......
Pine, acres	259,000	......
Sawmills, number	3	$50,000
Charcoal, sacks	1,500	600
Fuel, wood, cords	7,700	41,200
Lumber, feet	9,700,000	189,000
Sash and door factories, number	1	16,000
Total value		$296,800

Power used for mills and manufactories in county—Steam, 35; electrical, 12; water, 5; gasoline, 8.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	17,500	800	18,300
Apricot	30,600	.....	30,600
Cherry	13,000	200	13,200
Fig	2,500	150	2,650
Lemon	215,000	5,200	220,200
Nectarine	2,200	175	2,375
Olive	53,300	350	53,650
Orange	2,725,300	475,000	3,200,300
Peach	12,150	.....	12,150
Pear	18,500	.....	18,500
Plum	2,300	.....	2,300
Prunes	2,800	.....	2,800
Other kinds	7,500	.....	7,500
Total fruit	3,102,650	481,775	3,584,525
Almond	1,200	.....	1,200
Walnut	5,200	1,575	6,775
Total nut trees	6,400	1,575	7,975
Grapevines	13,500	3,500	17,000
Berries, acres	62	.....	62

Dairy Industry.

	No.	Production.	Value.
Creameries	3	......	......
Butter, pounds	..	375,000	$112,500

Poultry and Eggs.

	Dozen.	Value.
Chickens	7,300	$32,850
Ducks	90	450
Geese	30	300
Turkeys	500	7,500
Eggs	725,000	188,500
Total value		$229,600

Live Stock Industry.

	Number.	Value.
Cattle—Beef	8,000	$226,550
Stock	6,425	141,300
Dairy cows—Graded	1,820	72,500
Calves	1,600	16,000
Swine	4,750	52,100
Horses—		
Thoroughbred	65	65,000
Standard-bred	225	52,000
Common	13,000	1,235,000
Colts	1,000	20,000
Mules	425	21,250
Sheep	20,000	80,000
Total stock, all kinds	......	$1,981,700
Wool, pounds	55,000	$3,450

Manufactured Output.

	Quantity.
Brick, thousand	3,000
Cement, tons	72,000
Cigars, thousand	360
Flour, barrels	75,000
Lime, barrels	130,000
Hides, pounds	591,500
Lard, pounds	132,100
Meat packed	85,000
Tallow, barrels	885
Olive oil, gallons	15,000
Pickled olives, gallons	35,000
Soap, pounds	24,000

SAN DIEGO COUNTY.

San Diego County occupies the southern part of the State, and has an area slightly larger than Massachusetts. The Pacific Ocean washes its shores for upward of 75 miles. The land rises gently from the ocean for a distance of about 50 miles to a chain of peaks forming the backbone of the county, descending again quite rapidly to the Colorado River Valley, the greater part of which is below sea level.

The arable portion of the western slope is divided into a series of irregular terraces or plateaus. The lower or coast terrace comprises a number of valleys with the intervening mesa. This large acreage is practically frostless. Next come a series of higher valleys, Poway Valley, varying in elevation from 400 to 500 feet. The third terrace, the altitude of which ranges from 1,000 to 2,500 feet, comprises the foothill region, with numerous smaller intervening valleys, nooks and glens. Next comes the mountain region. The area of tillable land in these valleys and mesas is approximately 600,000 acres, a still larger area being suited to pasturage and grazing. The elevation of the mountain valleys varies from 2,500 to 4,500 feet. They are chiefly devoted to stock raising, but many of them are well adapted to the growing of small fruits and vegetables and to diversified farming.

The arable soil of the county may be classed under two heads: granitic and adobe; though there is often a mixture of both, resembling adobe.

To the east of the mountains, in the delta of the Colorado, is the famous Imperial Valley. After many months of labor, and a large expenditure of money, a generous share of the flow of the Colorado River has been diverted into this great valley, the first delivery of water for irrigation being made in June, 1901, and so rapidly have the main canals and laterals been extended that many thousands of acres are now under cultivation, this rapid development affording employment and resulting in the building of homes for thousands of settlers, thus adding millions to the wealth of the county. The center of this wonderfully fertile section is reached by a spur from the main line of the Southern Pacific Railroad. The central town is Imperial. There is a good hotel, an ice factory, creamery, and other evidences of prosperity. What until recently was described in our geographies as the dreaded Colorado Desert bids fair to soon become the leading stock and dairy section of the great Southwest.

The intermountain region, the hills and valleys between the plains of Imperial and the western slope of the county, is rich in minerals, and affords excellent pasturage for several thousand cattle. The mineral wealth of San Diego County, though known to be great, is largely undeveloped, and offers an excellent field for the prospector and capitalist.

Lepidolite and amblygonite, containing lithia and other valuable products, exist in greater quantities than in any other known deposit in the world. San Diego is producing the finest tourmaline in the United States. The crystals are of exceptional hardness, possess exquisite delicacy of coloring, and when cut form gem-stones of great brilliancy. Kunzite, a new gem, not found in any other part of the world, was recently discovered at Pala, and is attracting a great deal of attention. Gem experts are manifesting a deep interest in the remarkable crystallizations found in San Diego County.

According to a bulletin on the "Climatology of California," recently published by the U. S. Department of Agriculture, San Diego County, has the heaviest and most reliable rainfall of any part of Southern California. The rainfall increases, and greater extremes of temperature occur, as you leave the coast, the higher mountain peaks being often covered with snow to quite a depth during a part of the winter.

Water is impounded mainly for the citrus orchards of the coast section, the higher valleys requiring but little or no irrigation for their crops of cereals, deciduous fruits, olives, vegetables, etc.

As an evidence that education keeps pace with the population, there are more than one hundred and fifty schoolhouses distributed through the county, the instruction in which is up to the usual high standard found throughout California.

The board of supervisors has done and is doing good work in the way of road building, the most distant and mountainous places being readily reached over excellent highways.

The orange, lemon, and pomelo, or grape-fruit, do well. The largest single lemon grove contains about 800 acres.

Raisin grapes are a profitable crop, and the industry has a bright future. The wine industry is large and growing.

Olive growers are making money. An olive grove, to be a commercial success, should be set out with a view to supplying pickling fruit, oil olives being treated as a by-product. The demand for pickled ripe olives is already in excess of the supply, and steadily growing.

Peaches, apricots, pears, quinces, plums, cherries, and other deciduous fruits do well. The mountain region around Julian has attained a special reputation for the crisp, finely flavored apples.

A good walnut orchard, properly located with reference to soil and water, is a safe investment. Small areas well suited to this crop may be found in different parts of the county—notably in the Tia Juana Valley. Almonds do well, and there are some thriving orchards.

San Diego County is celebrated for its deliciously perfumed and fine-flavored honey, which always finds a ready market at top prices. The apiaries are located for the most part among the hills and valleys back from the coast.

There is reason to believe that the cultivation of the silkworm may hold a most important part in the industrial development of San Diego County—the climatic conditions are so perfectly adapted to the delicate constitution of the worm, and the foliage of the mulberry may be had in such wholesome condition practically during the entire year. Many acres have been set out to mulberry trees, and those interested feel greatly encouraged over the outlook.

The dairy industry has shown a healthy growth, having trebled in the past four years.

The modern city of San Diego was founded by A. E. Horton in 1867. The situation is not only sanitary and attractive, but it also admirably adapted for a large ocean commerce. Numerous wharves extend into deep water, and in their neighborhood may be found lumber yards, planing mills, warehouses, foundries, etc. The electric street railway system is equipped with modern cars and complete in every respect. Water is provided in abundance, the supply and distribution being controlled by the municipality. The streets of the city are well lighted by electricity. The schools, private and public, have an excellent reputation. A fine, large opera house, perfect in its appointments, is on the circuit of the very best theatrical and operatic companies. There are also several smaller theaters. The different religious organizations worship in attractive edifices; secret societies and benevolent associations have their lodge rooms, and numerous musical and literary clubs are supported by an active membership. There are several strong banking institutions. The hotel accommodations are excellent, and there are a number of sunny modern lodging houses. San Diego is thrown into special prominence as being the first port of call on the Pacific coast of the United States north of Panama, and the magnificent bay, around the shores of which the city is built, will soon become an important naval rendezvous. The Government has concluded arrangements for the erection of a large coaling station here, and is fast completing the building of a modern military post at Fort Rosecrans, the big guns of which command the entrance to the bay.

Just across the bay from San Diego, ten minutes by ferry, is the peninsular city of Coronado, with its world-famous Hotel del Coronado and many beautiful homes.

National City, the second largest city, is situated on the southeast shore of the bay. The land here rises gently from the water front, and is admirably suited for the location of manufacturing establishments or other plants requiring a comparatively large area of level ground with good water frontage. There are a number of attractive homes within the city limits and nestling among the lemon and orange groves in the fertile valleys near by. The church and school facilities of the place are excellent. A large manufactory of citrus products is in successful operation, turning out citric acid, oil of lemon, lemon extracts, etc. There is also an olive oil factory, and its product is equal to the best.

Passing through Old Town, you come to Pacific Beach, a very attractive suburb of San Diego. The land is quite level near the ocean, affording one of the widest, smoothest, hardest, and most attractive beaches along the coast.

Escondido is some 35 miles northeast of San Diego, being connected by spur with the main line of the Southern California Railway. A large area of productive country is tributary to Escondido, from which are made shipments of hay, grain, cattle, hogs, oranges, lemons, raisins, wine, honey, chickens, eggs, butter, etc. The school and church accommodations of the place are excellent.

STATISTICS OF SAN DIEGO COUNTY, 1907-8.

General Statistics.

Area, 4,876.77 square miles, or 3,121,132 acres.

Number of farms	5,554
Number of acres assessed	1,423,171
Value of country real estate	$4,696,890
Of improvements thereon	$1,092,115
Of city and town lots	$13,938,637
Of improvements thereon	$5,724,995
Of personal property	$3,590,903
Total value of all property	$29,043,540
Expended on roads, last fiscal year	$46,755
Expended on bridges, last fiscal year	$24,937
Number of miles of public roads	5,000
Road levy per $100, 1908	60c
Value of county buildings	$475,000
Irrigating ditches and flumes—miles. 133 (estimated); cost	$3,420,000
Railroads. steam—miles, 192.97; assessed value	....
Railroads. electric—miles, 29.50; assessed value	....
Electric power plants—4; assessed value	$40,600
Electric power lines — miles, 89.71; assessed value	*$45,000
Number of acres irrigated (estimated)	14,000

*$20,000 included in plant.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	62,360	27,350	89,710
Apricot	47,610	3,700	51,310
Cherry	5,745	700	6,445
Fig	15,600	2,200	17,800
Lemon	266,000	35,600	301,600
Olive	229,100	21,500	250,600
Orange	107,000	4,000	111,000
Peach	90,300	43,000	133,300
Pear	17,850	10,000	27,550
Plum	10,750	10,000	20,750
Prunes	87,360	4,000	91,360
Other kinds	17,000	.....	19,350
Total fruit	956,675	164,400	1,121,075
Almond	8,280	1,100	9,380
Walnut	8,000	2,700	10,700
Total nut trees	16,280	3,800	20,080
Grapevines	2,288,000	549,500	2,837,500
Berries, acres	180	12	192

Wines, Brandies, Etc.

	Gallons.	Value.
Dry wines	430,000	$122,900
Sweet wines	150,000	75,000
Beer, barrels	40,000	310,000
Brandy	5,000	10,000
Vinegar	1,500	975

Number of wineries, 5; distilleries, 4; breweries, 1.

Fish Industry.

	Pounds.	Value.
Various kinds	1,900,000	$76,000
Salt fish	860,000	32,600
Pickled fish	225,000	8,250
Lobsters	83,200	14,150
Turtles	10,200	510
Totals	3,078,400	$131,510

Fruits, Vegetables, Etc.

	Total Production. Pounds.	Value.
Green—		
Apples	1,900,000	$47,500
Apricots	1,000,000	30,000
Blackberries	255,000	12,750
Beans	1,670,000	66,800
Cabbage	350,000	2,625
Cucumbers	16,000	320
Cauliflower	150,000	6,000
Corn	1,600,000	32,000
Cherries	100,000	5,000
Figs	16,000	480
Grapes	3,610,000	72,020
Grape fruit	2,600,000	30,000
Lemons, boxes	351,312	737,750
Loganberries	5,000	250
Onions	250,000	3,125
Oranges, boxes	99,840	159,745
Olives	3,682,000	128,870
Pears	103,250	2,065
Peaches	399,500	11,985
Peas	310,000	17,050
Persimmons	20,000	600
Plums	99,000	2,970
Irish potatoes	4,018,000	50,225
Sweet potatoes	252,000	3,780
Prunes	77,500	1,550
Quinces	2,000	60
Strawberries	726,000	36,300
Tomatoes	456,000	4,560
Rhubarb	18,000	540
Totals	23,076,250	$1,466,920
Dried—	*Pounds.*	*Value.*
Almonds	40,000	$5,600
Apricots	126,000	10,080
Beans	800,000	35,150
Peaches	16,000	1,280
Prunes	22,500	1,800
Raisins	4,180,000	188,100
Walnuts	80,000	9,600
Totals	5,264,500	$251,610
Canned—	*Cases.*	*Value.*
Olives, pints (48)	7,000	42,600
Olives, quarts (24)	8,000	8,400
Olives, gallons (12)	1,600	15,300
Olives (bulk), gallons	500	375
Olive oil, ½ pints (48)	300	2,880
Olive oil, pints (24)	600	5,400
Olive oil, quarts (12)	650	5,200
Olive oil, gallons	20,000	37,000
Totals	....	$147,155

Poultry and Eggs.

	Dozen.	Value.
Chickens	30,250	$143,688
Ducks	1,500	7,500
Geese	510	4,335
Turkeys	1,200	30,000
Eggs	1,200,000	360,000
Total value		$545,523

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 51,900	.....	$155,700
Beeswax	25,000	6,000
Flowers, cut	.....	18,000
Honey	1,000,000	55,600
Alfalfa seed	5,500	1,100
Eucalyptus trees, No.	1,000,000	9,000
Mineral water, cases	8,400	54,720

STATISTICS OF SAN DIEGO COUNTY, 1907-8—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	11,000	2,600	$88,400
Barley	20,000	6,860	198,940
Oats	3,900	910	30,940
Corn	2,000	465	15,810
Buckwheat	36,900	10,835	334,090
Alfalfa hay	1,425	5,700	102,600
Grain hay	40,500	40,500	607,500
———	......	680	5,400
Grass hay	3,500	3,500	22,000
Total hay	45,425	50,380	$741,500

Live Stock Industry.

	Number.	Value.
Cattle—Beef	11,070	$442,800
Stock	38,475	1,154,250
Dairy cows—Graded	740	37,000
Angus	80	8,000
Ayrshire	11,730	410,550
Herefords	8	400
Jersey	150	7,500
Calves	13,400	134,000
Swine	10,960	98,640
Horses—		
Thoroughbred	85	17,000
Standard-bred	1,850	231,250
Common	8,600	516,000
Colts	1,500	37,500
Jacks and jennies	40	3,200
Mules	1,000	125,000
Sheep	10,300	56,650
Lambs	4,200	12,600
Common goats	510	1,275
Total stock, all kinds	114,698	$3,293,615
Wool pounds, fleece	100,000	$25,000
Wool, pounds, pulled	100,000	10,000

Forest Products.

	Amount.	Value.
Area of timber lands, acres	43,260	$519,120
Cedar, acres	2,000	......
Pine, acres	17,200	......
Oak, acres	23,060	......
Fir, acres	1,000	......
Fuel, wood, cords	1,500	9,000
Fuel, wood, loads	5,650	28,000
Total value		$556,120

Power used for mills and manufactories in county—Steam, 110; electrical, 60; gasoline, 55.

Dairy Industry.

	No.	Production.	Value.
Creameries	4	.....	......
Skimming stations, (cream gallons)	4	7,000	$7,000
Butter, pounds	..	600,000	180,000
Dairies	250	.....	......

Manufactories.

	No.	No. of Employes.	Value of Product.
Bookbinderies	2	10	$10,000
Boat builders	8	34	36,600
Wood boxes	1	.....	25,600
Brick	2	38	18,700
Brooms	1	6	29,250
Carriages and wagons	5	25	231,000
Cigars	3	64	189,300
Clothing	..	.....	4,400
Coffce, spices, etc.	2	15	155,000
Confectionery	2	43	87,000
Foundries and iron works	6	110	150,000
Furniture	5	20	50,000
Jewelry	3	3	25,400
Leather goods	1	2	2,000
Trunks	3	9	22,000
Meat products—			
Hides	5	16	62,500
Lard	..	.....	6,720
Meat packed	..	.....	30,000
Tallow	..	10	24,000
Olive oil	..	.....	50,480
Cement	1	5	21,600
Boxes	6	215	25,600
Planing mills			597,400
Laths			4,950
Salt	2	56	90,625
Soap	1	1	4,000
Artificial stone	5	88	45,000
Crushed rock	..	.....	35,000
Granite and marble	2	25	30,000
Onyx	1	11	45,000
Onxy, rough			130,000
Tin and galvanized iron	3	25	53,000
Stoves	1	10	15,000
Gem cutting	8	20	65,575
Gem cutting, rough			377,150
Rubber stamps	1	2	4,800
Mattresses	..	6	20,000
Sal soda, citrus washing powder, insect powder, etc.	1	12	23,500

Manufactured Output.

	Quantity.
Brick, thousand	2,600
Brooms, dozen	9,000
Cigars, thousand	3,712
Smoking tobacco, pounds	11,480
Hides, pounds	500,000
Lard, pounds	56,000
Meat packed, pounds	240,000
Tallow, barrels	1,200
Salt	9,250
Soap, pounds	80,000
Citrus washing powder	295,400
Sal soda	120,000
Insect powder, etc	40,000
Planing mills, feet	22,580,000

SAN FRANCISCO COUNTY.

The county of San Francisco is consolidated with the city of the same name, and comprises a peninsula embraced by the waters of the Pacific Ocean on the west, and by the bay of San Francisco on the north and east. San Mateo County adjoins it on the south. Topographically it is a succession of hills, the highest of which is about 1,000 feet.

It has a population of approximately 400,000, and its industries are chiefly commercial, manufacturing, and shipping. There is no production of raw products to speak of.

STATISTICS OF SAN FRANCISCO COUNTY, 1907-8.

General Statistics

Value of city and town lots	$260,657,800
Of improvements thereon	$66,816,201
Of personal property	$100,361,602
Total value of all property	$427,834,608
Railroads, electric; assessed value	$18,192,460
Electric power plants—2; assessed value	$6,403,977

In the absence of an official report from San Francisco, we present some figures here from the New Year "Chronicle," which will serve to show that city's financial condition, and something of the business done there in farm and dairy products:

Financial.

The business of the San Francisco Clearing-house for each of the twelve months ending November 30, 1908, in comparison with the corresponding months of the previous years, makes the following showing:

	1906.	1907.
December..	$203,269,394 90	$124,329,252 93
	1907.	1908.
January ...	204,512,323 10	147,763,112 04
February ..	194,294,367 00	128,006,385 32
March	200,558,251 65	133,514,197 29
April	189,035,735 37	140,364,763 08
May	188,809,949 71	130,439,997 35
June	168,591,327 38	137,096,068 98
July	182,833,805 76	153,112,317 72
August	183,343,978 10	148,557,682 70
September .	169,804,814 37	149,375,975 70
October ...	201,241,688 01	170,825,027 47
November..	113,102,173 39	154,689,236 62
Totals ..	$2,199,398,318 94	$1,718,074,017 20

In consequence of the disturbed condition of the financial interests of the country during the past year the bank clearings show a decrease in volume. This is the first time San Francisco's bank clearings have failed to show a large increase in comparison with the preceding twelve months in many years past. The decrease is $481,324,301.71, but it is no greater proportionately than the decrease in all the leading cities of the country. The totals for previous years covering the same months are as follows:

Year.	Clearings.
1906	$1,992,301,370 75
1905	1,825,704,112 80
1904	1,528,794,564 75
1903	1,522,324,278 06
1902	1,342,927,204 34
1901	1,165,601,468 34
1900	1,023,396,017 96
1899	955,552,457 58
1898	812,213,159 43
1897	741,755,488 40
1896	684,991,100 00
1895	683,888,718 35
1894	656,166,660 26

The total clearings for the twelve months ending November, 1907, were the largest for any year in the history of the clearing-house, which was organized in 1876. The largest increase for any calendar year prior to 1907 was 1878, when the total was $195,380,516 in excess of the clearings of 1877. The largest monthly total on record was for November, 1906, when the amount was $218,367,450.77.

All balances in the San Francisco Clearing-house are settled daily in gold coin, no balance tags, due bills, or checks being permitted. By this system each day's clearings is complete in itself, and no part of it figures in the succeeding day's operations. There is no duplication of clearings in San Francisco.

STATISTICS OF SAN FRANCISCO COUNTY, 1907-8—Continued.

The bank clearings of all the Pacific and far Western cities of the United States, which have clearing-houses, for eleven months of 1908 make the following showing as compared with the corresponding months of the previous year:

Cities.	1907.	1908.
San Francisco	$2,005,128,803	$1,605,544,448
Los Angeles	553,568,853	452,552,721
Seattle	457,244,928	388,143,127
Portland	332,072,285	281,570,765
Salt Lake City	279,077,299	228,068,072
Spokane	279,792,481	276,772,377
Tacoma	225,440,096	196,257,434
Helena	44,850,859	36,598,632
Fargo	25,880,041	27,539,838
Sioux Falls	23,555,245	26,414,692
Oakland	134,487,376	69,161,880
San Jose	23,698,155	21,213,183
Total Pacific	$4,384,796,601	$3,609,837,079

Dairy Products.

The receipts of dairy produce in San Francisco for the twelve months ending November 30, 1908, as compared with the two preceding years, makes the following showing:

The quantities of butter coming to hand, in pounds, were as follows:

Months—	1906.	1907.	1908.
*December	582,786	713,330	945,500
January	627,400	768,100	1,017,100
February	974,505	932,200	756,900
March	2,070,119	1,273,600	1,133,300
April	851,614	1,547,800	1,771,020
May	....	1,534,400	1,393,400
June	....	1,348,400	1,506,900
July	247,341	1,525,000	1,381,700
August	1,305,268	1,262,700	1,027,500
September	667,889	1,391,000	889,800
October	728,200	1,310,500	998,700
November	1,095,839	934,500	745,200
Totals	9,150,961	14,541,500	13,567,020

*December, 1905, 1906 and 1907.

The quantities of cheese coming to hand, in pounds, were as follows:

Months—	1906.	1907.	1908.
*December	326,134	758,100	749,100
January	320,600	604,200	692,200
February	344,292	768,100	500,000
March	659,660	697,900	674,500
April	288,174	896,600	954,000
May	....	981,500	894,900
June	....	799,100	1,065,600
July	276,492	724,700	1,320,500
August	721,508	876,800	920,200
September	379,685	602,000	691,200
October	471,085	762,000	735,400
November	768,410	636,100	503,700
Totals	4,556,040	9,107,100	9,701,300

*December, 1905, 1906 and 1907.

The quantity of eggs coming to hand, in dozens, was as follows:

Months—	1906.	1907.	1908.
*December	336,180	474,450	462,300
January	377,220	418,200	633,980
February	891,600	1,125,990	763,800
March	1,729,950	1,645,380	1,109,430
April	270,440	2,099,610	1,620,330
May	....	1,590,450	1,165,470
June	....	847,580	1,019,730
July	90,750	875,900	947,430
August	136,290	932,440	643,500
September	84,970	493,410	581,280
October	119,980	605,407	741,090
November	137,030	488,150	658,820
Totals	4,174,200	11,597,030	10,339,170

*December, 1905, 1906 and 1907.

Commercial.

The values of San Francisco exports to and imports from foreign countries and the Atlantic States by sea during the past twelve years, from December 1st to the 30th of the following November, are shown as follows:

Years.	Exports.	Imports.
1897	$46,035,164	$39,819,591
1898	37,928,940	37,155,362
1899	37,618,300	44,575,170
1900	41,651,193	41,064,811
1901	40,084,500	36,235,690
1902	45,140,918	35,362,941
1903	51,095,805	36,517,895
1904	51,787,399	42,570,477
1905	67,274,980	44,310,800
1906	50,416,877	47,825,810
1907	30,403,656	55,104,213
1908	31,065,345	45,213,990

Flour and Grain.

For several seasons past the yield of wheat in California has been below the average of former years, and the yield for the last year was smaller than was expected on early indications.

The exports of wheat from San Francisco during each month of the year ending November 30, 1908, and for the three preceding years, were as follows, in centals:

Months—	1905.	1906.	1907.	1908.
December	225,529	2,821	68,730	247,749
January	138,853	28,640	50,626	512
February	1,373	57,410	13,771	133,088
March	2,266	42,850	13,990	177
April	1,870	3,612	780	468
May	1,472	2,160	514	583
June	2,328	1,470	1,696	243
July	1,691	2,416	752	394
August	5,853	6,000	2,876	222
September	14,183	31,370	426	311
October	10,369	20,262	13,983	13,868
November	1,384	45,378	108,983	252
Totals	407,359	244,389	282,797	400,867

SAN JOAQUIN COUNTY.

San Joaquin County spans the San Joaquin Valley in the central part of the State, and embraces the most of the famous San Joaquin delta within its limits. The various soil varies in texture, but is mostly level and well adapted for agriculture. The climate of this area is tempered by the currents of sea air rushing through the gap in the Coast Range, and is therefore exceptionally agreeable. The products are wonderfully diversified, and from its rank ten years ago of being the leading county in the production of wheat. barley and rye, it has intensified and diversified so rapidly that it now leads in the production of potatoes, asparagus, beans, wine and table grapes, orchard fruits, hay, and garden vegetables. Stockton, the county seat, is located in the center of the county and at the head of tidewater navigation in California. San Joaquin County has 400 miles of navigable waterways and more miles of railroad than any other county of Northern California, and is therefore very advantageously situated for convenient transportation. Stockton is a commercial and manufacturing center of great activity and promise, and claims distributing facilities of an unrivaled character. Four transcontinental railroads with their various branches center at its water front, and the construction of interurban lines to tap the tributary districts has now fairly begun.

Within the past nine years the number of farmers has increased 150 per cent., and the number of small farms (under 100 acres) has increased fourfold in San Joaquin County. The county has no debt and has $747,000 invested in fine buildings, including a handsome courthouse and a well-managed county infirmary. A movement is now on foot to improve 200 miles or more of county highways with macadam, and great strides are being made in all directions to improve the home conditions of its rapdly increasing rural population. It was remarkable of this county that the recent panic had little or no effect in disturbing its industries—so stable is their basis and so stable its products.

STATISTICS OF SAN JOAQUIN COUNTY, 1907-8.

General Statistics.

Area, 1,365 square miles, or 873,600 acres.	
Number of farms	4,282
Number of acres assessed	871,600
Value of country real estate	$17,358,825
Of improvements thereon	$3,444,734
Of city and town lots	$6,641,393
Of improvements thereon	$6,328,617
Of personal property	$5,216,150
Total value of all property	$39,960,978
Expended on roads, last fiscal year	$124,806
Expended for bridges, last fiscal year	$41,463
Number of miles of public roads	1,205
Road levy per $100, 1908	40c
Value of county buildings	$747,000

General Statistics—Continued.

Irrigating ditches — miles, 75; cost	$165,000
Railroads, steam—miles, 200.93; assessed value	$4,422,644
Railroads, electric—miles, 28; assessed value	$271,757
Electric power plants—2; assessed value	$23,038
Electric power lines — miles, 77¾; assessed value	$51,077
Number of acres irrigated	260,000

Fish Industry.

	Value.
Various kinds	$15,000

STATISTICS OF SAN JOAQUIN COUNTY, 1907-8—Continued.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	......	$8,500
Apricots	......	35,000
Asparagus, 6,000 acres	......	600,000
Blackberries	......	25,000
Beans, 18,000 acres	28,800,000	864,000
Beets	......	10,000
Cabbage	......	23,000
Celery	......	31,000
Cauliflower	......	12,000
Corn	......	11,400
Cherries	......	320,500
Figs	......	10,000
Gooseberries	......	500
Grapes, tons	57,287	1,730,000
Lemons, boxes	......	2,100
Loganberries	......	4,500
Nectarines	......	1,500
Onions, 1,200 acres	......	530,000
Oranges, boxes	......	12,250
Olives	......	52,600
Pears	......	28,800
Peaches	......	375,800
Peas	......	25,000
Plums	......	13,000
Irish potatoes, sacks	2,300,000	2,070,000
Sweet potatoes	......	22,000
Prunes	......	650,000
Quinces	......	3,500
Raspberries	......	2,300
Strawberries, 1,000 acs	......	13,800
Tomatoes	......	103,000
Melons	......	50,000
Total		$6,955,450
Dried—	*Pounds.*	*Value.*
Almonds	......	$78,500
Chestnuts	......	500
Figs	......	8,463
Peaches	......	55,750
Peanuts	......	4,500
Prunes	......	62,500
Walnuts	......	6,700
Total		$216,913
Canned—	*Cases.*	*Value.*
Cherries	4,000	......
Grapes	26,000	......
Pears	40,000	......
Peaches	220,000	......
Plums	60,000	......
Asparagus	20,000	$90,000
Total		$560,000

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	......	......
Skimming stations	40	......	......
Butter, pounds		2,010,000	$603,000
Milk sold for consumption		......	350,000
Total value			$953,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	29,054	$179,723
Ducks	275	2,750
Geese	260	3,105
Turkeys	1,563	23,450
Eggs	2,778,000	694,500
Total value		$903,528

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	13,000	2,000	15,000
Apricot	75,200	4,000	79,200
Cherry	35,500	10,000	45,500
Fig	7,000	1,200	8,200
Lemon	1,600	200	1,800
Nectarine	1,600	500	2,100
Olive	48,500	5,500	54,000
Orange	9,500	4,200	13,700
Peach	225,000	20,000	245,000
Pear	27,000	3,000	30,000
Plum	20,500	5,000	25,500
Prunes	50,300	11,000	61,300
Quince	3,000	1,200	4,200
Other kinds	.....	.....	1,500
Total fruit trees	517,700	67,800	587,000
Almond	141,300	7,000	148,300
Chestnut	105	55	160
Pecan	140	62	202
Walnut	6,300	19,000	25,300
Other nuts	.....	.....	110
Total nut trees	147,845	26,117	174,072
Grapevines, acres	16,980	19,843	36,326
Berries, acres	.....	350	452

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	2,000,000	$200,000
Sweet wines	1,250,000	281,250
Beer, barrels	1,450,000	362,500
Brandy	250,000	87,500
Total		$931,250

Number of wineries, 4 large and 100 small, 104; distilleries, 6; breweries, 2.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	42,100	22,103	$707,296
Barley	73,600	55,200	1,435,200
Oats	27,500	19,912	507,360
Rye	2,200	858	22,308
Corn	2,400	.....	100,800
Total cereals	147,800	97,953	$2,772,964
Alfalfa hay	26,325	157,950	$1,737,450
Grain hay	110,500	165,750	2,340,500
Grass hay	2,000	2,500	25,000
Total hay	138,825	326,200	$4,102,950

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	7,000	$40,000

Power used for mills and manufactories in county—Steam, 24; electrical, 64; natural gas, 11; gasoline, 12.

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 2,400	......	$4,800
Beeswax	2,500	125
Chicory	6,000,000	48,000
Flax	......	6,000
Flowers and plants, acres	5	4,500
Honey	5,000	2,500
Total value		$65,925

STATISTICS OF SAN JOAQUIN COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	6,540	$191,000
Stock	.....	511,000
Dairy cows—Graded	.....	500,000
Holsteins	40	4,000
Shorthorns	35	3,500
Calves	6,700	46,900
Swine	38,700	76,000
Horses—		
Standard-bred	14,490	1,449,000
Common	5,480	330,000
Colts	3,510	75,000
Mules	5,700	650,000
Sheep	45,680	135,000
Lambs	1,500	1,400
Common goats	100	200
Total stock all kinds	165,225	$3,974,100
Wool, pounds	168,000	$27,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Art goods	3	12	$15,000
Bookbinderies	6	130	255,000
Awnings	1	15	28,000
Bags and tents	1	60	130,000
Brick	4	171	220,000
Bakeries	7	70	175,000
Brooms	1	4	7,500
Buhach	1	7	30,000
Carriages and wagons	8	75	160,000
Boats	4	55	122,000
Boilers	1	5	5,000
Cigars	3	9	15,000
Chicory	1	12	270,000
Clothing	14	45	90,000
Gloves	1	55	63,000
Dredgers	1	80	220,000
Confectionery	4	25	50,250
Cooper-shops	2	8	5,500
Ice	1	7	25,000
Harness	4	25	51,400
Electrical supplies	3	20	25,000
Flouring mills	4	225	4,500,000
Foundries and iron works	4	175	427,500
Fence wire	1	20	37,000
Furniture	5	20	57,000
Jewelry	4	12	21,000
Leather goods, fancy	1	6	9,000
Ladders	1	5	7,500
Machinery, farm and traction	9	380	1,672,000
Mineral water	1	4	1,200
Medicines	4	15	45,000
Mealfalfa	1	6	30,000
Macaroni	4	15	45,000
Meat products— Hides Lard Meat packed Tallow	6	75	225,000
Olive oil	5	45	27,000
Patterns	1	2	4,500
Plows	2	17	13,700
Pickled olives	2	8	4,500
Planing mills	8	220	563,600
Potteries	1	3	2,500
Soda water	1	2	4,000
Salt	1	4	2,000
Soap	1	7	41,000
Trusses	1	1	1,500
Artificial stone	2	50	5,500
Grape juice	1	27	75,000
Tanneries	1	75	455,600
Tin and galvanized iron	2	21	12,000
Wire screns	1	4	6,500
Wind mills	1	15	45,000
Beverages	112	200	931,250
Creameries	3	35	603,000
Canneries	2	600	560,000
Totals	269	3,346	$12,624,750

SAN MATEO COUNTY.

San Mateo County adjoins San Francisco on the south, and being on the peninsula, is the natural outlet for San Francisco's surplus population. During the past three years 357 tracts have been subdivided into lots, and thousands of homes erected, both in the Santa Clara Valley on the east of the mountains, and on the ocean or coast side of the county.

Two suburban railroads are now in course of construction through the entire length of the county. These railroads will open up to commerce large fertile sections of the county. The Bay Shore cut-off on the Southern Pacific is completed, which shortens the time thirty minutes to and from San Francisco and all points south of the cut-off. The Dumbarton bridge and cut-off across San Francisco Bay, east of Redwood City, is nearly completed. This will greatly facilitate the handling of railroad traffic into and out of San Francisco.

Several factories are established along the bay line of the county. Factory sites, ideal locations, are plentiful and many are soon to be utilized.

This county furnishes most of the vegetables, milk and dairy products used in San Francisco.

San Mateo County's tide lands produce the finest oysters, and are utilized by a large oyster company.

The Alaska Codfish Company has a large establishment on the shore line of the bay, where codfish are cured and packed for market.

San Mateo County has grown 34 per cent in population in two years. It, being on the peninsula on which San Francisco is situated, is the only suburban country in or around the vicinity of San Francisco that can be reached without crossing water.

The Dumbarton cut-off, on the line of the Southern Pacific, is now practically completed, whereby the passengers on all overland trains may land in San Francisco without crossing the bay on ferries.

The shore line of San Mateo County on the bay side affords great facilities for transporting manufactured goods, and factories are taking advantage of cheap land, the railroads on one side and shipping on the other.

The Ocean Shore Railroad is being rushed on the westerly side of this county, and in a short time will be completed between Santa Cruz and San Francisco.

STATISTICS OF SAN MATEO COUNTY, 1907-8.

General Statistics.

Area, 477 square miles, or 305,280 acres.	
Number of farms	546
Number of acres assessed	293,842
Value of country real estate	$10,016,380
Of improvements thereon	$3,155,480
Of city and town lots	$6,526,130
Of improvements thereon	$2,098,425
Of personal property	$2,909,355
Total value of all property	$24,705,770
Expended on roads, last fiscal year	$99,107
Number of miles of public roads	750
Expended for bridges, last fiscal year	$15,973
Road levy per $100, 1908	50c
Value of county buildings	$123,000
Railroads, steam—miles, 41¾; assessed value	$701,033
Railroads, electric — miles, 14; assessed value	$154,000
Electric power plants—3; assessed value	$250,000
Electric power lines—miles, 61; assessed value	$34,200

STATISTICS OF SAN MATEO COUNTY, 1907-8—Continued.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	25,000	$250,000
Redwood, acres	25,000	125,000
Sawmills, number	5	75,000
Fuel, wood, cords	2,500	15,000
Lumber, feet	12,000,000	240,000
Shingles, thousand	8,000,000	16,000
Total value		$1,596,000

Power used for mills and manufactories in county—Steam, 22; electrical, 13.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	39,000	5,400	44,400
Apricot	2,600	.....	2,600
Cherry	250	.....	250
Fig	100	.....	100
Olive	9,900	.....	9,900
Orange	200	.....	200
Peach	1,100	.....	1,100
Pear	950	.....	950
Plum	150	.....	150
Prunes	12,590	1,600	14,190
Total fruit trees	66,840	7,000	73,840
Almond	500	.....	.....
Walnut	800	.....	.....
Total nut trees	1,300		
Grapevines	182,000	1,000	183,000
Berries, acres	170	.....	170

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,390,000	$25,000
Apricots	900	450
Blackberries	1,400	102
Beans	350,000	17,500
Beets	200,000	1,000
Cabbage	19,000,000	190,000
Celery	250,000	16,000
Cauliflower	6,000,000	60,000
Corn	90,000	1,450
Grapes	50,000	1,000
Onions	225,000	4,500
Peas	275,000	13,750
Persimmons	3,250,000	32,500
Strawberries, cases	160	1,280
Tomatoes	90,000	900
Total		$365,432

Dried—	*Pounds.*	*Value.*
Beans	1,120,000	$33,600
Onions	111,000	3,150
Prunes	58,800	2,800
Total		$39.550

Miscellaneous Products.

	Pounds.	*Value.*
Flowers and plants, acres	400	$400,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	6,000	$24,000
Ducks	150	675
Geese	50	600
Turkeys	80	1.120
Eggs	180,000	36,000
Total value		$62,395

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	1,200	$36,000
Stock	3,200	80,000
Dairy cows—Graded	12,500	312,500
Holsteins	700	28,000
Jersey	350	14,000
Shorthorns	430	21,500
Calves	6,900	34,500
Swine	7,500	45,000
Horses—		
Thoroughbred	260	130,000
Common	2.050	102,500
Colts	300	6,000
Mules	50	3,000
Sheep	2.500	12,500
Lambs	400	800
Common goat	150	750
Total value		$722,650
Wool, pounds	9.000	$1,800

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	2	......	......
Butter, pounds		450,000	$90,000
Cheese, pounds		640,000	96,000
Milk, gallons		1,400,000	280,000
Cream, gallons		9.500	5,700

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	1,400	1,098	$43,920
Barley	1,500	1,340	44,000
Oats	12,200	7,864	300,000
Corn	40	22	......
Total cereals	15,140	10.324	$387,920
Grain hay	3,000	23.360	$325,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	58,000	$12,180

Number of wineries, 6.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	3	13	$20,000
Confectionery	5	9	7,000
Foundries and iron works	1	130	......
Meat products—			
Hides		500	230,000
Lard			456,000
Meat packed, tons			2,600
Tallow			160,000
Olive oil		.....	300
Planing mills	9	91	2,200,000
Potteries	1	130	1,325,500
Salt	2	50	150,000
Tanneries	2	281	1,510,000
Fuse works	1	41	100,000
Paint works		175	......

Manufactured Output.

	Quantity.
Brick, thousand	2,158,000
Cigars, thousand	57,140
Hides, pounds	920,000
Lard, pounds	6,514,000
Meat packed, tons	2,600
Tallow, barrels	8,500
Olive oil, gallons	150
Salt, tons	3,000

SANTA BARBARA COUNTY.

Santa Barbara County is located on the California coast in the parallelogram where Point Conception marks the change in the coastal trend. It is very mountainous, and is divided by mountains into five great natural divisions. The southern of these contains the city of Santa Barbara and two thirds of the county's population. The city has a population of nearly 13,000, and is located on an excellent harbor. Near by are Carpenteria and Goleta, the home of the lima bean and walnut. In the interior of the county is the Santa Ynez Valley, with a population of about one thousand. This valley is large, but owing to the lack of water is cultivated only for grain and hay. Just west of this, across the low hills of the Santa Rosa Rancho, is the fertile Lompoc Valley. Here is one of the richest sections of agricultural lands in California. Crops of all kinds can be raised here in abundance. The valley is populated by about 4,000 thrifty and prosperous people. To the northeast and across the Santa Rita and Purissima Hills is the Los Alamos Valley, with a small population, devoted chiefly to grain raising. Just north, and drained by the Santa Maria River, is the Santa Maria Valley—30 miles long and 3 to 10 miles in width. It has a population of about 7,000, and contains several towns, chief of which is Santa Maria. Beets, beans, grain, and poultry are the chief farm products. The greatest industry, however, is that of oil—8,000,000 barrels being produced in the field south of Santa Maria during the past year. The county has two rivers (neither navigable), the Santa Maria and the Santa Ynez. Alcatraz, an oil port 27 miles west of Santa Barbara, and Santa Barbara itself, are the only landing places for large vessels. An area equal in acreage to nearly three fourths that of the assessed acreage of the county is contained within the United States Forest Reserve. There are two steam railroads, and in the Santa Maria Valley the beet sugar industry has developed an electric railway system for freight purposes. The Southern Pacific Railroad traverses the entire county around its southern and western boundaries, and the Pacific Coast Railway serves as an outlet for the Santa Maria, Los Alamos, and Santa Ynez valleys.

STATISTICS OF SANTA BARBARA COUNTY, 1907-8.

General Statistics.

Area, 2,630 square miles, or 1,839,532 surveyed acres.	
Number of farms*	1,300
Number of acres assessed	1,079,122
Value of country real estate	$8,949,055
Of improvements thereon	$1,253,395
Of city and town lots	$4,112,725
Of improvements thereon	$3,860,320
Of personal property	$4,257,715
Of money and solvent credits	$167,870
Total value of all property, exclusive of railroads	$22,601,080
Road levy per $100, 1908	40c
Expended on roads, last fiscal year	$80,000
Expended for bridges, last fiscal year	$45,000
Number of miles of public roads (estimated)	2,000
Value of county buildings and grounds	$200,000
Railroads, steam—miles, 155.07; assessed value	$2,723,281
Railroads, electric—miles, about 20; assessed value	$42,150
Electric power plants and lines—4 (2 assessed); assessed value	$42,600
Number of acres irrigated, approximately	10,000

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*1,342 men engaged in farming about nurseries.

STATISTICS OF SANTA BARBARA COUNTY, 1907-8—Continued.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	20,650	1,845	22,495
Apricot	2,630	1,390	4,020
Cherry	1,000	.....	1,000
Lemon	105,315	31,680	136,995
Olive	24,940	9,715	34,655
Orange	715	340	1,055
Peach	6,315	1,370	7,685
Pear	1,180	340	1,520
Prunes	1,180	260	1,440
Total fruit trees	163,925	46,940	210,865
Walnut	29,315	22,910	52,225
Berries, acres	60	10	70

Fruits, Vegetables, Etc.

Green—	Total Production. *Pounds.*	*Value.*
Apples	1,200,000	$12,000
Blackberries	125,000	8,000
Beans, dried	13,260,000	460,000
Beets, sugar	28,000,000	1,400,000
Corn	1,000,000	5,000
Cherries	15,000	1,200
Grape fruit	500	500
Lemons, boxes	90,000	200,000
Loganberries	50,000	3,000
Onions	4,750,000	16,000
Oranges, boxes	2,000	3,000
Pears	75,000	2,000
Peaches	150,000	4,500
Peas	35,000	2,000
Persimmons	700,000	3,000
Irish potatoes	7,150,000	72,000
Sweet potatoes	20,000	500
Prunes	60,000	2,000
Raspberries	30,000	2,000
Strawberries	100,000	6,500
Total	....	$2,203,200

Dried—	*Pounds.*	*Value.*
Apricots	50,000	$3,250
Walnuts	2,800,000	340,000
Totals	2,850,000	$343,250

Wines, Brandies, Etc.

	Gallons.	*Value.*
Sweet wines	20,000	$7,000

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 750	......	......
Flowers and plants, acres	100	$50,000
Honey	30,000	3,000
Sugar beets, tons	14,000	1,400,000
Sweet peas	100,000	5,000
Mustard	4,000,000	120,000
Crude oil, barrels	8,500,000	7,500,000

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	.....	......
Receiving stations, cans	3	27,375	$250,000
Butter, pounds		300,000	90,000

Live Stock Industry.

	Number.	*Value.*
Cattle—Stock	26,370	$450,000
Dairy cows—Graded	7,280	175,000
Ayrshire	60	4,500
Holsteins	15	1,000
Jersey	300	10,000
Shorthorns*		
Calves	2,646	16,000
Swine	7,105	58,000
Horses—		
Standard-bred	38	4,500
American	2,384	200,000
Common	4,012	150,000
Colts	840	25,000
Jacks and jennies	12	900
Mules	1,684	90,000
Sheep	58,960	150,000
Total stock all kind	111,706	$1,334,900

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*One small herd at Goleta.

Wool, pounds	157,000	$12,560

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	6,000	$20,000
Ducks	100	500
Geese	25	150
Turkeys	50	600
Eggs	580,000	205,000
Total value		$226,250

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	2	5	$3,000
Paper boxes	2	2	1,000
Brick	3	15	8,000
Carriages and wagons	7	25	4,000
Cigars	3	7	9,000
Confectionery	4	16	55,000
Flouring mills	1	3	7,500
Jewelry manufactory (genuine)	1	3	2,000
Leather goods	6	12	10,000
Machinery, parts	3	10	20,000
Meat products—			
Hides	7	40	8,000
Lard			16,000
Meat packed			14,000
Olive oil	1	30	40,000
Planing mills	3	49	150,000
Artificial stone	1	5	5,000
Sugar, beet	1	600	1,400,000
Willow and wooden ware	1	1	1,000

Manufactured Output.

	Quantity.
Brick, thousand	1,100,000
Cigars, thousand	110
Flour, barrels	1,500
Hides	128,000
Lard, pounds	200,000
Meat packed, pounds	100,000
Tallow, barrels	200,000
Olive oil, gallons	10,000

STATISTICS OF SANTA BARBARA COUNTY, 1907-8—Continued.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	25,000	$600,000
Pine, acres	25,000	600,000
Posts and pickets (chaparral) in forest reserve	800	12
Pine poles in forest reserve	30	6
Total value		$600,018

No lumber statistics secured, but it is estimated that there are 75,000,000 feet in the county. This is practically inaccessible with the present lack of facilities, hence its value can be estimated only potentially.

Power used for mills and manufactories in county—Steam, about 20; electrical, 10.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	2,000	660	$25,000
Barley	30,000	19,250	481,250
Oats	9,380	6,710	200,000
Corn	1,000	500	5,000
Total cereals	42,380	27,120	$711,250
Grain hay	29,780	30,000	$300,000

Fish Industry.

	Pounds.	*Value.*
Various kinds	200,000	$15,000
Crawfish	240,000	23,000
Totals	440,000	$38,000

SANTA CLARA COUNTY.

Santa Clara County is situated on the south arm of San Francisco Bay, and is separated from the Pacific Ocean by one tier of counties. The county seat is San Jose, and is distant 50 miles from San Francisco. The county is 47 miles wide from north to south, and through the center runs the favored Santa Clara Valley with an average width of 15 miles. The country from the valley slopes upward through rolling hills to the summit of the Mount Diablo Range of mountains on the east, and to the summit of the Santa Cruz Mountains on the west. Its peculiar location with reference to prevailing winds and ocean currents has a marked effect on the climate, rendering it pleasantly cool in summer and not too cold in winter. The average winter temperature is about 40 degrees and in summer 70 degrees. It is preëminently the horticultural county of California. The statistics accompanying this report show the variety and quantity of its products.

Its roads are excellent, and make all points easily accessible. More than 300 miles of these roads are sprinkled during the summer months. Three lines of railroads connect it with the outside world. Its population is 70,000. San Jose, the county seat, has a population of 30,000. Many flourishing towns and villages are within its borders.

Educational interests are represented by the Leland Stanford Junior University, the Santa Clara College, the University of the Pacific, the College of Notre Dame, and the State Normal School, together with numerous private seminaries and institutions for special educational work. In the public school system there are eight high schools and 104 grammar and primary schools. The annual expenditures for public schools is $311,500. This is in addition to the municipal expenditures by cities and towns for this purpose. The value of school property is $910,832.

The valley is drained by a number of streams. In summer their water courses greatly diminish, and the smaller ones wholly disappear. Having their sources in the surrounding hills and sinking as they approach the valley, they augment the subterranean supply of the artesian wells. These are all over the valley, usually from 60 to 100 feet in depth, though some find a larger and more permanent supply at a much greater depth.

The extent and value of agricultural, horticultural, and industrial interests can be gathered from the accompanying statistics:

STATISTICS OF SANTA CLARA COUNTY, 1907-8.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	32,025	$96,075
Ducks	2,500	11,500
Geese	200	2,400
Turkeys	300	6,000
Eggs	175,000	35,000
Totals	210,025	$150,975

Miscellaneous Products.

	Pounds.	*Value.*
Flowers and plants, acres	150	$100,000
Garden seed	3,000,000	1,000,000
Sugar beets, tons	50,000	100,000
Total value		$1,200,000

STATISTICS OF SANTA CLARA COUNTY, 1907-8—Continued.

General Statistics.

Area, 1,355 square miles, or 867,200 acres.

Number of farms	23,422
Number of acres assessed	727,906
Value of country real estate	$23,220,120
Of improvements thereon	$7,840,415
Of city and town lots	$14,383,260
Of improvements thereon	$10,069,325
Of person property	$6,063,690
Total value of all property	$61,576,810
Expended on roads, last fiscal year	$164,102
Expended for bridges, last fiscal year	$52,840
Number of miles of public roads	983
Road levy per $100, 1908	40c
Value of county buildings	$1,730,000
Irrigating ditches—miles, ——; cost	$15,000
Railroads, steam—miles, ——; assessed value	$2,254,013
Railroads, electric—miles, ——; assessed value	$622,710
Electric power plants, assessed value	$254,645
Electric power lines, assessed value	$26,885
Number of acres irrigated	125,000
Telephone lines—miles, 179; assessed value	$123,650

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	16,310	37,100	53,410
Apricot	542,080	11,300	553,380
Cherry	134,000	24,600	158,600
Fig	1,480	660	2,140
Lemon	710	880	1,590
Nectarine	930	520	1,450
Olive	10,230	4,990	15,220
Orange	1,185	1,205	2,390
Peach	590,100	42,200	632,300
Pear	125,300	17,400	142,700
Plum	273,100	21,000	294,100
Prunes	4,000,890	382,180	4,383,070
Quince	2,500	320	2,820
Total fruit	5,698,815	544,355	6,243,170
Walnut	10,600	3,180	13,780
Total nut	28,100	8,200	36,380
Grapevines, acres		.....	8,210

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	2,066	$74,500
Stock	17,575	341,500
Dairy cows—Graded	6,000	180,000
Herefords	70	3,500
Holsteins	89	6,595
Jersey	60	3,125
Shorthorns	220	11,000
Calves	5,130	39,425
Swine	4,761	45,600
Horses—		
Thoroughbred	110	22,000
Standard-bred	260	39,000
Common	13,500	545,000
Colts	2,225	33,000
Mules	175	3,500
Sheep	860	1,720
Lambs	240	480
Angora goats	130	650
Common goats	500	500
Total stock all kinds	53,971	$1,351,470

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	420,000	$60,000
Apricots	40,000,000	450,000
Asparagus	4,000,000	160,000
Blackberries	1,160,000	50,400
Beans	960,000	42,000
Beets	240,000	5,000
Cabbage	345,000	2,500
Celery	125,000	3,500
Cauliflower	130,000	4,000
Corn	1,500,000	30,000
Cherries	7,000,000	180,000
Figs	100,000	3,500
Grapes	1,320,000	92,750
Lemons, boxes	1,300	1,200
Loganberries	220,000	10,000
Onions	1,140,000	30,000
Oranges, boxes	2,000	2,000
Olives	500,000	15,000
Pears	20,000,000	275,000
Peaches	20,000,000	130,000
Peas	1,800,000	36,000
Plums	375,000	10,250
Irish potatoes	950,000	18,000
Prunes	75,000,000	750,000
Quinces	240,000	4,800
Raspberries	625,000	40,000
Strawberries	1,100,000	66,000
Tomatoes	30,000,000	150,000
Totals	209,253,300	$2,417,100

Dried—	*Pounds.*	*Value.*
Almonds	30,000	$12,000
Apricots	10,000,000	700,000
Beans	320,000	10,420
Onions	1,140,000	30,000
Peaches	2,000,000	95,000
Peas	900,000	24,000
Prunes	30,000,000	1,200,000
Walnuts	500,000	20,000
Totals	44,890,000	$2,091,420

Canned—	*Cases.*	*Value.*
Apples	18,750	$63,350
Apricots	87,500	215,000
Cherries	50,000	238,000
Grapes	12,500	42,500
Pears	87,500	352,750
Peaches	50,000	400,000
Peas	76,250	198,250
Plums	12,500	26,310
Tomatoes	187,500	300,000
Totals	582,500	$1,836,160

Dairy Industry.

	Production.	*Value.*
Butter, pounds	325,000	$85,000
Cheese, pounds	780,000	150,000
Cream, gallons	30,000	50,000
Total value		$285,000

Manufactured Output.

	Quantity.
Brick, thousand	4,500
Brooms, dozen	1,390
Cigars, thousand	1,582
Hides, pounds	769,000
Lard, pounds	34,800
Tallow, barrels	275
Olive oil, gallons	15,000
Soap, pounds	116,750

STATISTICS OF SANTA CLARA COUNTY, 1907-8—Continued.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	2	71	$122,500
Wood boxes	3	32	76,000
Brick	4	170	45,000
Brooms	1	2	2,500
Carriages and wagons	12	111	105,740
Cigars	12	43	76,100
Coffee, spices, etc.	2	23	120,000
Confectionery	19	40	125,000
Cooper-shops	3	18	35,000
Foundries and iron works*	13	107	312,300
Furniture	6	14	18,500
Jewelry	2	5	8,000
Leather goods	18	30	92,000
Meat products—			
Meat slaughtered	..	.....	129,200
Hides	..	.....	83,125
Lard	..	.....	2,755
Tallow	..	.....	1,410
Olive oil, gallons	..	15,000	45,000
Pickled olives	..	35,000	20,000
Planing mills	14	760	172,000
Potteries	2	22	38,000
Soap	1	4	3,500
Artificial stone	6	32	162,000
Granite	6	67	260,000
Tanneries	2	132	397,000
Tin and galvanized iron	6	75	164,000
Willow and wooden ware	1	1	2,000
Wood turning and carving	1	1	1,800
Woolen mills§	1	104	125,000
Miscellaneous	96	940	4,322,100
Total value			$7,646,805

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*Includes machinery.

§Only seven months' run.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	400	260	$9,360
Barley	4,000	3,240	64,800
Oats	400	366	10,248
Total cereals	4,800	3,866	$84,408
Alfalfa hay	500	2,500	$30,000
Grain hay	20,000	30,000	290,000
Total hay	20,500	32,500	$420,000

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	960,000	$192,000
Sweet wines	20,000	20,000
Champagne*	293,000	293,000
Beer, barrels	110,000	770,000
Brandy	480,000	620,000
Alcohol	1,950,000	2,535,000
Total value		$4,430,000

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*The bottle is the unit of measurement for champagne.

Number of wineries, 49; distilleries, 11; breweries, 6.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	60,000	$300,000
Oak, acres	50,000	500,000
Redwood, acres	10,000	30,000
Fuel, wood, cords	2,500	25,000
Sash and door factories, number	6	100,000
Shingles, thousand	2,500	5,775
Totals	125,006	$960,775

Power used for mills and manufactories in county—Steam, 208; electrical, 83; water, 2.

SANTA CRUZ COUNTY.

Santa Cruz County fronts its entire length on the Pacific Ocean. It lies midway between Oregon and Lower California, and is in the heart of Central California. It is separated from San Mateo and Santa Clara counties by the Santa Cruz Mountains, and from Monterey County by the Pajaro River. It is one of the smallest counties, and comprises a narrow strip of mountainous land about 40 miles long and 18 broad, forming a vast amphitheater, and sloping from the summits of the Santa Cruz range, whose highest elevation, Loma Prieta, is 4,000 feet, southward and westward to the bay of Monterey.

The curving line of shore and the corresponding curve of the mountain line inclose an irregular, crescent-shaped tract of country, with an average width of 20 miles, which for grandeur, beauty, and variety of scenery equals any expanse of similar size in the world. The sides of the mountains are closely set with forests of pine, redwood, madrone, and other trees, the redwoods having, in many cases, attained gigantic growth.

A number of streams rise in these hills, and bring down the rich alluvial loam into the valleys, which, in their normal condition, teem with native grasses and flowers, and when cultivated yield phenomenal results.

These streams are, agriculturally as well as topographically, an important feature, watering as they do every section of land. Besides these, natural springs are innumerable. Nearing the coast, there are many interesting topographical features. The leagues of wide, high-wind-swept grassy plateaus, which form remarkable grazing and dairy lands; the succession of chalk terraces; the broad amphitheatrical valley of the Pajaro; the salt lagunas, picturesque in configuration, and surrounded by park-like groves of live oaks; the high sandstone cliffs along the shore; the magnificent ocean drives—all are materials for pleasant investigation.

Along the coast line, a series of raised benches form a strip of elevated land. This widens to the south of the city of Santa Cruz, and affords a large area of fruitful soil, which has been brought into a high state of cultivation. From Santa Cruz City south the soil consists of light loam, abounding in lime, potash, and phosphoric acid.

In the Pajaro Valley there is a great variety from the rich sedimentary alluvial wash to the light, sandy soil of the foothills.

In the lower part of the valley a clayey loam predominates. This is followed by a heavy adobe higher up, and then the dark, reddish loam of the plains, the latter being the favorite with fruit growers, for it is here that flourish the best orchards.

The average annual rainfall, taken from a record of thirty-three consecutive years, is 25.26 inches, showing that this is a well watered district.

The charm of Santa Cruz County is her infinite variety. In lumber products she ranks third in the State. Her butter, cheese, and cream might well win her a place in the dairy districts. Hay, grain, potatoes, and the whole range of cereals and vegetables give enormous yields.

In the Department of Agriculture at Washington, D. C., there is a record of 130 bushels of wheat per acre raised in the Pajaro Valley, and while she does not claim to wear the "citrus belt," yet oranges are raised for home consumption, and the cultivation of the lemon is a profitable business; but her deciduous fruits, large and small, her table and wine grapes, and her fine wines, are winning renown. From the summit of the range, more than 2,000 feet above the sea, down to the wide and fruitful valleys along the coast, grow and flourish delicious fruits. Prunes, pears, apricots, peaches, cherries, Japanese and native plums, figs, walnuts, persimmons, olives, and nectarines thrive, but the crop of the largest profit is that of apples, their quality and size being astonishing, and their yield as much so.

From Bellflowers in September to Newtown Pippins in December the supply is steady, and the shipments now average from 3,000 to 4,000 carloads a season. The market for apples is to England and the continent, Germany being a large buyer. The especial home of the apple, as well as that of the strawberry, is the fertile valley of the Pajaro, and the flavor and color of the foothill apples are renowned. The exhibition of apples at the Pajaro Valley Fair during October, 1907, was, according to the best authorities on the subject, never equaled in California either in quality or quantity. This exhibit contained over two carloads of apples, representing over fifty varieties, but the standards of the valley, Bellflowers, Newtowns, Langford's Seedlings, Pearmains, and Missouri Pippins predominated. The general excellence of the pack, which was largely commercial (few of the apples having been packed in a fancy manner for exhibition purposes), gained the admiration of experienced apple men. The saying, "Our farmers are our capitalists," is no idle boast in the Pajaro Valley; one is soon convinced of this fact, if a ride is taken over its well-kept roads through miles of orchards and cultivated farms. Watsonville, the trading center of this fertile valley, is the third station in the matter of shipments on the coast division of the Southern Pacific Railroad, and the volume of business is increasing every year. There is now a movement under way to afford this section water transportation through the Pajaro River to Monterey Bay, which will place the producers of this vicinity on an equal footing with any other section of the State.

There were used in the canneries, driers, and vinegar plants 20,388 tons of apples. The output of the same was 10,000 cases of canned apples, 116 cars of evaporated apples, and 913,000 gallons of vinegar. These industries, together with 50 packing houses, furnished employment for over 1,600 persons.

A meeting of our capitalists, fruit packers, orchardists, and fruit growers was recently held and plans discussed for the building of a cold storage plant of 500-car capacity. A site has been selected, and there is every reason to believe that the project will be carried out.

Of the small fruits, the strawberry is the most widely grown, and furnishes a practically continuous crop. Of the large acreage devoted to this berry, many acres will be added the coming season. Raspberries, blackberries, Japanese wine berries, and the loganberry (which originated in Santa Cruz) yield unfailing crops.

The wines of this county are winning the highest praise and demand that they deserve, and the product of our vineyards is shipped to the heart of the wine countries of Europe.

In the southern part of the county a large acreage is devoted to the profitable growth of sugar beets, potatoes, beans and onions and the yield is enormous. Market gardening is profitable.

A great deal of asparagus and rhubarb is grown for outside markets. Hothouse cucumbers are supplied San Francisco and Eastern cities during the winter months.

Seeds, bulbs, plants and cut flowers contribute largely to the supply for metropolitan markets. There was imported from Holland this season for a local bulb company three and a half tons of rare bulbs, the freight and duty on same was over $600.

Dairying is a profitable industry, and thousands of acres of grazing land support well selected herds of stock.

Poultry raising is a profitable business, the climate and conditions being well adapted for such industry.

Considerable capital is invested in the deep sea fisheries. The fish hatchery at Brookdale, on Clear Creek, has, at the present time, upwards of 2,000,000 trout and salmon fry.

During the fall and winter months 5,000,000 or 6,000,000 salmon eggs will be hatched and the fry liberated in the bay. Steelhead and rainbow trout abound in all the thirty odd streams.

The forest covered mountains are a retreat for quail and deer, and the many lagoons and the four beautiful lakes in the Pajaro Valley in fall and winter are feeding places for all varieties of wild ducks.

At Santa Cruz the tent city, pavilion, casino and baths, representing an expenditure of $750,000, were opened last season, and this beautiful summer resort had practically the greatest concourse of pleasure seekers on the coast. It is estimated 100,000 people from San Francisco and the interior visited our shores during the summer.

Capitola, four miles east of Santa Cruz can be reached by both steam and electric railroad. This is another beautiful summer resort.

There are two Carnegie libraries in the county well stocked with the latest works.

The public schools throughout the county are of a high standard, as are also the private schools and colleges. The many fine churches represent the leading denominations.

There are many fraternal societies, and a large number of them hold meetings in fine lodge rooms in buildings of their own.

There are five banks in the county—all sound banking institutions.

The supervisors have done and are doing good work in road building, and the most mountainous places can now be reached by easy grades.

Many industries have developed to the profit producing point. The Santa Cruz Portland cement plant, located 12 miles north of the city of Santa Cruz, represents an expenditure of $5,000,000, and has the largest capacity for the manufacture of cement of any similar institution of its kind. The powder works, tannery, paper mill, soap and glue factory, planing and sawmills, lime kilns and the bitumen industry, are all in active operation, and the general air or thrift and prosperity is apparent. The output of lumber has been large for a great many years, but great tracts of forest still remain. Many of the trees are of ancient growth, and it is not uncommon to see 35,000 feet of clear lumber cut from a single tree.

Santa Cruz, Watsonville, Boulder Creek, Soquel, Aptos, Ben Lomond, Brookdale, Felton, Capitola, Davenport, and Glenwood are the principal towns.

STATISTICS OF SANTA CRUZ COUNTY, 1907-8.

General Statistics.

Area, 500 square miles, or 320,000 acres.

Number of farms	1,765
Number of acres assessed	262,938
Value of country real estate	$4,640,260
Of improvements thereon	$1,625,800
Of city and town lots	$4,962,155
Of improvements thereon	$2,753,045
Of personal property	$1,903,765
Total value of all property	$15,885,025
Expended on roads, last fiscal year	$40,662
Expended on bridges, last fiscal year	$12,389
Number of miles of public roads	458
Road levy per $100, 1908	60c
Value of county buildings	$162,500
Railroads, steam—miles, 51.49; assessed value	$802,244
Railroads, electric — miles, 15; assessed value	$55,045
Electric power plants—2; assessed value	$52,085
Electric power lines—miles, 70; assessed value	$18,500
Number of acres irrigated	1,200

Ocean Shore Railroad has 25.6 miles of railroad, but same is not yet subject to assessment.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	629,545	90,260	719,805
Apricot	62,980	15,155	78,135
Cherry	21,645	5,135	26,780
Fig	250	155	405
Lemon	125	100	225
Olive	540	150	690
Orange	145	75	220
Peach	15,360	900	16,260
Pear	15,875	2,000	17,875
Plum	17,305	2,955	20,260
Prunes	122,845	4,700	127,545
Quince	150	.....	150
Other kinds	2,250	.....	2,250
Total fruit	889,015	121,585	1,010,600
Almond	355	75	430
Walnut	6,200	3,100	9,300
Total nut	6,555	3,175	9,730
Grapes, acres—			
Table	660	335	995
Wine	710	910	1,620
Total acres	1,370	1,245	2,615
Berries, acres—			
Strawberries	410	.....	410
Raspberries	25	.....	25
Loganberries	63	.....	63
Blackberries	115	.....	115
do. Mammoth	10	.....	10
Dewberries	2	.....	2
Total acres	625	.....	625

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	285	214	$7,490
Barley	348	261	7,830
Oats	1,500	1,200	4,800
Corn	467	584	22,190
Total cereals	2,600	2,259	$85,510
Alfalfa hay	215	967	$10,637
Grain hay	6,000	.....	147,000
Total hay	6,215	11,467	$157,637

Fruits, Vegetables, Etc.

Green—	Total Production. Pounds.	Value.
Apples*	93,000,000	$1,448,000
Apricots	210,000	2,625
Asparagus	3,250	405
Blackberries	460,000	17,250
do. Mammoth	40,000	1,500
Cucumbers, hothouse	16,500	1,235
Cherries	317,955	20,665
Figs	43,000	1,290
Grapes, table	2,640,000	52,800
Grapes, wine§	2,980,000	......
Loganberries	252,000	9,450
Pears	1,542,800	9,255
Peaches	2,168,850	37,955
Plums	555,590	8,425
Irish potatoes	8,000,000	100,000
Quinces	26,800	400
Raspberries	120,000	9,000
Strawberries	2,460,000	138,375
Tomatoes	115,000	1,150
Dewberries	3,200	250
Totals	114,954,945	$1,860,030
Dried—	*Pounds.*	*Value.*
Almonds	7,100	$852
Apples	3,494,000	209,640
Apricots	1,500,000	97,500
Beans	150,000	52,500
Onions	2,800,000	19,600
Prunes	1,220,000	30,500
Walnuts	106,000	13,250
Totals	9,277,100	$423,842
Canned—	*Cases.*	*Value.*
Apples*	10,000	$25,000
Jelly, dozen	300	405
Preserves, jars	200	450
Totals	10,500	$25,855

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*A case of apples contains 12 one-gallon tins.

*3,000 cars actual shipment of apples does not include 815,495 boxes that were handled by the driers, vinegar plants and canneries.

§For value see wine, gallons.

STATISTICS OF SANTA CRUZ COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	Value.
Cattle—Beef	1,100	$33,000
Dairy cows—Graded	4,760	142,800
Oxen	80	2,000
Calves	1,740	14,790
Swine	2,950	21,650
Horses—		
Thoroughbred	14	5,600
Standard-bred	105	20,000
Common	4,975	372,125
Imported Belgian draft stallion	1	......
Colts	560	28,000
Mules	145	10,875
Angora goats	800	3,600
Sheep—		
Imported or fine	15	150
Graded	300	1,500
Common	1,800	6,300
Lambs	750	1,500
Total stock all kinds	20,095	$663,890

Manufactured Output.

	Quantity.
Bituminous rock, tons mined	35,345
Cement, tons*	219,000
Cigars, thousand	630
Box shooks	261,555
Lime, barrels	305,200
Malt, tons	165
Hides, pounds	324,985
Lard, pounds	202,325
Meat packed, pounds	87,150
Tallow, barrels	460
Paper, pounds	1,920,000
Glue, pounds	26,000
Soap, pounds	170,500
Powder, kegs	450,000
Leather	45,000
Vinegar, barrels	18,260

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*Cement works have a capacity of 6,000 barrels per day. Machinery is on the grounds to increase the capacity to 12,000 barrels per day. An average of 200 tons of lime rock per day is being shipped to other parts of the State.

Forest Products.

	Amount.	Value.
Sawmills, number	9	......
Grape stakes, pieces	1,018,000	$20,360
Fuel, wood, cords	81,000	283,500
Tanbark, cords	6,000	96,000
Lumber, feet	16,250,000	260,000
Pickets, pieces	896,000	31,360
Piles	1,500	9,000
Posts, pieces	506,160	50,615
Railroad ties, pieces	21,690	13,115
Shakes, thousand	2,760	35,880
Shingles, thousand	42,864	75,012
Stave bolts, cords	820	4,100
Car strips, used when shipping apples in carload lots	480,000	2,880
Total value		$881,822

Power used for mills and manufactories and in irrigation in county—Steam, 27; electrical, 6; water, 1; gasoline, 10.

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 1,415	.....	$2,830
Flowers, plants, and bulbs, acres*	15	15,000
Honey	21,262	2,125
Hops	76,000	7,600
Sugar beets, tons	5,000	25,000
Bituminous rock, tons	35,345	106,000
Horse beans	100,000	2,000
Pumpkins, tons	1,000	4,000
Melons, tons	600	9,000
Pelts, number	6,600	2,310

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*There was imported this season from Holland for a local bulb company, 3½ tons of rare bulbs. The freight and duty on same was over $600.

Manufactories.

	No.	No. of Employes.	Value of Product.
Bookbinderies	1	.....	......
Berry baskets Berry drawers Berry chests	1	4	$9,435
Wood boxes	3	15	12,035
Carriages and wagons	4	10	16,780
Cement	1	365	2,354,250
Cigars	2	16	28,350
Confectionery	7	24	46,375
Cooper-shop§	2	12	15,260
Foundries and iron works	1	6	12,250
Leather goods, harness, etc	7	10	30,500
Lime	3	325	381,500
Malt	1	.....	825
Meat products—			
Lard	12	60	20,235
Meat packed			10,895
Tallow			7,000
Paper	1	20	57,600
Powder works	1	160	720,000
Planing mills*	6	125	586,000
Soap	2	5	8,525
Tanneries	1	42	250,000
Soda works	3	6	10,000
Ice plant	1	10	20,000
Glue factory	1	2	2,600

Box shooks shipped into the country, amount paid for setting them up, $12,000.

§Connected with lime company.

*The output of the planing mill includes sash and doors, wood trimming and carving. There is now in course of construction near Santa Cruz one of the largest planing mills on the coast.

Poultry and Eggs.

	Dozen.	Value.
Chickens	5,590	$33,540
Ducks	145	725
Geese	125	1,500
Turkeys	185	3,700
Eggs	670,590	174,353
Total value		$213,818

STATISTICS OF SANTA CRUZ COUNTY, 1907-8—Continued.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines, claret	227,400	$45,480
Sweet wines, riesling	20,000	7,000
Beer, barrels	14,425	115,400
Beer, bottled	19,200	10,080
Cider, bottled	8,000	3,200
Vinegar*	913,000	91,300

Number of wineries, 12; breweries, 3.

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*One vinegar plant is now adding to its present capacity several large storage tanks to enable it to handle 25,000 barrels in a season; machinery will also be added to crush on an average of 500 boxes of apples per day.

Fish Industry.

	Pounds.	*Value.*
Various kinds	1,419.133	$42,575

About 30 men are employed in the fishing industry between Santa Cruz and Capitola.

Dairy Industry.

	Production.	*Value.*
Butter, pounds	245.535	$76,115
Cheese, pounds	475,660	47,560
Cream, gallons (not included in above)	11,195	12,315

Number of dairies, 20.

The milk product of several dairies is delivered to home consumers.

SHASTA COUNTY.

Shasta County is at the head of the Sacramento Valley. Its greatest length from east to west is 90 miles, and its greatest breadth from north to south is 60 miles.

The mountains of the Sierra Nevada and Coast Range cover a large portion of the county on all sides except the south. They are rugged and lofty, rising more than 5,000 feet above the sea. On the east there are four peaks of special prominence. Lassen Peak, altitude of 10,577 feet, is timbered for two thirds of the way up; the others are bald, and usually covered with snow. Other peaks and buttes are numerous, and all indicate volcanic origin, as shown by extinct craters, cones, sulphur deposits, beds of lava, etc. Hot and boiling springs are of frequent occurrence. In the southern portion is a foothill region, half circular, forming the northern end of the Sacramento Valley proper, and embracing about 500,000 acres, the altitude of which is from 500 to 2,500 feet above sea level. The southwestern portion of this region is a succession of rounded hills, varying in height from 50 to 200 feet, and the central and southern portion consists of table-lands, varying in altitude from 500 to 700 feet. It has many narrow valleys.

Shasta is noted for the number and beauty of its streams. First in importance is the Sacramento River, flowing through the county from north to south; all but 20 miles is through a rocky canyon. The McCloud River, bursting from Mount Shasta's side, rushes through the mountains of the north in a southerly direction and empties into Pitt River. The most beautiful stream of the northeast is Fall River. In its meanderings it is 40 miles in length, and empties into the Pitt. Besides these larger streams there are a score of tributaries, while springs abound in the foothills and mountains.

The soil of the valleys is an alluvium, a rich sedimentary deposit, largely intermixed with disintegrated rock, and in some parts with a gravel. The usual color is light red or reddish brown. It is very fertile, and excellent for plums, prunes, pears, figs, and small fruits. The mesa lands bordering the valleys are of a sandy loam, with a large percentage of clay, and carrying in many portions, especially in the higher parts, considerable gravel and bowlders. Fruit does well on these mesa lands. On the foothills is a red loam or clay, productive and adapted to berries. On the elevated plateaus of the north and northwest the soil varies from a black, sandy loam to a red loam or clay, while to the southwest the soil is generally adobe, productive of grain and rich natural grasses.

Irrigation is unnecessary for most crops, as the rainfall is sufficient. The rainy season begins in September and extends, at intervals of two or three weeks, from that time until May. During this time the ground is thoroughly saturated with moisture, and the rainy period covers the entire growing season. At the end of the wet season grains, grasses, etc., are ready for the harvest, and fruits, grapes, etc., are beginning to ripen.

Beautiful resorts and health-giving springs abound. The high mountains are heavily timbered with sugar pine, cedar, fir, and other valuable timbers. There are some large valleys and extensive plateaus, mostly devoted to general farming, stock raising, and wool growing. The foothills are more or less timbered with oak and pine, and their higher portions yield all kinds of minerals and stone—gold, silver, copper, iron, platinum, quicksilver, lead, marble, sandstone, limestone, coal, onyx, etc.—affording also opportunities for lovely homes to the small farmer, fruit grower, stock raiser, poultryman and gardener. The climate is pleasant, not extremely hot in summer nor cold in winter. The valleys are fertile and capable of producing all things grown in the temperate or semi-tropical regions. At certain altitudes, crisp and luscious apples are produced, and the quantity and quality can not be surpassed.

Shasta orchards are a success, producing heavy crops and of the best quality. The prune, peach, pear, plum, apple, apricot, almond, fig, lemon, orange, and olive thrive. Grapes of wine, table, and raisin varieties have proven a success in the valley portions, and many gallons of wine are made and shipped to different parts of the country; so with raisins. Wheat, grass, and alfalfa are grown successfully. The markets are the best, as there is home consumption for everything produced except fruit, and hundreds of carloads in addition to the products raised here are shipped in annually, consisting mostly of grain, hay, butter, eggs, and vegetables. The home seeker will find land adapted to grain growing, hay making, poultry raising, or gardening at less prices than in the older settled portions of the State.

Stock raising is an important factor. The mild winters in the lower altitude obviate the necessity of feeding, while the summer ranges in the mountains make it possible for the stock raiser to keep his herd upon green feed the greater portion of the year.

The sawmills annually distribute thousands of dollars for labor. The Terry Lumber Company's mills are the largest in the county. They are connected with Bella Vista by flume, and there have planing mills, yards and dryhouses, and a railway to the main line at Anderson. The wood camp is in the big bend of the Pitt, and has been sending thousands of cords of wood annually down the Pitt to the smelters. In the Shingletown country there are several large sawmills, and there have been graded about twenty-five miles of road for traction-engine work. Over this road, with engines, they transport their lumber to the railroad. At or near Whitmore there are also a number of sawmills. There are some large flouring mills.

The resorts are numerous and easy of access.

Redding, the county seat, is one of the most beautifully located places on the Pacific Slope, commanding a view of both the Sierra and Coast ranges, with their lofty, snowclad peaks, and an equally beautiful view of the Sacramento south and canyon north.

The next town of importance is Keswick, at the smelters of the Iron Mountain Company, six miles from Redding.

Shasta, once the county seat, is famous the State over for its former glory.

Anderson, on the California and Oregon Railroad, 12 miles south from Redding, is the chief shipping point for the fruit industry of the county. The country surrounding the town is largely valley land, and thousands of acres of bearing orchards are tributary to it.

While Shasta's preëminence in mineral production is largely due to the development in copper, her output in the more precious metals is very large, and the production of these metals as a by-product of the copper sulphide ores will, with the extension of the industry, exceed the present output many times.

Statistics showing the "Mineral Productions" of Shasta County for the last preceding year are included herein. These items are important to the county and State, as a vast amount of revenue is derived therefrom.

The production of copper in Shasta County, although a great and growing industry, is yet in its infancy, having almost doubled in the past year.

In an agricultural way, Shasta County has, besides her vast output of grain, fruit, and stock, important possibilities yet in their experimental stage. A great many crops that can be grown at immense profit have only been tested, the large land holdings being occupied in raising less profitable crops that admit of greater investment.

Irrigation is receiving more notice than ever before, and as our choicest lands, of which the acreage is large, lie along the numerous streams of the county, where water in abundance is easily and cheaply accessible, together with the fact that our climate is such as to admit of the successful growth of semi-tropical vegetation, this feature is destined to become an important one.

STATISTICS OF SHASTA COUNTY, 1907-8.

General Statistics.

Area, 4,050 square miles, or acres.	2,590,000
Number of farms	1,000
Number of acres assessed	1,409,458
Value of country real estate	$7,339,625
Of improvements thereon	$1,947,800
Of city and town lots	$726,755
Of improvements thereon	$1,190,505
Of personal property	$1,492,923
Total value of all property	$12,740,653
Expended on roads, last fiscal year	$47,048
Expended for bridges, last fiscal year	$71,693.86
Number of miles of public roads	1,000
Road levy per $100, 1908	35c
Value of county buildings	$140,000
Irrigating ditches—miles, 183; cost	$15,750
Railroads, steam — miles, 133; assessed value	$2,799,059
Railroads, electric—miles ——; assessed value	$13,500
Electric power plants—3; assessed value	$245,000
Electric power lines—miles, 184; assessed value	$95,000
Number of acres irrigated	30,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	500	$2,500
Ducks	40	320
Geese	25	250
Turkeys	550	13,200
Eggs	4,500	1,125
Total value		$17,895

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	3,600	2,300	$75,900
Barley	2,800	2,000	66,000
Oats	400	200	7,000
Total cereals.	.....	.....	$148,900
Alfalfa hay	6,000	.....	$72,000
Grain hay	3,300	.....	42,000
Grass hay	7,500	.....	45,000
Total hay	17,000	.....	$159,000

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	15,000	1,000	16,000
Apricot	500	.....	500
Cherry	500	.....	500
Fig	800	.....	800
Lemon	250	200	450
Olive	9,000	.....	9,000
Orange	800	500	1,300
Peach	25,000	3,000	28,000
Pear	20,000	.....	20,000
Plum	1,000	.....	1,000
Prunes	70,000	2,000	72,000
Other kinds	7,000	.....	7,000
Total fruit trees	149,000	6,700	156,500
Almond	3,500	.....	3,500
Walnut	250	.....	250
Total nut trees	3,750	.....	3,750
Grapevines	400	.....	.....
Berries, acres	120	.....	.....

STATISTICS OF SHASTA COUNTY, 1907-8—Continued.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	95,000	......
Apricots	16,000	......
Blackberries	32,000	......
Cabbage	50,000	......
Cherries	8,000	......
Figs	9,000	......
Grapes	35,000	......
Loganberries	5,000	......
Onions	20,000	......
Olives	86,000	......
Pears	2,520,000	......
Peaches	4,750,000	......
Plums	44,000	......
Irish potatoes	200,000	......
Sweet potatoes	10,000	......
Prunes	30,000	......

Dried—	*Pounds.*	*Value.*
Almonds	20,000	......
Apples	8,000	......
Apricots	1,000	......
Beans	28,000	......
Figs	14,000	......
Grapes	2,000	......
Pears	250,000	$12,500
Peaches	543,000	57,150
Prunes	20,000	700

Dairy Industry.

	Production.	*Value.*
Butter, pounds	40,000	$20,000

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres*	350,000	......
Sawmills, number	10	......
Charcoal, sacks	18,000	......
Fuel, wood, cords	2,250	......
Laths, thousand	100	......
Lumber, feet	21,900,000	$400,000
Posts, pieces	1,000	1,000
Shakes, thousand	1,000	8,000

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*Mixed timber.

Power used for mills and manufactories in county—Steam, 10.

Wines, Brandies, Etc.

Number of breweries, 1.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	3,500	$87,500
Stock	20,000	260,000
Dairy cows—Graded	300	15,000
Herefords	50	3,000
Holsteins	5	625
Jersey	275	13,750
Shorthorns	110	6,600
Calves	4,500	45,000
Swine	5,000	20,000
Horses—		
Thoroughbred	5	2,500
Standard-bred	36	2,955
Common	4,000	160,000
Colts	642	12,840
Jacks and jennies	25	200
Mules	250	1,800
Sheep	22,000	55,000
Lambs	10,000	15,000
Common goats	12,000	24,000

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	2	45	$30,800
Cigars	3	6	10,100
Confectionery	3	5	3,600
Flouring mills	1	5	27,700
Foundries and iron works	1	35	70,000
Lime	2	.....	......
Meat products—			
Hides	..	.....	22,000
Lard	..	.....	5,160
Tallow	..	.....	3,500
Pickled olives	..	.....	4,000

Manufactured Output.

	Quantity.
Brick, thousand	3,850
Cigars, thousand	202
Flour, barrels	3.000
Lime, barrels	11,500
Hides, pounds	244,800
Tallow, pounds	50,000

SIERRA COUNTY.

Sierra County has an area practically all mountainous. The altitude ranges from 2,000 to 8,600 feet, the highest elevation being that of the Sierra Buttes; but the greater portion has an elevation of from 4,000 to 5,000 feet.

The main ridge of the Sierra Nevadas crosses the eastern part from south to north. Several spurs traverse the county from east to west, forming the watersheds of the four principal streams which make the drainage system of the western part. These streams consist of the Middle Yuba River on the south, the North Yuba near the center, and Canyon Creek and Slate Creek on the north; and in the eastern end the many streams that form the headwaters of the Feather and Truckee rivers. Of the peculiar topographical features are the expansive valleys and lakes lying among the loftiest peaks of the Sierras. The lakes vary from one eighth of a mile to three or four miles in length, most of them circular, and, considering their small size, remarkable for their depth.

The important body of agricultural land is Sierra Valley. It extends over the boundary line into Plumas County, and is the largest and the most elevated of the valleys of the Sierras, being 4,750 feet above sea level. It is 30 miles in length and 10 in width. This valley is particularly adapted to stock raising and dairy purposes, and a fine quality of timothy and alfalfa hay is raised. There are several creameries in the valley, and a superior quality of butter is made, of which almost all is shipped to the outside. Considerable beef cattle are fattened for San Francisco and other markets, besides large shipments of sheep. The soil is a deep, black loam, largely admixed with rich vegetable mold, the result of ages of forest growth.

Since 1849 the principal industry has been gold mining. One hundred and ninety millions of dollars have been taken from its rivers, gravel deposits and quartz veins.

The greater portion is practically covered with a virgin belt of soft timber. The lumber cut runs into many millions of feet. The Floriston Paper Mill Company owns timber lands, and uses a large amount of Sierra County timber.

Population, according to census of 1900, was 4,017.

Average temperature winter 47°, summer 72°, summer nights are pleasantly cool.

Annual rainfall, about 60 inches.

Character of agricultural soil: black loam, very rich.

The principal towns are: Downieville, Forest City, Sierraville, Loyalton, Sierra City.

Natural products: white, yellow, and sugar pine, fir, spruce, and cedar, live stock, fruit, berries, and garden truck.

Manufactured products: lumber, boxes, sashes, doors, etc., creamery butter.

Minerals: gold, iron, copper, asbestos, and lime.

Irrigation and power facilities are unlimited.

Transportation facilities: Boca & Loyalton Railroad, Central Pacific Railway, Nevada-California-Oregon Railway, and Hobart-Mills Railroad. Communication facilities: Sunset Telephone Company, Western Union Telegraph Company, and Sierra Valley Telegraph Company.

Educational facilities: first-class common and grammar schools.

Health resorts: Campbell's Hot Springs, Webber, Independence, and Gold Lakes.

Hunting and fishing abundant—trout, mountain quail, grouse, duck, snipe, deer, and bear.

STATISTICS OF SIERRA COUNTY, 1907-8.

General Statistics.

Area, 1,000 square miles, or 640,000 acres.	
Number of farms	105
Number of acres assessed	308,567
Value of country real estate	$1,264,965
Of improvements thereon	$188,915
Of city and town lots	$62,425
Of improvements thereon	$320,915
Of personal property	$270,563
Total value of all property	$2,107,783
Expended on roads, last fiscal year	$6,440
Expended for bridges, last fiscal year	$4,001
Number of miles of public roads	300
Value of county buildings	$14,000
Railroads, steam—miles, 29.48; assessed value	$264,736
Electric power plants—5; assessed value	....
Number of acres irrigated, about	20,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	433	132	$5,940
Barley	417	120	3,600
Oats	182	64	2,880
Rye	80	19	570
Total cereals	1,112	335	$12,990
Alfalfa hay	1,163	1,684	$11,788
Grain hay	977	947	6,729
Grass hay	10,482	11,158	83,685
Total hay	12,622	13,789	$102,202

Dairy Industry.

	Production.	*Value.*
Butter, pounds	240,000	$600,000

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Cabbage	2,800	$560
Cherries	10,000	500
Onions	7,000	140
Peaches	1,000	50
Irish potatoes	180,000	4,200
Strawberries, boxes	1,000	250
Totals	57,000	

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	5,738	342	6,080
Cherry	155	24	179
Peach	382	50	432
Pear	384	32	416
Plum	356	75	421
Other kinds	20	.....	.....
Total fruit trees	7,035	523	6,548
Chestnut	30	10	40
Walnut	25	20	45
Total nut trees	55	30	85

A few berries are raised in gardens for home use.

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	212,000	$650,000
Cedar, acres	1,000	......
Pine, acres	211,000	......
Sawmills, number	13	96,000
Fuel, wood, cords	32,700	......
Laths, thousand	1,400	21,000
Lumber, feet	41,000,000	633,000
Posts, pieces	7,800	780
Railroad ties, pieces	67,500	27,000
Shingles, thousand	1,100	3,025
Total value forest products		$660,000

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	2,950	$88,500
Stock	4,400	88,000
Dairy cows—Graded	1,750	70,000
Herefords	90	5,400
Shorthorns	90	5,400
Calves	1,400	11,200
Swine	750	4,500
Horses—		
Standard-bred	3	1,500
Common	900	72,000
Colts	170	51,000
Mules	45	3,600
Sheep	1,900	5,700
Lambs	700	......
Common goats	100	200
Total stock all kinds	16,248	$363,200
Wool, pounds	15,000	$1,875
Mohair, pounds	200	30

STATISTICS OF SIERRA COUNTY, 1907-8—Continued.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,050	$6,300
Ducks	12	84
Turkeys	10	200
Eggs	51,000	13,000
Total value		$19,584

Wines, Brandies, Etc.

	Gallons.	*Value.*
Beer, barrels	273	$3,276
Cider	360	108

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 140	.....	$1,120
Honey	1,000	200

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	4	120	$210,000
Foundries and iron works	1	2	1,800
Meat products—			
Hides, number	..	1,800	5,400
Lard, pounds	..	6,900	1,035
Tallow, pounds	..	28,000	980

SISKIYOU COUNTY.

Siskiyou is one of the northern counties of the State, adjoining Oregon on the north for 80 miles.

Of its area of 6,048 square miles 1,500 square miles are valley, the remainder mountainous. Among the mountains are many farms and stock ranches, well watered and wooded. It contains large areas of farming, mining, desert, swamp, and timber lands. The so-called desert lands are very fertile, and when water is applied produce abundant crops. The swamp lands, when drained, are also exceedingly fertile. The Federal Government is at present engaged in a comprehensive plan of drainage and reclamation in the northeastern portion of this county and southern Oregon, which contemplates the drainage of the swamp lands and the use of the waters in the irrigation of the desert lands. This will make homes for thousands of settlers.

The mining section comprises the west half of the county, and produces nearly one million dollars in gold annually. A system of immense ledges of copper ore has recently been discovered, which, when more fully developed, will add much to the mineral output. There are large deposits of iron ore, limestone, granite, marble of the finest quality, and sandstone that, owing to the absence of lime, is regarded as the best on the coast. The only jade mine in the United States is located in the western portion of the county.

The agricultural lands are chiefly comprised in Scott Valley, in the western portion of the county, Shasta Valley and Little Shasta in the central portion, and McCloud and Butte valleys in the eastern portion. At the different elevations all fruits and vegetables common to the temperate zone thrive.

Timber is everywhere; there are thousands of sections that will cut from ten to twenty million feet of yellow and sugar pine, besides large quantities of red fir and cedar.

The Sierra Nevada and Coast Range mountains meet here. The altitude ranges from 2,000 feet in the valleys to 14,500 feet on the mountain peaks, the highest of these being Mount Shasta. There are localities where snow seldom falls, and regions of perpetual snow; these conditions make it one of the most scenic of the counties.

Many of the swift mountain streams and water falls have been harnessed for electrical power. Chief among these is the Siskiyou Electric Power and Light Company's plant at Fall Creek, which is the third largest in the State, and furnishes cheap and abundant power to all parts of the county. Electrical power sufficient to run the machinery of the entire State can be developed from the abundant water power. The principal river is the Klamath, which, with its tributaries, drains almost the entire county. This stream is not navigable, and furnishes a natural dumping ground for the placer mines, its swift current carrying the tailings out to the ocean.

The Southern Pacific Railroad passes through the county from north to south, entering near Dunsmuir, where are located its roundhouse and machine shops, and leaving it at Coles at the base of the Siskiyou Mountains.

The scenic beauty and health-giving springs abounding in all portions of the county makes this the mecca of the summer tourist and health seeker. Chief among the noted resorts are the famous Shasta Springs, Neys Springs, Shasta Retreat, and Upper Soda Springs, all situated in the Sacramento Canyon; 750,000 gallons of the waters of these springs are bottled annually. Sisson, at the base of Mount Shasta, Garretsons Springs in the Siskiyou Mountains, and the Klamath Hot Springs are noted health resorts. In all portions of the county fish and game abound, making it an ideal field for the sportsman.

Some of the largest pine lumber mills on the coast are located here, chief among which are the McCloud and Weed Lumber Company's plants. Vast areas of the timber lands, after the removal of the timber, makes valuable farms.

Lumbering is the leading industry, with mining and live stock a close second and third.

The mountain regions furnish splendid range during the summer season for thousands of horses and cattle. New gold mines are being discovered, and old ones continue good with depth.

Yreka, the county seat, is the principal town. The courthouse, jail, and hospital are splendid buildings. Two electric plants furnish light and power. The city owns its own water system. Water is obtained from the adjacent mountains and, being filtered through gravel beds, is as pure as any in the State.

All this, added to our present prosperity, our temperate climate, and natural advantages, assures for Siskiyou County a bright future.

STATISTICS OF SISKIYOU COUNTY, 1907-8.

General Statistics.

Area, 6,048 square miles, or acres.	3,870,720
Number of farms	950
Number of acres assessed	1,864,460
Value of country real estate	$8,898,138
Of improvements thereon	$2,327,606
Of city and town lots	$346,835
Of improvements thereon	$864,000
Of personal property	$2,173,720
Total value of all property	$14,610,299
Expended on roads, last fiscal year	$50,330
Expended for bridges, last fiscal year	$7,091
Number of miles of public roads	1,050
Road levy per $100, 1908	40c
Value of county buildings	$100,000
Irrigating ditches, miles	300
Railroads, steam—miles, 1,722; assessed value	$4,385,346
Electric power plants—8; assessed value Electric power lines—miles, 90; assessed value	$72,650
Number of acres irrigated	33,000

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 3,000	....	$15,000
Flowers and plants, acres	75,000	75,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	80,000	32,000	$960,000
Barley	12,000	5,000	150,000
Oats	10,000	5,000	125,000
Total cereals	102,000	42,000	$1,235,000
Alfalfa hay	25,000	60,000	$600,000
Grain hay	2,000	4,000	40,000
Grass hay	12,000	30,000	300,000
Total hay	39,000	94,000	$940,000

Poultry and Eggs.

	Dozen.	Value.
Chickens	4,000	$20,000
Turkeys	150	2,700
Eggs	44,000	11,000
Total value		$33,700

Wines, Brandies, Etc.

	Gallons.	Value.
Shasta Springs water, bottled at springs	750,000	$50,000

Number of breweries, 3.

STATISTICS OF SISKIYOU COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	6,000	$240,000
Stock	32,640	489,900
Dairy cows—Graded	3,600	144,000
Calves	9,000	40,000
Swine	6,000	60,000
Horses—		
Thoroughbred	21	21,000
Standard-bred	1,000	100,000
Common	4,000	300,000
Colts	1,500	45,000
Jacks and jennies	100	10,000
Mules	635	31,750
Sheep	10,000	25,000
Angora goats	400	2,000
Total stock all kinds	74,896	$1,508,650
Wool, pounds	60,000	$9,000
Mohair, pounds	1,200	480

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres*	2,000,000	$30,000,000
Sawmills, number	42	......
Fuel, wood, cords	30,000	60,000
Lumber, feet	100,000,000	20,000,000
Total value		$50,060,000

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*Mixed timber.

Power used for mills and manufactories in county—Steam, 41; electrical, 6.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	7	700	$2,000,000
Cigars	3	10	20,000
Confectionery	1	6	10,800
Foundries and iron works	1	.....	......
Meat products—			
Hides		10,000	1,100

Fruits, Vegetables, Etc.

	Total Production. Pounds.	*Value.*
Green—		
Apples	200,000	$5,000
Beans	30,000	......
Beets	100,000	......
Cabbage	100,000	......
Celery	10,000	......
Onions	60,000	......
Pears	15,000	......
Peaches	30,000	......
Plums	10,000	......
Irish potatoes	1,000,000	......
Strawberries	7,500	......
Tomatoes	25,000	......
Totals	1,587,500	....

Late spring frosts practically destroyed the fruit crop.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	13,000	4,500	17,500
Apricot	550	50	600
Cherry	875	100	975
Nectarine	100	.....	100
Peach	4,600	1,000	5,600
Pear	2,500	500	3,000
Plum	3,200	400	3,600
Prunes	3,000	1,000	4,000
Total fruit trees	27,825	7,550	35,375
Almond	50	.....	.....
Walnut	300	.....	.....
Total nut trees	350	.....	.....
Berries, acres	50	.....	.....

Grapes not raised commercially.

Manufactured Output.

	Quantity.
Cigars, thousand	20,000

SOLANO COUNTY.

Nestled in the foothills of the Coast Range on its western border, and extending across broad acres of the most fertile land in bounteous California, till its eastern confines are marked by the majestic Sacramento River, lies Solano County. It is, in part, in the Sacramento Valley, the great stream of Northern California breaking through Solano's hills in the onward rush of ages toward the sea, and thousands of its acres being in the vast area that has been a world's granary for years, its products going to all lands. A quarter of a million acres, nearly half of Solano's area, is devoted to grain raising. The wheat grown here is the best milling wheat produced in the State. Thousands of cattle, horses, and sheep graze on the upland pastures and marsh lands, and great industrial establishments pay fortunes in wages annually, but the brightest gem in the diadem of resources and industries that marks the county's unquestioned leadership is the fruit produced in its sheltered valleys, a product that has made the county famous far and wide. The first deciduous fruit sold in the United States each year is grown in Solano County, where are several sequestered valleys, with gently rising slopes, sheltered by ranges of high hills that bar the egress of moisture-laden clouds in one season and shut out the hot, drying winds of another. Here the trees bloom in February and the fruit forms rapidly, ripening beneath the genial heat of the spring season, which is really early summer. In early April the shipments begin, and continue until late fall. The soil is unexcelled, even in California, for productiveness, and the fruit raised on the limited area is sold for millions of dollars annually, returning fortunes to the orchardists of this favored section. Citrus fruits are marketed here a month ahead of the Southern California products.

In the eastern section of the county, where the enterprise of man has wrested broad acres from overflow, is another fabulously rich section, the delta lands of the Sacramento River being noted for their productiveness. In addition, many large industrial establishments are located within the county, a great majority of the people being prosperous wage workers, whose yearly earnings, with the resources of the soil, the products of field, farm, and factory, make a story of wealth and prosperity that seems incredible, the income of the county from all sources exceeding the princely sum of twenty-two million dollars per year.

This favored section is of a limited area. From east to west its extreme length is 45 miles, while from north to south the county measures 35 miles. The surface of the county is 911 square miles, or 583,000 acres, of which 40,000 acres are water, included in the Sacramento River and Suisun and San Pablo bays. Besides its great natural resources, or rather because of them, Solano County ranks as one of the strongest counties in California, from a financial view-point. There is not a dollar of county debt, either bonded or floating. Three communities—Vallejo, Suisun, and Rio Vista—own their own water systems and supply their inhabitants at rates at least fifty per cent lower than those paid in cities depending upon private capital for this essential necessity. The real property and improvements in the county are worth, at a conservative valuation, $30,000,000, while the mortgages amount to the comparatively insignificant sum of $2,666,000, the major portion of which is represented in money invested in home building within the municipalities. The enormously rich agricultural and horticultural holdings are practically free of incumbrance.

The tax rate for county purposes is from $1.00 to $1.10 on the $100.00 outside incorporated cities and towns, and 40 cents less inside, where no levy is made for road purposes. The expenditures, while by no means extravagant, are liberal for school, road, and hospital expenses. The county salary roll, including township officers, is about $45,000 per year. The sum of $50,000 to $60,000 is annually spent on the roads, which are maintained in excellent condition throughout the year. Public schools cost over $130,000 per year, of which $37,500 is raised in the county tax. The sum of $17,500 is spent sprinkling the roads, and over $11,000 for the expense of the homeless, sick, and indigent.

CLIMATE.

As in other respects, Solano County is greatly favored in climate. The rainy months are from November to March, with desultory rains a month or six weeks earlier and later. The dry season is from six to eight months. Grain and hay are kept in the field till hauled for shipment. Snow and hail are practically unknown, and frosts rarely do any damage to even delicate plants. The average rainfall is sixteen to twenty inches, though it is greater in the fruit-growing sections. Intense cold is unknown, and at Mare Island Navy Yard and other industrial plants hundreds of men work in the open air the year round. In summer the heat is never oppressive, rarely going above 100 degrees Fahrenheit. The nights are cool, a breeze from the ocean coming each day at sunset, cooling the atmosphere, and greatly adding to the health and comfort of the people.

POPULATION.

The population in 1900 was 24,193, and is now estimated at 30,000, of whom nearly one half live in Vallejo and Benicia, the industrial centers of the county. The county could easily support double its present population.

ADAPTABILITY.

The land of Solano County varies in the purposes for which it is adapted, the following table having been compiled by E. N. Eager, when county surveyor, to show the area available for different modes of cultivation:

No. 1 fruit land	53,000 acres
No. 2 fruit or No. 1 grain land	240,000 acres
No. 2 grain or No. 1 pasture land	75,000 acres
Pasture land	45,000 acres
Mountainous grazing land	30,000 acres
Marsh or tule land	100,000 acres
Water	40,000 acres

STATISTICS OF SOLANO COUNTY, 1907-8.

General Statistics.

Area, 911 square miles, or 583,000 acres.	
Number of farms	2,950
Number of acres assessed	526,935
Value of country real estate	$10,105,639
Of improvements thereon	$1,926,289
Of city and town lots	$1,768,644
Of improvements thereon	$2,914,374
Of personal property	$2,505,712
Total value of all property	$19,230,683
Expended on roads, last fiscal year	$73,810
Expended for bridges, last fiscal year	$33,000
Number of miles of public roads	700
Road levy per $100, 1908	40c
Value of county buildings	$156,000
Railroads, steam—miles, 7,345; assessed value	$1,574,944
Railroads, electric — miles, 35; assessed value	$33,962
Electric power lines — miles, 113½; assessed value	$112,550
Number of acres irrigated	1,200

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	120,000	18,000	$540,000
Barley	55,500	20,000	600,000
Oats	7,000	1,000	30,000
Beans	800	.....	......
Corn	200	100	6,000
Total cereals	183,500	39,100	$1,176,000
Alfalfa hay	500	20,000	$160,000
Grain hay	1,500	20,000	200,000
Total hay	2,000	40,000	$360,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	2,350	.....	.....
Apricot	227,900	.....	.....
Cherry	40,500	.....	.....
Fig	5,600	.....	.....
Lemon	3,000	.....	.....
Nectarine	2,500	.....	.....
Olive	3,000	.....	.....
Orange	7,000	.....	.....
Peach	375,000	.....	.....
Pear	160,000	.....	.....
Plum	110,000	.....	.....
Prunes	350,000	.....	.....
Quince	500	.....	.....
Other kinds	120,000	.....	.....
Total fruit	1,707,350	.....	.....
Almond	100,500	.....	.....
Walnut	6,000	.....	.....
Total nut trees	106,500	.....	.....
Grapevines	2,570	.....	.....
Berries, acres	10	.....	.....

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	920,000	$110,400
Sweet wines	120,000	30,000
Beer, barrels	15,000	80,000
Brandy	100,000	75,000
Vinegar	1,500	500

Number of wineries, 3; distilleries, 3; breweries, 3.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	50,000	$2,500
Apricots	27,000,000	270,000
Blackberries	5,000	500
Beans	2,000,000	60,000
Corn	100,000	3,000
Cherries	1,700,000	85,000
Figs	600,000	6,000
Nectarines	100,000	10,000
Oranges, boxes	500	500
Pears	9,000,000	90,000
Peaches	3,500,000	140,000
Plums	5,500,000	550,000
Irish potatoes	1,500,000	15,000
Quinces	10,000	100
Tomatoes	100,000	4,000
Totals	51,165,500	$741,600
Dried—	*Pounds.*	*Value.*
Almonds	600,000	$48,000
Apricots	5,400,000	324,000
Beans	2,000,000	60,000
Currants	200,000	6,000
Nectarines	200,000	10,000
Pears	1,800,000	108,000
Peaches	4,600,000	184,000
Plums	280,000	8,400
Prunes	12,000,000	360,000
Walnuts	40,000	4,000
Silver prunes	200,000	10,000
Imperial prunes	50,000	2,000
Ruby prunes	200,000	10,000
Totals	27,570,000	$1,134,400
Canned—	*Cases.*	*Value.*
Tomatoes	15,000	$40,000
Asparagus	10,000	25,000
Totals	25,000	$65,000

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 250	.....	$250
Beeswax	500	100

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	6	......	......
Butter, pounds		440,000	$150,000
Cheese, pounds		10,000	1,000
Condensed milk, cases		10,000	20,000

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	60,000	$1,800,000
Stock	10,000	178,860
Dairy cows—Graded	5,000	175,000
Angus	1,000	50,000
Shorthorns	100	10,000
Calves	3,000	15,000
Swine	3,000	10,000
Horses—		
Thoroughbred	100	20,000
Standard-bred	1,000	100,000
Common	6,000	600,000
Colts	300	15,000
Mules	1,200	125,400
Sheep	125,000	250,000
Total stock all kinds	215,700	$3,349,260
Mohair, pounds	600,000	$100,000

STATISTICS OF SOLANO COUNTY, 1907-8—Continued.

Fish Industry.

	Pounds.	*Value.*
Salmon	474,771	$24,000
Codfish	500,000	50,000
Totals	974,771	$74,000

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	10,000	$50,000

Power used for mills and manufactories in county—Electrical, 1.

Manufactured Output.

	No.	*No. of Employes.*	*Quantity.*
Cement, barrels		600	1,700,000
Flour, barrels	2	150	300,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	5,000	$20,000
Ducks	75	500
Geese	20	240
Turkeys	100	2,400
Eggs	500,000	100,000
Totals	505,195	$123,140

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cement	1	600	$1,700,000
Flouring mills	2	150	1,200,000
Foundries and iron works	1	100	200,000
Salt	1	.....	4,000
Tanneries	2	300	1,900,000

SONOMA COUNTY

Sonoma County is bounded on the west by the Pacific Ocean, for more than 65 miles that boundary conforming to the irregularities of the shore, while on San Pablo Bay it has a frontage of 20 miles.

There is no sameness in the surface of the county. Variety is a leading characteristic. Valleys, and hills, and mountains appear to have been planned and distributed to give the best effect. The great central valley extends the entire length of the county from south to north, and commands attention by remarkable fertility. The area on which rough stone interferes with farming operations is small. Out of the area of land in the county at least 200,000 acres are valley land, the richest soil known, being a black loam; 200,000 acres are rolling or higher table land, of an exceedingly rich alluvial brown soil, with considerable sand. This is the best fruit land. We may class 200,000 acres as foothill lands, adapted to many kinds of agricultural and horticultural products and pasturage. At least 100,000 acres of mountain land are adapted to grazing, and about 80,000 acres are covered with redwood timber of a magnificent growth.

On the coast line are several small but valuable harbors, bays, and beaches.

Sonoma Valley is about 20 miles in length, with an average width of 8 miles. It lies parallel to Petaluma Valley, from which it is separated by a range of mountains.

The streams and water courses of Sonoma County are numerous. Russian River, the largest stream, enters on the north, flows in a southeasterly direction for 20 miles, turns at Fitch Mountain, and finds its way to the largest depression in the Santa Rosa basin, from which it breaks through a gap in the Coast Range to the Pacific Ocean. This river gathers the waters from three fifths of the area of the county.

Sonoma County, besides her great wine, fruit, dairy, stock, and other large industries, produces as much poultry and eggs as all the balance of the State put together. The advantages of the poultry and egg industry are its nearness to a reliable market, quick cash returns, and length of season. The vicinity of Petaluma is largely devoted to this industry; possibly one half of the poultry and eggs shipped from the county are from there. On an acre of ground can be raised and kept successfully 400 laying hens the year round. These chickens, with ordinary care and attention, such as an intelligent and industrious man would give to any business, will net the owner from $1 to $1.25 a hen clear profit a year, over and above the cost of feed, which is all purchased and paid for, except such as vegetables, kale, and feed raised in the garden. With a few acres well stocked with chickens a family can make a good, independent living. The poultry business is like the banking business—cash on the spot, and there is no surer road to success than along the chicken route in Sonoma County.

Cattle are raised on a large scale, principally for dairying purposes. Our grazing land is unsurpassed. In the valley lands it requires about 5 acres per cow per year for dairying purposes: in the hill lands from 10 to 15 acres per cow. In the northern part of the county sheep raising forms an important industry. Much of the coast region is devoted to pasturage purposes.

The moisture that rises from the ocean near the coast is absorbed by the ground, and from this fact the pastures are kept green nearly the year round, making this section the ideal spot for the dairyman and stock raiser. The breeds of milch cows represented are mostly Jerseys, Holsteins, and Ayrshires, with some strains of Durhams, and fine American breeds. All milk used at the creameries is bought and sold by weight. In well-managed dairies the yield of butter per cow per annum is from 150 to 200 pounds.

The value of the growth of stock cattle is $10 per head per year, until the limit is reached, and this without other feed than that obtained by grazing upon lands valued at from $10 to $40 per acre.

In the production of hops Sonoma County leads the world. There is no other county that can produce the quality equal to a choice Sonoma. Nearly all other hop-raising sections, outside of a few counties in this State, are subject to crop failures, caused chiefly by vermin, mold, honey-dew, rust, red spider, or severe storms. Such calamities are unheard of in this county. During the hop harvest the growers are favored with bright, sunshiny days. The very best quality of soil—and there is plenty of it—together with an excellent climate, is required for a successful culture of hops. In New York state hops grow on elevated land, while in Sonoma County the rich, sandy loam of the river and creek bottoms is employed. The richness of the soil, together with the adaptable climate, assures an average crop of about 1,800 pounds of dried hops to the acre. Most of the hops are shipped to Eastern and European markets, but there is a growing demand for our product in Australia, New Zealand, and the Orient.

This county produces large quantities of wheat, oat, barley, and alfalfa hay. Good hay can be raised wherever one can plow. It is harvested in May and June.

The soil is particularly adapted to oats, which many consider the most profitable of our grain crops. However, wheat, barley, and corn are extensively cultivated in every locality at a splendid profit. Corn is grown mostly on river-bottom land, and yields on an average 65 bushels to the acre.

One of the chief industries is fruit growing. The estimated value of a fruit tree from the time it is planted to the time it comes into bearing is $1 per year. The right season for planting is during February and March. While many fruit driers are operated, many authorities prefer the sun-drying process, which involves no expense and can always be relied upon. The sun-dried product is of superior quality and flavor, and will bring a correspondingly higher price.

The peach is a great favorite, as the trees commence to bear the second year after planting. The soil best suited to them is a sandy loam, and they may be cultivated with equal success either on the hillsides or in the valleys. After the trees come into bearing the income will depend principally upon the care bestowed upon them. Peaches of standard size for the market are those that will fill a 2-inch hole. If larger they are called "extras," and if smaller, "seconds." The latter are mostly used for drying. All varieties of the peach thrive.

Prunes should have the best quality of soil, for the tree is a heavy bearer.

The growing of citrus fruits, though comparatively a recent industry, has gained a strong foothold, and present indications point to a stead increase in acreage.

While the olive requires a good, well-drained soil, there are many orchards that are planted around the rocky foothills. They come into bearing after five or six years. Olive culture is making rapid strides. The oil produced has established an excellent reputation, and is usually sold ahead of its production.

Sonoma County is the true home of the English walnut. It is only recently that the walnut has attracted the attention of growers in this county, but now that its possibilities as a money-maker are becoming more widely known, the acreage devoted to its cultivation is rapidly increasing, and it promises to become one of our great industries.

Sonoma is the greatest blackberry county. The blackberry season begins in the latter part of June, and runs into September. Raspberries are harvested in May, June, July, and August.

Gooseberries are a valuable product, and here are raised the largest and finest varieties.

Many strawberries are not shipped, most of the supply being used for home consumption, but those raised are of the very best quality.

Sonoma grows vegetables throughout the year, and often raises from two to three crops annually. Potatoes are grown in almost every section, attain large size, and are of the finest quality. Asparagus is particularly adapted to the soil and climate. Tomatoes are produced in great quantities for canning. String beans are also grown extensively for this purpose. Sonoma watermelons are of large size and fine flavor.

Sonoma is the largest and most important grape and wine producing county in the State. Her wines are justly famed throughout the world. and took first premium at the Genoa Exposition in Italy in 1892. A gold medal was awarded at the World's Fair in Chicago in 1893, and also at the Midwinter Fair in San Francisco in 1894; and the grand prize, the highest award, was given her wines at the St. Louis World's Exposition by a jury composed of twenty-one members, most of whom were French and German experts. In order to accommodate the enormous yield of its own section alone, one wine company has erected a wine tank with a capacity of half a million gallons, the largest in the world.

Tobacco growing has made a fair start, and is one of the coming industries. The plant will thrive in almost every section, and is now quite extensively grown and manufactured in many localities, and the quality is excellent. David Hetzel has raised tobacco for many years near Guerneville.

The amount of lumber manufactured by the sawmills runs into millions of feet. A large amount of shingles, pickets, and shakes is made in the county.

John Schindler, near Melitta, has several hundred tea plants in his garden, and thinks he will be able to place his tea on the market in a year or so.

Labor commands good prices, especially competent and experienced farm hands.

Sonoma County has a large number of mineral springs.

The principal cities are: Santa Rosa, Sonoma, Petaluma, Healdsburg, Cloverdale, and Sebastopol.

The Japan current gives us unfailing rains, and regulates the temperature both summer and winter.

Compared with the East, our roads are more solid and permanent. This is due to the absence of excessive frosts, which crack and break up the hardest ground, of whatever material it is composed.

The many and varied health-giving mineral waters, fishing and hunting locations, and summer resorts, make this county a paradise for the pleasure seeker. Thousands of visitors spend the summer living in tents pitched along the many beautiful streams and in the numerous picturesque spots.

STANISLAUS COUNTY.

Stanislaus County is situated at the head of the San Joaquin Valley, 100 miles southeast of San Francisco, and 350 miles north of Los Angeles. It extends west to the ridge of the Coast Range, joining Santa Clara County; east to the Sierra foothills, joining Tuolumne and Calaveras counties, and it is bounded on the north by San Joaquin County, and on the south by Merced, both being valley counties. The San Joaquin River runs north and south through Stanislaus, having as tributaries the Tuolumne and Stanislaus rivers, which flow west from the high Sierras. A number of small streams flow to the San Joaquin from the Coast Range. There are mineral deposits of various kinds, including gold and mineral paints, in the Sierra foothills. Small timber abounds in the foothills and along the streams.

The foothill lands are devoted to grazing and grain farming, and the valley land, the greater part of which is under irrigation, to diversfied farming. Fruit raising and dairying predominate. In the center of the county is the Modesto-Turlock Irrigation District of 260,000 acres, incorporated under the Wright law; in the western part of the county, surrounding Newman, and on the east side, surrounding Oakdale, are private irrigation systems, watering about 20,000 acres.

The Southern Pacific and Santa Fe main lines pass through Stanislaus County, as well as two branch lines of the Southern Pacific, which skirt the eastern and western foothills. The Sierra Railway, reaching the southern mines, has a terminal in this county. An electric railway to Stockton and one across the county from Oakdale to Newman are projected.

Stanislaus County is fourth in the State in the value of her dairy products. Other important industries are the growing of deciduous fruits of all kinds, cantaloupe growing, sweet potato growing, grapes, berries, and vegetables. A cannery at Modesto and the Pacific Pea Packing Company's plant at Oakdale take care of the products of the orchard, while packing houses at Turlock furnish a market for sweet potatoes and cantaloupes.

Dredge mining on a large scale and quartz mining to some extent are carried on at La Grange, in the Sierra foothills.

Water for irrigation on the east side of the San Joaquin River is supplied from the Tuolumne and Stanislaus rivers, the water being diverted by large dams; the irrigated lands on the west side of the county are supplied by the Miller & Lux system, which takes water from the San Joaquin River.

STATISTICS OF STANISLAUS COUNTY, 1907-8.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	32,150	$160,750
Ducks	520	2,600
Geese	50	300
Turkeys	900	22,500
Eggs	750,000	187,500
Total value		$373,650

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	20,000	$160,000
Eucalyptus, acres	200	......
Total value		$160,000

Power used for mills and manufactories in county—Steam, 20; electrical, 38; water, 2; gasoline, 6; gas, 2.

STATISTICS OF STANISLAUS COUNTY, 1907-8—Continued.

General Statistics.

Area, 1,486 square miles, or 965,900 acres.

Number of farms	3,500
Number of acres assessed	879,035
Value of country real estate	$8,733,770
Of improvements thereon	$1,065,860
Of city and town lots	$775,255
Of improvements thereon	$1,039,850
Of personal property	$2,245,665
Total value of all property	$14,242,950
Expended on roads, last fiscal year	$61,801
Expended for bridges, last fiscal year	$13,149
Number of miles of public roads	740
Road levy per $100, 1908	40c
Value of county buildings	$75,000
Irrigating ditches—miles, ——; cost	$587,900
Railroads, steam—miles, ——; assessed value	$2,733,274
Electric power plants—3; assessed value Electric power lines—miles, 64; assessed value	$30,425
Number of acres irrigated	75,420
In irrigation districts, acres	265,000

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	2,111	$36,485
Stock	11,963	162,305
Dairy cows—Graded	12,102	307,480
Dutch Belted	35	7,000
Guernsey	2	200
Herefords	45	9,000
Holsteins	55	11,000
Red Polled	15	3,000
Shorthorns	9	1,800
Calves	7,564	67,655
Swine	3,500	29,475
Horses—		
Thoroughbred	44	8,055
Standard-bred	1,123	82,260
Common	5,477	219,635
Colts	1,781	37,110
Jacks and jennies	40	3,860
Total stock all kinds	101,869	$1,406,800
Wool, pounds	450,000	$45,000

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	4,884	1,625	6,509
Apricot	9,947	34,374	44,321
Cherry	1,438	1,799	3,237
Fig	5,892	153,048	158,940
Lemon	2,472	3,635	6,507
Nectarine	55	650	1,205
Olive	5,729	14,309	20,038
Orange	9,933	13,118	23,051
Peach	43,707	400,783	444,490
Pear	3,864	6,848	10,712
Plum	5,029	7,240	12,269
Prunes	6,342	6,077	12,419
Quince	85	91	176
Limes	64	46	110
Pomelos	31	40	71
Total fruit trees	99,472	643,683	744,055
Almond	7,519	57,289	64,808
Chestnut	75	.....	75
Walnut	4,416	3,383	7,799
Total nut trees	12,010	60,672	72,682
Grapevines, acres	3,680	4,480	8,160
Berries, acres	350	.....	350
Peanuts, acres	6	.....	6

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	60,000	$3,000
Apricots	200,000	8,000
Blackberries	26,250	2,500
Beans	600,000	25,000
Corn	25,000	2,500
Currants	2,250	150
Cherries	143,800	8,620
Figs	1,423,000	56,920
Gooseberries	....	310
Grapes	36,800,000	368,000
Grape fruit	3,100	310
Limes, boxes	50	......
Lemons, boxes	2,472	2,472
Loganberries	25,000	1,250
Oranges, boxes	19,666	19,666
Olives	458,520	9,170
Pears	309,120	12,364
Peaches	4,370,700	218,535
Plums	15,360	310
Irish potatoes	275,000	3,437
Sweet potatoes, crates	160,000	160,000
Prunes	6,500	500
Quinces	5,560	350
Raspberries	25,000	1,250
Strawberries	203,420	15,125
Tomatoes	1,514,260	5,285
Watermelons, tons	5,500	38,500
Canteloupes	45,000	22,500
Total		$985,714

Dried—	*Pounds.*	*Value.*
Almonds	750,000	$78,500
Apricots	120,000	9,600
Beans	550,000	22,000
Figs	550,000	22,000
Onions	900,000	6,750
Peaches	79,315	7,172
Peanuts	2,500	250
Raisins	500,000	15,000
Walnuts	50,000	6,000
Total		167,272

Canned—	*Cases.*	*Value.*
Apricots	1,000	$2,400
Pears	4,232	9,522
Peaches	18,316	43,958
Peas	25,000	47,500
Plums	666	1,265
Tomatoes	8,571	9,919
Totals	57,795	$114,564

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	141,167	11,000	$295,000
Barley	92,985	18,000	700,000
Oats	26,176	9,800	270,000
Rye	2,960	1,480	29,600
Corn	2,654	1,465	49,810
Total cereals	265,942	41,745	$1,344,410
Alfalfa hay	47,055	126,000	$1,260,000
Grain hay	.....	31,500	378,000
Total hay	.....	157,500	$1,638,000

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 5,200	.....	$5,200
Beeswax	3,500	875
Honey	910,000	72,800

STATISTICS OF STANISLAUS COUNTY, 1907-8—Continued.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	4	......	$396,294
Skimming stations	7	2,409,000	772,700
Butter, pounds..... ..		1,320,982	396,294
Cheese	1	24,000	3,120

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	1	13	$6,000
Cigars	2	4	6,000
Confectionery	6	12	25,000
Flouring mills......	1	10	8,800
Meat products—			
Hides	14	.....	7,550
Lard	14	.....	80,021
Tallow		.....	22,500
Olive oil...........	1	6	2,600
Pickled olives.......	1	6	200

Manufactured Output.

	No.	*No. of Employes.*	*Quantity.*
Brick, thousand....	1	13	600,000
Cement, tons.......	2	.....	200,000
Flour, barrels......	1	10	1,600
Hides, pounds......	14	.....	755,025
Lard, pounds.......	14	.....	800,210
Tallow, barrels.....	14	.....	4,500
Olive oil, gallons....	1	6	650
Pickled olives, gallons	1	6	200

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines...............	40,000	$16,000
Sweet wines............	16,000	8,000
Brandy	9,000	9,000
Cider	800	400
Whiskey	500	250

Number of wineries, 1; distilleries, 3.

SUTTER COUNTY.

Sutter County is the only county in the State that does not touch either of the principal mountain ranges, the greater portion of the county lying between the Feather River on the east and the Sacramento on the west. About one fourth of the county is "tule land," a large part of which is possible for reclamation. This land when reclaimed is of exceptional fertility. During the past season a new levee and reclamation system has been inaugurated in the western part of the county by which 15,000 acres of new land will be added to the producing area next year.

Sutter is a county that never has a "dry season," as the underground supply of moisture is always sufficient to furnish enough to produce crops.

Once a grain-growing community almost exclusively, it is now changing very rapidly to a fruit and dairy section, and this year the value of those branches of agriculture exceed that of the grain.

The winter of 1906-07 was noted as one of exceptional severity, and the flood of March, 1907, as the greatest ever known in the county. At that time a very large part of the county was under water. In spite of this flood, in which not a life was lost, and only a few head of stock were drowned, the agricultural output of the county was unusually large. This was evidenced late in the season when financial affairs were bad in some parts; not a ripple was caused in our county, and the usual amount of tax money was paid in by the residents. Sutter, while the fifty-seventh in size, ranks twenty-second in assessed value, having the highest assessed per capita of any purely rural community in the State.

Sutter is most noted as being the only prohibition county in the State, having adopted prohibition in 1893 and since resolutely maintained the same.

STATISTICS OF SUTTER COUNTY, 1907-8.

General Statistics.

Area, 384,079 acres.	
Number of farms	1,151
Value of country real estate	$7,046,620
Of improvements thereon	$1,445,970
Of city and town lots	$335,200
Of improvements thereon	$513,070
Of personal property	$1,195,594
Total value of all property	$10,536,454
Expended on roads, last fiscal year	$21,506
Expended for bridges, last fiscal year	$11,400
Number of miles of public roads	735
Road levy per $100, 1908	36c
Value of county buildings	$40,000
Irrigating ditches—miles, 8; cost	$10,000
Railroads, steam—miles, 36.63; assessed value	$901,453
Railroads, electric—miles, ——; assessed value	$150,500
Electric power plants, assessed value	$23,375
Electric power lines — miles, 46.75; assessed value	....
Number of acres irrigated	700

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	31,250	13,125	$420,000
Barley	36,000	7,750	217,000
Oats	3,150	1,688	47,952
Corn	2,070	2,684	77,836
Buckwheat	.....	272	8,160
Total cereals	72,470	25,519	$770,948
Alfalfa hay	2,541	13,975	$118,800
Grain hay	30,800	46,200	415,800
Grass hay	1,616	2,424	16,968
Total hay	34,957	62,599	$544,568

Dairy Industry.

	No.	*Production.*	*Value.*
Skimming stations	2	.....	......
Butter, pounds	2	.....	......
Cheese, pounds		586,690	$158,406
Condensed milk, cases		488,907	53,779

STATISTICS OF SUTTER COUNTY, 1907-8—Continued.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	2,014	$70,490
Stock	5,036	36,262
Dairy cows—Graded	3,725	11,175
Calves	2,538	25,380
Swine	5,415	......
Horses—		
Thoroughbred	9	10,800
Standard-bred	427	102,480
Common	2,263	169,725
Colts	1,144	80,080
Jacks and jennies	40	12,000
Mules	2,002	280,280
Sheep	36,851	73,700
Lambs	28,518	28,518
Total stock all kinds	70,563	$957,747
Wool, pounds	329,252	$29,632

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	4,573	1,825	6,398
Apricot	9,152	.....	9,152
Cherry	1,930	150	2,080
Fig	4,371	2,070	6,441
Lemon	785	265	1,050
Olive	1,453	.....	1,453
Orange	5,065	350	5,415
Peach	142,817	25,825	168,642
Pear	21,925	350	22,275
Plum	2,225	100	2,325
Prunes	58,750	2,055	60,805
Total fruit trees	253,056	32,990	286,036
Almond	55,352	20,280	75,632
Walnut	472	103	575
Total nut trees	55,824	20,383	76,207
Grapevines	3,025	930	3,955
Berries, acres	15	.....	15

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Flouring mills	1	8	$115,000
Cannery	2	600	292,000
Packing house	1	300	625,000

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	9,387	$42,241
Turkeys	1,655	39,720
Eggs	564,725	118,682
Totals	575,767	$200,643

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	311,130	$5,167
Apricots	363,480	2,726
Asparagus	20,000	1,250
Blackberries	10,000	700
Cabbage	50,400	504
Cherries	193,000	3,480
Grapes	3,450,000	14,000
Lemons, boxes	1,464	1,830
Oranges, boxes	4,910	4,910
Olives	70,144	2,805
Pears	3,047,700	38,096
Peaches	10,191,000	127,387
Plums	489,500	67,418
Irish potatoes	1,755,000	28,314
Tomatoes	427,500	1,710
Total		$300,399

Dried—	*Pounds.*	*Value.*
Almonds	83,028	$74,725
Beans	2,328,000	6,153
Figs	184,707	9,002
Prunes	462,500	18,500
Raisins	2,091,639	115,040
Totals	5,149,874	$223,490

Canned—	*Cases.*	*Value.*
Peaches	115,000	$292,000

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 1,219	.....	$2,438
Honey	113,025	10,172
Hops	134,000	10,720
Alfalfa seed	126,000	16,380

TEHAMA COUNTY.

Tehama County occupies the upper or northern portion of the Sacramento Valley. It is 200 miles north of San Francisco, and 120 miles north of Sacramento. Part of its eastern boundary follows the summit of the Sierra Nevada Mountains, and its western boundary lies along the summit of the Coast Range. Its greatest length is 78 miles; its width from north to south, 38 miles. Of its area, speaking roughly, 700,000 acres are agricultural lands, 800,000 grazing, and 500,000 timber.

Red Bluff is the county seat. It is a clean, modern little city, located upon an elevated plain, with superior drainage, and with the Sacramento River washing the foot of the bluffs on one side. Other towns are Corning, Tehama, Vina, Paskenta, and Kirkwood.

The county is easily reached, being on the line of the California and Oregon branch of the Southern Pacific Railroad. Two lines of this road converge at the town of Tehama, 12 miles below Red Bluff; one coming up the valley on the west side, and the other on the east side of the Sacramento River. North of Tehama there is but one line of track. The Sacramento River is navigable to Red Bluff, and steamboats from San Francisco and Sacramento make weekly trips up and down during most of the year.

Telegraph and telephone lines follow the railroad, and several private lines are in operation.

The public school system is complete and excellent. A school is maintained wherever there is need of one.

The Sacramento River runs through the county from north to south. From this river there is a rise to the east and west until the summit of the mountain range is reached. South of Red Bluff and west of the river lie broad plains; beyond these rolling hills developing into the foothills of the mountains, and then the mountains themselves, which rise quite abruptly to a height of from 3,000 to 9,000 feet.

In the alluvial land along the river the soil is mainly a dark brown, almost black, sandy loam, rich and deep. The table-land to the east is so rocky as to be of no use except for stock raising. On the west of the river the loamy lands merge into clayey loam second bottom; farther west is the sandier soil of the plains, gray, brown, and red in color; then the hills with reddish soil and gravelly loam. The creek bottoms have generally a yellowish soil. North of Red Bluff, in the hilly country, it is chiefly reddish clay and gravelly loam.

Tehama County is well watered. Numerous creeks carry streams from the mountain snows to the river. Wells can be dug anywhere to reach water at a moderate depth.

Irrigation is really not necessary, but experience has shown that plenty of water means an increase in product and variety. It is practiced to some extent, but mostly for the cultivation of alfalfa. There is a great deal of unappropriated water available for irrigation and the development of electric power, awaiting only the capital and energy to make it return a large profit.

The principal industries are horticulture, agriculture, stock raising, and lumbering. There is practically no mining. A large deposit of chrome ore to the west, valuable sulphur springs to the east, some indifferent placer claims to the north, and the story of mining is told.

The fruit industry gives employment to a large number of people, who can engage in healthful outdoor work in summer. Several thousand persons are directly or indirectly engaged in some branch of the fruit business.

Olives are fast coming into favor as a crop and as a food. The tree grows rapidly and yields abundantly. The fruit brings a good price, and the demand is constant and growing. The fruit is pickled green or ripe.

Oranges and lemons do well and bear abundantly. No attempts were made to plant them in quantity until within the past few years. There are in yards all over the county numberless trees that bear profusely. Several small orchards have been planted within the last few years, but they have not yet come into bearing. The trees are healthy and vigorous.

Almonds are being grown with success.

Raisin grapes, and indeed all grapes, grow remarkably well. The raisins can be cured in the sun during the long summer days.

An immense winery is located on the Stanford ranch, in the southern part of the county.

Peaches are the principal fruit. They are shipped green, and are canned and dried. The bulk of the crop is dried.

Prunes are readily cultivated and yield abundantly.

The apricot is the third fruit in importance. All the apricots are dried. The pits are sold for fuel, or for extracting the oil, which is used by druggists and confectioners.

Pears do well. The fruit is nearly all shipped green. The Bartlett is the favorite.

Figs are attracting more attention since the procurement of blastophaga, the insect which fertilizes the Smyrna fig. A great many of these trees are now being planted, and no doubt this fruit will assume a larger place in the output of the county hereafter.

Apples are grown only in the foothills. The chief apple-producing region of the county is at Manton, 35 miles to the northeast of Red Bluff, where very fine apples are raised.

Berries and all small fruits do well. They come into market early and sell readily.

In agriculture there has been a gradual change from the growing of wheat to fruit or other grains.

Hay is made from a mixture of wild oats and wheat grown together and cut when just on the point of turning. It is cured on the ground and then stacked.

Alfalfa, where water can be obtained, is the best of all forage crops. It is a splendid feed for cattle, hogs, and horses.

Experiments are being made looking toward the cultivation of hops and sugar beets.

The stock business is carried on under conditions that differ from those of the Eastern States, and are differing from those of former years here. The owner of cattle, sheep, and goats finds it necessary to own or control two ranges; one in the valley for the winter months, and one in the mountains for the summer season. Considerable land has been withdrawn into temporary forest reserves. The number of men engaged in the stock business has greatly increased, and range land has been in greater demand as a consequence.

Sheep raising is easily the favorite branch of the stock business. This is the principal wool-producing county of Northern California, and indeed of the State. Twice each year the buyers come here, and there is a busy time until the wool is sold. It is sometimes bought before the sheep are sheared. The favorite breeds of sheep are Spanish Merino, French Merino, Southdown, and Cotswold for wool, and Shropshire more particularly for mutton.

The cattle business is conducted in much the same general way as the sheep business, except that the animals do not require constant care and herding; there is a further difference, that nearly every farmer has at least a few head of cattle, while but few of them have any sheep. The favorite breeds of cattle are Holstein, Hereford, Jersey, and Durham.

Of late years Angora goats have come into greater favor. They are hardy animals, readily adapting themselves to a mountainous and hilly country which no other animal can occupy. They will eat almost anything; can protect themselves from wild animals, and their wool or mohair is in demand and brings a good price.

There is everywhere plenty of timber of various kinds for fuel, posts, etc., for immediate local use. Oaks are the principal trees of the valley, except along the streams, where willows, cottonwoods, and sycamores abound. Oak wood is the favorite fuel. But in the Sierras there is a magnificent belt of timber containing a great preponderance of sugar pine, which is one of the finest of timber trees. Several sawmills are located in this timber belt, and most of the land, if not all, is now owned by private individuals or corporations.

The wool, lumber, stock, fruit, hay, grain, etc., can all be sold at Red Bluff. A market is always available in San Francisco; and in Red Bluff, the county seat, there are local individuals and firms ready and willing to buy all of these products that are offered. There are two large packing houses for fruit, warehouses for wool and grain, livery stables for hay, a flouring mill for wheat, and railroad and river means of transportation.

The large land holdings are being broken into smaller tracts to encourage immigration and settlement. The outlook is most hopeful.

STATISTICS OF SUTTER COUNTY, 1907-8—Continued.

Wines, Brandies, Etc.

Number of wineries, 2; distilleries, 1.

Dairy Industry.

	No.	Production.	Value.
Creameries	3	.....	......
Butter, pounds		168,280	$42,070
Cream, gallons		26,414	26,414
Milk, gallons		354,743	70,948

Miscellaneous Products.

	Pounds.	Value.
Bees, hives, 375	.....	$375
Honey	3,880	388
Hops	253,000	20,240
Syrup, gallons	1,000	500
Sugar beets, tons	2,315	18,520
Mustard seed	4,000	150
Peach pits, sacks	2,083	2,083
Preserves, gallons	300	300

STATISTICS OF TEHAMA COUNTY, 1907-8.

General Statistics.

Area, 3,200 square miles, or acres.	2,048,000
Number of acres assessed	1,265,370
Value of country real estate	$6,714,675
Of improvements thereon	$933,085
Of city and town lots	$582,585
Of improvements thereon	$1,103,390
Of personal property	$2,445,525
Total value of all property	$11,779,260
Expended on roads, last fiscal year	$42,096
Expended for bridges, last fiscal year	$14,000
Number of miles of public roads	820
Road levy per $100, 1908	38c
Value of county buildings	$75,000
Irrigating ditches—miles, 350; cost	$52,500
Railroads, steam—miles, 57.83; assessed value	$1,499,328
Electric power lines—miles, 101; assessed value	$52,050
Number of acres irrigated	2,000
Telegraph lines—miles, 116	$10,650
Telephone lines—miles, 115	$8,810

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Wood boxes	1	30	$125,000
Brick	1	6	4,500
Brooms	1	3	9,750
Cigars	2	5	18,780
Confectionery and ice cream	4	7	30,000
Flouring mills	2	8	125,000
Foundries and iron works	1	2	10,000
Furniture and picture frames	3	.....	11,450
Jewelry	1	1	2,000
Leather goods	4	7	12,350
Mineral water	..	.....	500
Meat products—			
Hides and pelts	..	.....	11,537
Lard	..	.....	5,000
Meat packed	..	.....	28,000
Tallow	..	.....	3,200
Olive oil	..	.....	24,000
Pickled olives	..	.....	7,500
Ice	..	.....	6,500
Planing mills*			
Salt, mineral	..	.....	2,500
Artificial stone	1	10	10,000
Soda water	2	3	4,000
Syrups and extracts	4	5	1,500
Tamales	7	.....	7,000
Tiling	1	3	3,500
Tin and galvanized iron	3	6	18,000
Medicine	..	.....	600
Cement blocks	..	.....	9,000
Gas works	1	6	7,350

*Included in sash and door factory.

A woolen mills and scouring plant is under construction.

Manufactured Output.

	Quantity.
Brick, thousand	700
Brooms, dozen	3,000
Cigars, thousand	268
Flour, barrels	31,250
Hides, pounds	63,680
Lard, pounds	50,000
Meat packed, pounds	400,000
Tallow, barrels	200
Olive oil, gallons	12,000

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	532,440	$7,987
Apricots	265,750	3,986
Asparagus	60,000	4,800
Blackberries	60,000	3,600
Beans, string	90,000	5,400
Beets	45,000	675
Cabbage	130,000	1,625
Celery	15,000	375
Cauliflower	30,000	2,400
Corn	160,000	3,200
Currants	5,000	500
Cherries	125,000	5,000
Gooseberries	6,000	480
Grapes	14,440,000	288,800
Lemons	8,000	100
Loganberries	8,000	400
Nectarines	20,000	200
Onions	30,000	750
Oranges, boxes	4,350	4,350
Olives	185,203	7,408
Pears	2,622,892	26,229
Peaches	195,255	3,000
Peas	89,450	7,156
Grape fruit, assorted	361,980	5,430
Plums	6,736	68
Irish potatoes	863,820	8,638
Sweet potatoes	188,000	1,880
Prunes	26,450	265
Quinces	21,000	263
Raspberries	10,000	1,000
Strawberries	25,150	2,515
Tomatoes	400,000	4,000
Melons	758,000	3,790
Assorted vegetables	110,310	4,500
Sugar beets	4,630,000	18,520
Totals	26,528,786	$429,290
Dried—	*Pounds.*	*Value.*
Almonds	338,155	$33,816
Apples	161,044	8,052
Apricots	511,430	30,686
Beans	176,000	5,280
Figs	60,000	1,200
Onions	150,000	1,500
Pears	1,056,720	73,970
Peaches	2,998,168	149,908
Peanuts	5,100	306
Plums	56,833	2,842
Raisins	42,000	2,520
Walnuts	14,000	1,400
Assorted dried fruit	1,466,936	73,347
Totals	12,029,456	$588,802

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	95	$2,850
Stock	27,875	391,990
Dairy cows—Graded	9,250	37,000
Angus	271	15,760
Ayrshire bulls	74	3,100
Ayrshire yearlings	96	1,980
Swine	6,981	27,924
Horses—		
Thoroughbred	15	5,700
Standard-bred American	2,158	117,025
Common	2,215	67,665
Colts	885	18,060
Jacks and jennies	25	3,840
Mules	1,010	63,630
Sheep	222,480	500,585
Common goats	27,096	40,645
Total stock all kinds.	302,916	$1,209,844
Wool, pounds	3,429,338	$342,934
Mohair, pounds	156,120	24,979

STATISTICS OF TEHAMA COUNTY, 1907-8—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	Tons.	Value.
Wheat	28,900	2,252	$67,560
Barley	31,360	1,994	49,850
Oats	2,000	374	11,220
Hops	150	127	17,789
Corn	75	50	1,600
Potatoes	215	500	10,000
Beans	200	88	5,280
Total cereals	62,900	5,385	$163,290
Alfalfa hay	1,950	25,108	$251,080
Grain hay	25,500		
Total hay	27,450	25,108	$251,080

Forest Products.

	Amount.	Value.
Sawmills, number	2	......
Fuel, wood, cords	7,113	$21,339
Lumber, feet	23,456,000	375,296
Posts, pieces	40,098	5,013
Railroad ties, pieces	10,000	2,500
Sash and door, factories, number	1	100,000
Shakes, thousand	555	5,550
Totals	23,513,766	$509,698

Power used for mills and manufactories in county—Steam, 3; electrical, 3; water, 1.

Number of Fruit Trees and Vines.

	Bearing.	Non-Bearing.	Total.
Apple	18,400	3,750	22,150
Apricot	63,410	1,000	64,410
Cherry	4,825	245	5,070
Fig	10,590	2,535	13,125
Lemon	615	170	785
Olive	60,200	7,260	67,460
Orange	9,240	3,540	12,780
Peach	655,650	113,750	769,400
Pear	59,300	3,750	63,050
Plum	7,000	.....	7,000
Prunes, French	97,050	6,995	104,045
Other prunes	10,830	825	11,655
Total fruit	997,110	143,820	1,140,930
Almond	34,845	350	35,195
Walnut	3,500	.....	3,500
Total nut trees	38,345	350	38,695
Grapevines	2,775	.....	2,775
Berries, acres	60	.....	60

Poultry and Eggs.

	Dozen.	Value.
Chickens	28,833	$91,332
Turkeys	3,054	73,296
Eggs	228,330	68,499
Totals	254,217	233,127

TRINITY COUNTY.

Trinity County, being on the great mineral belt extending through the northwestern part of the State, has for its principal industry quartz, hydraulic placer, and dredge mining for gold, the La Grange placer mine being noted as the largest and best equipped placer mine in the world; the Hupp placer mine as having been continuously worked since 1854. Many others too numerous to mention have been steadily at work from thirty to forty years. Of quartz mines those at Deadwood, Trinity Center, Coffee Creek, Canyon Creek, East Fork, New River, and elsewhere have been and are still producing large quantities of gold. Recent discoveries of very rich telluride ores have given a new impetus to the exploitation of hitherto unprospected areas. Recent tests of the black sands, which are found in great quantities in this county, show platinum, osmiridium, and gold to the value of several hundred dollars per ton, and opens up a chance for a new and very profitable industry. The mineral product of the county approximates $1,000,000 per annum of gold, silver, platinum, and quicksilver. Many veins of copper, coal, iron, chrome iron, asbestos, and molybdenum are found in different parts of the county, but none of these have been exploited to any extent. Large deposits of limestone are numerous, and large areas of auriferous ores exist, awaiting exploitation and development. Numerous mineral springs of valuable curative qualities have been found in different parts of the county. With ample water power and plenty of timber, Trinity County is a prolific field for the prospector and mining investor. Farming and stock raising productions come next to mining in value. The southern portion of the county is well adapted for farming, dairying, fruit, poultry, and stock raising. Fruits, berries, vegetables, hay and grain do well in all parts of the county and are in demand at good prices. Poultry and swine products are always in demand in excess of the supply, the mines and incidental industries making a good market for all such products. The Trinity River, a non-navigable stream, has its source at the northeastern end of the county, and with its tributaries drains the greater portion of the county, discharging its waters into the Klamath River, which flows into the Pacific Ocean. Along the Trinity, Mad, Eel, and Van Duzen rivers with their tributaries are many small fertile valleys, and throughout the hills and mountains are many spots of good land suitable for farming and stock raising. Bees do well, but this industry is very limited at present. Mail routes extend over the entire county; good schools have been established in every section where needed, and at the last election it was voted to establish a high school. Trinity will have educational facilities equal to any county in the State. Wagon roads furnish the only mode of travel into the county. Different routes can be taken to reach different sections of the county. From Siskiyou County via Scott Mountain to Trinity Center; from Delta, Shasta County, to Trinity Center; from Redding, Shasta

County, via French Gulch, Deadwood, and Lewiston to Weaverville, the county seat, this being the regular mail route; or from Redding by Lewiston turnpike, or the Buckhorn routes to Weaverville; from Ono, in Shasta County, via Bullychoop mine; from Red Bluff, Tehama County, to Hay Fork Valley; from Covelo, Mendocino County, and from Bridgeville and Blocksburg, in Humboldt County, good roads extend into the southern part of the county. Also from Korbel, in Humboldt County, to the southwestern part of the county. Lumbering will soon be a very important industry, as hundreds of entries have been made of first-class pine, sugar pine, and fir timber. Trinity County is out of debt, and as new and diversified industries spring up the assessment roll of the county is bound to greatly increase in the near future with a corresponding decrease in the tax rate. The climate of Trinity is temperate. At the higher elevations considerable snow falls during the winter; below elevations of three thousand feet, if any snow falls, it soon disappears. Game and fish are plentiful, and together with the rugged mountain scenery are very enticing to the sportsman and tourist.

STATISTICS OF TRINITY COUNTY, 1907-8.

General Statistics.

Area, 3,000 square miles, or acres.	1,920,000
Number of farms	312
Number of acres assessed	655,559
Value of country real estate	$2,107,376
Of improvements thereon	$258,440
Of city and town lots	$28,506
Of improvements thereon	$82,504
Of personal property	$369,818
Total value of all property	$2,844,810
Expended on roads, last fiscal year	$8,090
Expended for bridges, last fiscal year	$7,976
Number of miles of public roads	472
Road levy per $100, 1908	40c
Value of county buildings	$20,000
Irrigating ditches—miles, 215; cost	$21,500
Ice plant	$1,000
Railroads, steam—miles, ¾; assessed value	$500
Electric light plants—6; assessed value	$21,800
Electric power plants—3; assessed value	$20,500
Electric power lines—miles, 33; assessed value	$7,500
Number of acres irrigated	9,640
Mining ditches—miles, 489; cost	$978,000
Miles of public trail	606
Gold mining claims	1,681
Quicksilver mining claims	28
Copper mining claims	18

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	1,050	$4,200
Ducks	20	100
Geese	5	40
Turkeys	90	1,620
Eggs	100,000	20,000
Total value		$25,960

Dairy Industry.

	Production.	*Value.*
Butter, pounds	82,000	$24,600

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	1,500,000	$30,000
Asparagus	1,000	50
Blackberries	32,000	2,560
Beans	140,000	4,200
Beets	60,000	1,200
Cabbage	110,000	2,200
Celery	1,500	75
Cauliflower	3,000	90
Corn	100,000	2,000
Cherries	16,500	990
Figs	600	30
Grapes	97,000	1,355
Onions	56,500	1,130
Pears	54,000	1,080
Peaches	60,000	1,200
Peas	10,000	400
Plums	40,000	800
Irish potatoes	690,000	13,800
Sweet potatoes	1,500	45
Prunes	2,200	600
Quinces	......	750
Raspberries	......	1,370
Strawberries	......	3,520
Tomatoes	......	3,800
Totals	2,975,800	$73,280

Dried—	*Pounds.*	*Value.*
Apples	8,000	560
Beans	12,000	360
Onions	20,000	500
Pears	2,000	140
Peaches	5,000	350
Plums	2,000	100
Prunes	1,500	45
Totals	50,500	$2,055

Wines, Brandies, Etc.

	Gallons.	*Value.*
Beer, barrels	150	$900
Cider	2,000	1,000
Vinegar	5,000	1,500

Number of breweries, 1.

STATISTICS OF TRINITY COUNTY, 1907-8—Continued.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	5,100	1,900	7,000
Apricot	40	10	50
Cherry	550	50	600
Fig	22	18	40
Lemon	15	10	25
Nectarine	14	.....	14
Olive	5	27	32
Orange	7	13	20
Peach	1,200	225	1,425
Pear	720	30	750
Plum	525	75	600
Prunes	726	43	769
Quince	122	37	159
Total fruit trees.	9,046	2,438	11,484
Almond	21	4	25
Chestnut	45	15	60
Pecan	2	.....	2
Walnut	187	42	229
Other nuts	.....	7	7
Total nut trees..	255	68	323
Grapevines, acres.	.....	.....	35
Berries, acres—			
Blackberries	.....	.....	30
Currants	.....	.....	2
Gooseberries	.....	.....	3
Raspberries	.....	.....	25
Strawberries	.....	.....	50

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	2,400	960	$38,400
Barley	112	56	2,240
Oats	225	90	3,850
Rye	45	25	1,000
Corn	210	121	5,445
Total cereals.	2,992	1,252	$50,935
Alfalfa hay	1,702	8,510	$102,120
Grain hay	6,320	7,900	118,500
Grass hay	5,120	8,192	122,880
Total hay	13,142	24,602	$343,500

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	950	$23,750
Stock	14,191	184,483
Dairy cows—Graded	496	11,408
Angus	50	5,000
Calves	2,100	8,400
Swine	2,250	11,250
Horses—		
Thoroughbred	3	750
Standard-bred	1	100
American	171	12,825
Common	1,837	64,295
Colts	280	4,280
Jacks and jennies	24	648
Mules	275	13,750
Sheep	2,870	8,616
Lambs	1,200	1,200
Common goats	375	1,125
Total stock all kinds..	27,073	$351,800

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	1,106,880	$5,475,200
Cedar, acres	5,000	......
Pine, acres	400,000	......
Redwood, acres	701,880	......
Sawmills, number	19	......
Fuel, wood, cords	22,350	89,400
Lumber, feet	4,106,000	82,120
Posts, pieces	8,200	820
Shakes, thousand	126,000	1,260
Shingles, thousand	6,000	360
Mining timbers, feet..	215,000	6,450
Lagging	187,000	6,554
Total value		$5,685,069

Power used for mills and manufactories in county—Steam, sawmills, 75; water, sawmills, 12; steam, quartz mills, 8; water, quartz mills, 20; electrical, quartz mills, 3.

Manufactured Output.

	Pounds.	*Value.*
Bees, hives, 51	.....	$102

TULARE COUNTY.

Tulare County, out of which three or four valley counties have been carved, is still one of the largest. It is about the size of Connecticut, and is almost square. It is remarkable for the height and beauty of its mountains, for its enormous groves of giant sequoia, for the fertility of its soils, for the abundance of water courses, for the variety of products, for scenery that many declare to be superior to the Yosemite, for the highest mountain (Mount Whitney) in the United States on its eastern border, for the successful citrus territory, where are grown oranges that equal the finest produced, and for being the earliest section to be settled up and devoted to agricultural purposes. It is one of the greatest stock-raising counties. Cattle are raised for meat rather than for dairying, although the latter industry is keeping pace. The glory of Tulare is its deciduous fruit orchards, all along the channels of the Kaweah and Tule rivers. The soil is a deep alluvial loam, rich in nitrates and potash, and free from alkali.

Late frosts are rare. The spring is warm and early, which gives the fruit a perfect richness and sweetness.

While irrigation is general, at least to the extent of giving the trees one good drenching a year, there are many ranches where the underflow is only 6 to 12 feet from the surface, rising even higher in spring, and therefore no artificial watering is needed.

The principal town and the county seat is Visalia. It is the oldest city in the valley, having been founded in 1852 by the brothers Vice, for whom it was named. It is a modern, well-improved, prosperous city, with every prospect of continuous active growth. In the old days it was the starting point of the overland stage, and to-day it is said of Visalia that it represents more per capita wealth than any other city of like population. Visalia is midway between San Francisco and Los Angeles, but it was not until 1897 that it was connected with the main lines of the railroad. Electric power is supplied from a mountain water course.

Tulare City is the second in point of size; it is about 10 miles south of Visalia. The main line of the Southern Pacific and the Tulare-Visalia line of the Santa Fe pass through the city. In the surrounding country, cattle, hogs, and horses are raised, and there are flourishing orchards and broad wheat and alfalfa fields. It has substantial brick buildings, on broad, beautiful streets.

The famed citrus belt of Tulare lies about 12 miles east of Visalia, and includes a series of settlements, or districts, chief of which are Lindsay, Exeter, and Porterville. This land is practically frostless. The soil is known to contain in exact proportions the elements needed for the growth of citrus trees. Freedom from fog gives immunity from insect pests, which need moisture in the air to prosper. The long, warm summer brings the fruit to maturity earlier than is the case farther south, and as a result Tulare fruit reaches the Eastern market in

November and the first weeks of December, in time for the Christmas trade.

Most of the district has a plentiful supply of water in the form of an underflow—a natural reservoir at a depth of from 50 to 75 feet. It is raised by pumping. Formerly the pumps were operated by gasoline, but electricity is now available at a reasonable price. Farmhouses are lighted by electricity, and the cities of Visalia and Tulare and the towns of Exeter, Lindsay, and Porterville are supplied from the same plant.

The Porterville oranges have repeatedly carried off first prize in the citrus fairs of the State.

In the Alta district, in the northwestern part, a considerable acreage is devoted to raisins, which do well in this county, although their cultivation has not been attempted on so extensive a scale as elsewhere.

Situated midway between the cities of Los Angeles and San Francisco, the dairyman is enabled to take advantage of varying market conditions to scure the highest prices. There has been a marked increase in the dairy interests. Another noticeable gain was made in horses and mules. There is a growing demand for draft horses and large-boned, big-muscled mules, and these animals command good prices.

Soil and climate are generally adapted to diverse products. A crop of grain hay may be cut in May, and a harvest of potatoes, squashes, Indian or Egyptian corn taken from the same field in October. Alfalfa is one of the best honey plants. It supplies poultry with green feed the entire year. Its succulent shoots promote the rapid growth of young pigs and calves. The problem of meeting bills does not confront the diversified farmer. He has always something to sell. There is no waste. The hog gets what the reaper overlooks. The chicken in turn finds what the pig misses. A vast saving in labor is effected. With the aid of his family, daily tasks, trivial in themselves, accumulate in results that materially swell the income. Nor is there either drudgery or monotony on a farm of this kind. Varied interests and changing occupations give zest to life and rob labor of its burdens.

Alfalfa hay has a broad market for shipment. Squashes, onions, and beans command good prices. Honey has an unlimited market, it being shipped East in carload lots. Poultry and eggs are higher than in the East, and their production cheaper. Berries of all kinds thrive, and meet with a ready demand in the local market.

STATISTICS OF TULARE COUNTY, 1907-8.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	89,032	4,388	$1,174,250
Barley	21,607	8,271	231,845
Oats	1,140	641	18,430
Corn	5,493	3,559	103,980
Total cereals	117,272	.....	$1,528,505
Alfalfa hay	29,520	.....	$373,216
Grain hay	40,324	.....	347,801
Grass hay	.....	.....	36,056
Total hay	69,844	.....	$757,073

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	7,000	$140,000
Cedar, acres	1,750	......
Pine, acres	1,400	......
Redwood, acres	3,850	......
Sawmills, number	6	......
Fuel, wood, cords	8,325	36,125
Lumber, feet	4,115,500	201,080
Pickets, pieces	40,000	1,000
Posts, pieces	11,500	975
Shingles, thousand	250	625

Power used for mills and manufactories in county—Steam, 171; electrical, 3,055; water, 50.

STATISTICS OF TULARE COUNTY, 1907-8—Continued.

General Statistics.

Number of farms	4,718
Irrigating ditches—miles, 411; cost	$588,355
Electric power plants—2; assessed value	....
Number of acres irrigated	121,649

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	983,200	$16,510
Apricots	770,000	13,662
Blackberries	173,500	8,660
Beans	20,000	800
Beets	4,000	80
Cabbage	32,000	550
Corn	10,000	300
Cherries	750	60
Figs	......	150
Grapes	18,074,000	109,908
Grape fruit	13,180	6,660
Limes, boxes	40	160
Lemons, boxes	87,280	168,690
Loganberries	30,750	1,385
Nectarines	29,400	310
Onions	87,500	1,250
Oranges, boxes	1,034,012	4,416,662
Olives	15,500	310
Pears	230,000	2,950
Peaches	10,863,000	112,629
Peas	60,000	1,800
Plums	232,000	2,634
Irish potatoes	2,202,000	20,819
Sweet potatoes	50,000	950
Prunes	3,832,000	112,668
Quinces	600	30
Raspberries	2,000	150
Strawberries	103,500	6,530
Tomatoes	100,000	900
Totals	39,040,212	$5,008,167

Dried—	*Pounds.*	*Value.*
Almonds	24,200	$2,345
Apples	200,830	10,137
Apricots	200,830	10,137
Beans	60,700	3,321
Figs	342,500	6,980
Grapes	5,415,000	148,800
Nectarines	24,000	1,200
Pears	2,500	500
Peaches	8,315,000	411,219
Plums	6,500	320
Prunes	4,036,000	71,763
Raisins	10,119,000	342,345
Walnuts	18,600	1,870
Totals	28,564,830	$1,000,800

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	176,000	$65,250
Sweet wines	440,000	132,000
Brandy	55,000	40,250

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick	1	21	$12,750
Flouring mills	3	19	......
Foundries and iron works	1	5	10,000
Planing mills	4	35	......
Granite	5	36	......
Sugar, beet	1	165	225,000
Tin and galvanized iron	2	15	18,000
Soda works	1	.....	......
Ice plant	1	.....	......

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	14,914	$296,446
Stock	73,115	1,086,025
Dairy cows—Graded	11,137	379,860
Herefords	110	4,700
Holsteins	211	20,200
Jersey	585	30,800
Polled Angus	15	1,200
Shorthorns	73	6,200
Calves	15,627	155,709
Swine	36,402	182,625
Horses—		
Thoroughbred	19	16,400
Standard-bred	72	24,700
Common	15,509	1,199,410
Colts	3,292	134,200
Jacks and jennies	25	6,250
Mules	3,004	319,575
Sheep	62,049	238,372
Lambs	25,400	71,100
Angora goats	2,153	6,715
Common goats	583	1,228
Total stock all kinds	264,295	$4,181,715
Wool, pounds	384,300	$38,430
Mohair, pounds	7,800	5,624

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	27,389	13,584	40,973
Apricot	41,978	8,783	50,761
Cherry	227	95	322
Fig	9,119	14,475	23,594
Lemon	40,960	6,416	47,376
Nectarine	2,809	371	3,180
Olive	5,880	2,422	8,302
Orange	816,964	653,039	1,470,003
Peach	474,543	534,996	1,009,539
Pear	6,117	6,170	12,287
Plum	7,947	2,100	10,047
Prunes	1,095,585	39,739	1,135,324
Quince	683	350	1,033
Other kinds	4,446	550	4,996
Total fruit	2,534,647	1,283,090	3,817,737
Almond	2,087	590	2,677
Chestnut	75	150	225
Pecan	18	10	28
Walnut	1,047	1,585	2,632
Other nuts	270	20	290
Total nut	3,497	2,355	5,852
Grapevines	3,374	965	4,339
Berries, acres	96	39	135

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	16,677	$57,745
Ducks	216	1,231
Geese	58	627
Turkeys	990	14,165
Eggs	617,580	133,576
Total value		$207,344

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	6	.....	......
Skimming stations		8,916,221	......
Butter, pounds		1,554,625	$421,879
Cheese, pounds		70,500	7,500
Cream shipped		273,405	......
Milk		50,000	10,000

STATISTICS OF TULARE COUNTY, 1907-8—Continued.

Manufactured Output.

	Quantity.
Brick, thousand	1,700,000
Cigars, thousand	80,850
Flour, barrels	18,000
Lime, barrels	5,000
Hides, pounds	110,500
Olive oil, gallons	1,550
Pickles, olive, gallons	2,100
Soap, pounds	5,000
Soda works, tons	990

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives	2,727	......
Flowers and plants, acres	30	$5,000
Honey	123,550	......
Alfalfa seed	130,450	......
Sugar beets, tons	9,675	......
Tobacco	10,000	4,000
Nursery stock—		
Peach trees	.....	88,500
Orange trees	.....	133,000

VENTURA COUNTY.

Ventura County, one of the smallest of the group of seven southern counties, lies between Santa Barbara County on the north and west, and Los Angeles County on the south and east, on the shores of the Santa Barbara Channel. The county is triangular in shape, one face of the triangle, full 50 miles, fronting the ocean.

Of its area of 1,852 square miles, less than one fourth is under cultivation. Back from the coast in all directions rise rugged mountain ranges, whose hearts are pierced in every direction with canyons and valleys of varying width. The entire northern section of the county is mountainous, but between the ranges here and there are to be found little valleys, whose soil is the most productive in the world.

The mountain watersheds supply innumerable streams which, flowing in different directions, form the two principal rivers of the county, from which is obtained a vast quantity of water for irrigation. These two rivers, the Santa Clara and the San Buenaventura, rise in these northern mountains, their sources being separated but a few miles. The Piru River, the Sespe, and the Santa Paula, each of considerable length from its winding through the mountain gorges and canyons, flow into and form the Santa Clara River, which enters the county on the southeastern border, and flows in a generally western direction straight across to the sea. This is a stretch of nearly 40 miles, and the stream, with its feeders north and south, becomes the life blood, as it were, of a magnificent valley covering the southern portion of the county from east to west. Beginning on the east with a width of 2 or 3 miles, the valley gradually widens until its western breadth along the seashore is about 20 miles. The valley is broken by detached mountain ridges, whose living streams not only aid in producing the inexhaustible water supply and enhance the fertility of the soil, but afford the finest scenery and most desirable health resorts.

The San Buenaventura River rises in the mountains in the northern part of the county, flows south, and enters the Pacific within 6 miles of the mouth of the Santa Clara.

The lower part of the Santa Clara Valley is a vast plain, 20 miles or more in width, extending back from the ocean in a great crescent, whose greatest distance is 10 miles from the shore. This plain for countless ages has been receiving the alluvial deposits brought down by the streams from the hills and mountains. It is the garden spot of the county, one of the most fertile tracts of land in the world, producing annually hundreds of thousands of dollars' worth of produce. Every variety of plant life does well in this section, but so well adapted is the soil to beans and beets that these are the staples.

Other products of the county—products in which it ranks with the leading counties in the State—are apricots, walnuts, lemons, and oranges, the yield of each of which is enormous. Not alone does the county boast the largest lima bean ranches, but also the most extensive walnut grove, and the largest single lemon ranch.

Its mountain slopes are covered with verdure, and in its mountain valleys are many apiaries. In a good year a vast amount of honey is produced, netting big returns to the apiarist.

The narrow stretch of coast from southern Santa Barbara County, through Ventura County and including the northern portion of Los Angeles County, is the greatest lima bean section in the world, and Ventura County is the greatest bean-producing section in the world.

The sugar beet thrives in this great valley, and the percentage of sugar is greater here than in any other section in the world. The culture of sugar beets supports the Oxnard sugar factory, the second largest in the world, with a capacity of 2,000 tons per day.

Many herds of cattle and sheep are to be found in the mountain sections, and stock raising is an important industry.

The county was the pioneer oil producer in this State, and its production of petroleum is still large.

The mountains are rich in mineral wealth; among its productions may be mentioned asphalt, clay, gold, natural gas, petroleum, rubble, sandstone and borax. The output of oil for the year was 375,000 barrels, worth $225,000, and 12,000 tons of borax, worth $1,200,000.

STATISTICS OF VENTURA COUNTY, 1907-8.

General Statistics.

Area, 1,852.66 square miles, or 1,185,704.95 acres.

Number of acres assessed	594,595
Value of country real estate	$6,254,463
Of improvements thereon	$666,430
Of city and town lots	$796,227
Of improvements thereon	$694,860
Of personal property	$2,287,985
Total value of all property	$10,720,472
Expended on roads, last fiscal year	$47,638
Expended for bridges, last fiscal year	$32,864
Number of miles of public roads	624
Road levy per $100, 1908	40c
Value of county buildings	$140,000
Irrigating ditches—miles, 59½; cost	$156,600
Railroads, steam—miles, 108.32; assessed value	$2,322,641
Electric power plants—3; assessed value	$17,190
Electric power lines—miles, 115; assessed value	$31,100
Number of acres irrigated	9,000

Fish Industry.

	Pounds.	*Value.*
Various kinds	114,000	$3,990

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries, dairies	3	.....	......
Skimming stations	1	.....	......
Butter, pounds		112,000	$39,200

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	3,800	$15,200
Turkeys	320	9,600
Eggs	275,000	68,750
Total value		$93,550

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	9,036	1,800	$61,200
Barley	25,130	3,200	92,800
Oats	5,860	500	16,000
Corn	2,020	600	19,200
Total cereals	42,046	6,100	$189,200
Alfalfa hay	.....	1,400	$15,600
Grain hay	.....	5,800	65,600
Total hay	21,800	7,200	$81,200

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	10,000	900	10,900
Apricot	86,000	4,200	90,200
Cherry	1,800	380	2,180
Fig	1,800	700	2,500
Lemon	90,000	33,000	120,000
Nectarine	600	300	900
Olive	38,000	3,000	41,000
Orange	97,800	11,600	109,400
Peach	6,000	1,850	7,850
Pear	3,000	800	3,800
Plum	1,800	500	2,300
Prunes	21,000	3,000	24,000
Quince	600	200	800
Other kinds	4,000	3,000	7,000
Total fruit trees	362,400	60,430	422,830
Almond	11,000	3,000	14,000
Walnut	123,750	39,000	162,750
Total nut trees	134,750	42,000	176,750
Grapevines	108,000	15,000	123,000
Berries, acres	140	45	185

Wines, Brandies, Etc.

	Gallons.	*Value.*
Dry wines	60,000	$18,000
Brandy	1,500	2,625

Number of wineries, 7; distilleries, 2.

STATISTICS OF VENTURA COUNTY, 1907-8—Continued.

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	224,000	$2,240
Apricots	18,000	1,800
Asparagus	3,500	350
Blackberries	48,000	2,400
Beans	3,000	150
Beets	3,000	150
Cabbage	200,000	2,000
Celery	2,000	100
Cauliflower	5,000	250
Corn	18,000	1,800
Cherries	15,000	750
Figs	4,500	225
Grapes	48,000	3,600
Grape fruit	34,000	1,800
Lemons, boxes	165,500	585,000
Loganberries	25,000	500
Nectarines	4,500	225
Oranges, boxes	123,300	135,500
Olives	1,620,000	24,300
Pears	96,000	2,880
Peaches	95,000	4,750
Peas	6,000	300
Persimmons	4,000	280
Plums	7,500	375
Irish potatoes	760,000	15,200
Sweet potatoes	98,000	1,960
Prunes	6,000	240
Quinces	5,000	200
Raspberries	3,000	300
Strawberries	150,000	7,500
Tomatoes	120,000	1,200
Total		$801,625
Dried—	*Pounds.*	*Value.*
Almonds	80,000	$9,600
Apricots	4,600,000	276,000
Beans, lima	68,000,000	2,720,000
Onions	236,000	14,160
Peaches	850	160
Peanuts	4,600	460
Prunes	360,000	10,800
Walnuts	3,048,000	371,245
Small beans	2,000,000	53,500
Totals	78,229,450	$3,455,925
Canned—	*Cases.*	*Value.*
Tomatoes	150	$450

Forest Products.

	Amount.	*Value.*
Area of timber lands, acres	50,000	......
Pine, acres	50,000	......
Sawmills, number	3	$19,000
Charcoal, sacks	12,000	6,000
Fuel, wood, cords	10,000	100,000
Lumber, feet	600,000	15,000
Total value		$140,000

Power used for mills and manufactories in county—Steam, 10; electrical, 6.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Bookbinderies	1	2	$1,800
Brick	3	26	12,000
Cigars	1	2	2,000
Confectionery	4	5	12,000
Foundries and iron works	2	30	54,000
Meat products—			
Hides	..	.....	24,000
Lard	..	.....	22,000
Meat packed	..	.....	4,500
Tallow	..	.....	650
Olive oil	..	.....	2,500
Planing mills	4	25	350,000
Artificial stone	2	4	2,000
Sugar, beet	1	650	1,600,000
Tiling	1	2	5,000

Manufactured Output.

	Quantity.
Brick, thousand	1,750,000
Hides, pounds	320,000
Lard, pounds	165,000
Meat packed	25,000
Tallow, barrels	350
Olive oil, gallons	1,250

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	3,000	$120,000
Stock	18,000	360,000
Dairy cows—Graded	1,000	30,000
Herefords	150	77,500
Jersey	500	25,000
Polled Angus	150	7,500
Calves	3,000	21,000
Swine	8,500	25,500
Horses—Common	7,700	1,010,000
Colts	1,800	45,000
Jacks and jennies	12	14,400
Mules	1,600	120,000
Sheep	22,850	102,825
Lambs	11,450	37,210
Angora goats	1,500	6,000
Common goats	1,200	2,500
Total stock all kinds	82,412	$1,934,435
Wool, pounds	220,000	$13,200
Mohair, pounds	3,000	1,200

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 8,600	.....	$34,400
Beeswax	1,800	432
Flowers and plants, acres	80	16,000
Honey	90,000	6,300
Grass seed and bulbs	4,500	11,250
Sugar beets, tons	156,000	780,000
Petroleum, barrels	375,500	375,500
Natural gas, cubic feet	2,000	2,500

YOLO COUNTY.

Yolo County is acknowledged by those at all acquainted with its wonderful fertility to be the gem of the great Sacramento Valley. Approaching it from the north or from the south, one is impressed with the increasing richness of the soil.

About four fifths of its area is level, but the western portion breaks into hills, with canyons and valleys of considerable extent, chief among which is Capay Valley, noted as one of the earliest fruit sections of the State. The hills are nearly all used for grazing, except the numerous homesteads. Along the eastern side of the county, near the Sacramento River, is what is known as the "tule basin," which contains about 40,000 acres. These lands are overflowed during high water, but as the water recedes furnish rich pasture for immense herds of stock. The county has very little waste land.

The two principal streams are Putah Creek and Cache Creek, the former being the boundary line, for a portion of the way, between Solano and Yolo counties. Cache Creek is the outlet of Clear Lake. Its elevation is 1,300 feet above sea level, and with Cache Creek as its only outlet, it will be seen that nature has furnished a magnificent natural reservoir. It is estimated that 50,000 horsepower could be generated by its waters, and that there would be enough left to irrigate every acre of land on each side of the creek, after it reaches the valley.

During high water Cache Creek has brought down from the hills and mountains immense quantities of the very cream of the soil, and for ages has been depositing this upon the land. The result is that there is a rich sedimentary deposit of from 20 to 30 feet in depth, entirely without hardpan, which is as rich as the valley of the Nile. This is particularly true of a large area around Woodland. It is ideal fruit land. You may find growing on this soil wheat, barley, oats, corn, alfalfa, all the vegetables of a temperate and sub-tropical climate, apples, apricots, nectarines, plums, pears, peaches, prunes, oranges, lemons, limes, figs, pomegranates, grapes (table, wine, and raisin), olives, almonds, walnuts, berries, and melons. Some of these lands are better adapted to particular crops than others, yet there are eighty-acre tracts of this sedimentary soil in the valley on which everything that has been named is now produced. The foothills in the western part, from Winters to Capay, and north, as well as those bordering Capay Valley, are mostly very fertile, and a great many have planted orchards and vineyards, the warm soil and exemption from frost making it a very desirable location.

The products are varied. Until within a few years, the cultivated area was devoted almost entirely to the production of wheat and to stock raising. Yolo still holds the banner as the largest producer of wheat and barley, according to acreage, but in the mean time she is coming to the front as a fruit producer.

The grape industry is a very important item. Yolo has the honor of producing the first raisins of commerce in America, and the late R. B. Blowers was the pioneer grower. The Seedless Sultana grape, which is grown here quite extensively, makes a very plump and "meaty" raisin, and for years the Woodland Sultanas have been acknowledged by the trade to be the best in the State. The shipment of table grapes to the New York market is quite an industry.

This county is noted for producing some of the fastest horses in California, and any day, on the streets and roads, can be seen fine specimens of driving horses. Woodland has been a center from which thousands of horses and mules have been shipped during the past few years, and they have gone to all parts of the country, notably to Hawaii, the Philippines, South Africa, and the Southern States.

There are thousands of acres of alfalfa, and the area is rapidly increasing. As each acre will yield from six to eight tons of hay, it can readily be seen how important the dairy interests may become. For stock of any kind there can be no better feed than alfalfa, either green or cured for hay.

The county seat is Woodland. Its streets are wide and clean, and lined with shade trees, while here and there can still be seen some of the majestic old oaks which suggested the name of the city.

Winters is located on Putah Creek, in the southwestern part of the county, and is noted as the earliest fruit section in the State.

Davis, also located on Putah Creek, is in a very fertile section. There are probably more almonds grown here than in any other district in the State.

Yolo is on Cache Creek. It is also in a very fine fruit section, and boasts of having the largest almond orchard in the world. It has an olive-oil and pickling plant. The olives used for oil are first dried, and then run through a mill, which separates the seed from the pulp, the latter being then pressed to extract the oil. It is claimed that this process gives an oil of superior flavor, and is the only mill in existence which uses this process. The olives, after being dried, can be stored away and will keep in that condition for an indefinite time, thus giving the mill the entire year in which to work up the product.

Esparto is near the mouth of Capay Valley, on Cache Creek. It is surrounded by a fine body of land, largely devoted to fruit, vines, and alfalfa. It is quite a shipping point for wheat and barley.

The Woodland Chamber of Commerce, the Winters Board of Trade, and the Guinda Board of Trade are active public organizations.

The Legislature of 1905 made an appropriation of $150.000 for the purchase and equipment of a university farm and to provide instruction in agriculture in connection therewith. This farm has been located upon a tract of about 780 acres of first-class valley land contiguous to the town of Davis. The Legislature of 1907 appropriated $132,000 for additional buildings, equipment, etc. Courses of instruction are in preparation.

STATISTICS OF YOLO COUNTY, 1907-8.

General Statistics.

Expended on roads, last fiscal year Expended for bridges, last fiscal year	$52,168
Value of county buildings	$60,000
Railroads, steam—miles, 87.80; assessed value	....
Electric power plants—1; assessed value	....
Electric power lines—miles, 71.2; assessed value	$65,365

Area, 1,017 square miles, or 650,880 acres.	
Number of acres assessed	577,129
Value of country real estate	$10,816,755
Of improvements thereon	$1,115,350
Of city and town lots	$872,765
Of improvements thereon	$1,450,925
Of personal property	$1,892,185
Total value of all property	$16,147,980
Road levy per $100, 1908	40c
Irrigating ditches—miles, 400; cost	$110,000

STATISTICS OF YOLO COUNTY, 1907-8—Continued.

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	16,000	4,740	$164,900
Barley	65,000	30,490	762,250
Oats	1,000	264	7,920
Rye	.....	84	2,520
Corn	500	55	1,650
Total cereals.	.....	35,633	$939,240
Alfalfa hay	.....	38,450	$384,500
Grain hay	.....	18,080	253,120
Total hay	.....	56,530	$637,620

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	3,500	$1,050
Apricots	3,369,000	202,140
Asparagus	43,400	3,472
Beans	206,600	8,265
Beets	113,000	1,130
Cabbage	1,251,500	18,770
Celery	149,000	2,980
Cauliflower	284,000	5,680
Corn	199,000	3,980
Figs	20,000	600
Grapes	4,886,600	366,495
Grape fruit	2,000	40
Lemons, boxes	165	495
Loganberries	21,800	2,180
Nectarines	5,000	300
Onions	34,500	690
Oranges, boxes	2,415	3,615
Olives	50,000	1,625
Pears	3,056,040	76,400
Peaches	3,836,200	287,715
Peas	93,600	2,808
Persimmons	5,000	100
Plums	1,250,000	93,750
Irish potatoes	1,064,200	21,280
Sweet potatoes	4,200	168
Prunes	941,450	188,290
Quinces	2,500	25
Raspberries	2,000	300
Strawberries	1,200	120
Tomatoes	1,963,500	39,240
Totals	22,858,790	$1,333,703
Dried—	*Pounds.*	*Value.*
Almonds	1,504,000	$120,320
Apricots	1,550,000	77,500
Beans	2,416,800	72,504
Figs	10,000	2,500
Nectarines	2,120	106
Onions	1,415,000	28,300
Pears	100,000	500
Peaches	1,080,000	540,000
Prunes	2,440,000	61.000
Raisins	3,622.000	905.500
Walnuts	2,500	1,250
Almond kernels	8.000	1.200
Apricot kernels	360,000	18.200
Canned—	*Cases.*	*Value.*
Peaches	26,000	$13,000
Plums	1,500	600
Totals	42,500	$88,600

Miscellaneous Products.

	Pounds.	*Value.*
Bees, hives, 1,690	.....	$4,225
Beeswax	2,000	560
Honey	211,375	21,137
Hops	650,700	52,055
Alfalfa seed	216.000	29.640
Sugar beets, tons	20,960	104,860

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	800	.....	.....
Apricot	85,000	.....	.....
Cherry	6,000	.....	.....
Fig	4,100	.....	.....
Lemon	1,500	.....	.....
Nectarine	300	.....	.....
Olive	20,000	.....	.....
Orange	12,000	.....	.....
Peach	50,000	.....	.....
Pear	21,000	.....	.....
Plum	2,500	.....	.....
Prunes	125,000	.....	.....
Quince	50	.....	.....
Other kinds	20	.....	.....
Total fruit trees	328,290	.....	.....
Almond	12,000	.....	.....
Walnut	6,000	.....	.....
Total nut trees	129,000	.....	.....
Grapevines	51,000	.....	.....

Fish Industry.

	Pounds.	*Value.*
Salmon	2,170,020	$141,109
Other kinds	574,255	34,456
Totals	2,745,175	$175,565

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	3	523,105	$156,930
Butter, pounds		185,190	27,040
Cheese, pounds		141,725	......
Cream shipped out		180,115	225,140
Total value			$431,785

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	800	$20,000
Stock	9,000	135.000
Dairy cows—Graded	500	17,500
Angus	6,000	150,000
Ayrshire	12	720
Herefords	20	1,200
Holsteins	275	16,500
Jersey	100	6.000
Shorthorns	500	30,000
Calves	3,000	15.000
Swine	11,000	82,500
Horses—		
Thoroughbred	50	3.750
Standard-bred	450	22,500
Common	5,000	250,000
Colts	1,000	25.000
Jacks and jennies	50	5.000
Mules	2,500	250,000
Sheep—		
Common	64,000	160,000
Fine	5.000	
Lambs	4,500	2,050
Angora goats	600	900
Total stock all kinds	114.357	$1,218.620
Wool, pounds	550,000	$77,000
Mohair, pounds	.....	1,200

Wines, Brandies, Etc.

	Gallons.	*Value.*
Sweet wines	150.000	$67.000
Beer, barrels	22,000	13.200

Number of wineries, 1; breweries, 1.

STATISTICS OF YOLO COUNTY, 1907-8—Continued.

Poultry and Eggs.

	Dozen.	*Value.*
Chickens	15,210	$68,445
Ducks	75	375
Geese	30	270
Turkeys	1,660	26,560
Eggs	228,955	37,240
Total value		$132,890

Manufactured Output.

	Quantity.
Flour, barrels	25,000
Hides, pounds	162,225
Lard, pounds	34,900
Tallow, barrels	294
Olive oil, gallons	50
Pickles, cucumber, gallons	1,500
Pickled olives, gallons	5,250

Forest Products.

	Amount.	*Value.*
Fuel, wood, cords	5,000	$3,750

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Cigars	1	4	$85,000
Confectionery	2	.....	45,000
Flouring mills	1	15	125,000
Iron works	1	5	8,000
Machinery, farm		.....	100,000
Meat products, lbs.		2,496,155	......
Hides, lbs.		162,225	......
Olive oil, gallons		50	......
Pickles, cucumber, gallons		1,500	......
Pickled olives, gallons		5,200	......
Miscellaneous		.....	13,250

YUBA COUNTY.

Yuba County is about half valley and half mountainous. In the mountainous portion the industries are mining, lumbering, and stock raising, but considerable fruit and hay are produced. At Hammonton twelve gold mining dredgers are running, and at Marigold two—all on the Yuba River. They are in operation day and night. The Colgate power plant derives its energy from the waters of that river. It has the longest transmitting line in the State. Many important quartz mines are operated. The Feather River forms most of the western boundary. It is the second largest water course in the Sacramento Valley, and is navigable as far up as Marysville. Bear River is the southern boundary of the county. Yuba River passes through the county about midway. These rivers are never failing in water supply. Subterranean water is available in most parts of the county. There are two irrigation districts that take water from the Yuba River. The county is traversed by two lines of the Southern Pacific, by the Western Pacific and by the Northern Electric railroads. The California Midland Railroad is projected and will be built. The county has at Wheatland the largest hop fields in the world. In the production of gold it ranks fourth among the counties of the State. Marysville is well represented by manufacturing establishments. A woolen mill, a wool scouring plant, a flouring mill, a cannery, a fruit packing house, a brick and cement block manufactory, a creamery, three foundries and machine establishments and other productive plants that go to make up a progressive city. Electric power is abundant and cheap; no embarrassment as concerns transportation; and there is a ready market for manufactured output. Land is cheap; indeed, much of the desirable area of the county is practically undeveloped. The valley lands will successfully produce anything that can be grown from Maine to Florida. From one orchard this year fifty carloads of Bartlett pears were shipped East, besides other fruit that was marketed.

STATISTICS OF YUBA COUNTY, 1907-8.

Live Stock Industry.

	Number.	*Value.*
Cattle—Beef	1,560	$46,700
Dairy cows—Graded	1,000	50,000
Calves	1,200	10,800
Swine	2,200	30,800
Horses—		
Thoroughbred	30	6,000
Standard-bred	20	30,000
Common	4,000	100,000
Colts	640	6,400
Jacks and jennies	25	1,000
Mules	500	37,500
Sheep	48,000	120,000
Common goats	700	1,750
Total stock all kinds	59,875	$233,550
Wool, pounds	400,000	$45,000

Cereal Products and Hay.

Tons of 2,000 pounds.

	Acres.	*Tons.*	*Value.*
Wheat	16,000	8,000	$256,000
Barley	4,800	7,000	182,000
Oats	6,000	1,000	32,000
Corn	60	300	9,600
Total cereals	26,860	16,300	$479,600
Alfalfa hay	460	2,300	$27,600
Grain hay	300	1,200	18,000
Total hay	760	3,500	$45,600

Fish Industry.

None commercially; a few for sportsmen.

STATISTICS OF YUBA COUNTY, 1907-8—Continued.

General Statistics.

Area, 625 square miles, or 400,000 acres.

Number of farms	900
Number of acres assessed	366,049
Value of country real estate	$2,405,480
Of improvements thereon	$533,645
Of city and town lots	$710,045
Of improvements thereon	$1,082,090
Of personal property	$1,535,280
Total value of all property	$6,266,540
Expended on roads, last fiscal year	$16,834
Expended for bridges, last fiscal year	$24,294
Number of miles of public roads	450
Road levy per $100, 1908	40c
Value of county buildings	$83,000
Irrigating ditches—miles, 100;	$160,550
Railroads, steam—miles, 44.22; assessed value	$800,072
Railroads, electric—miles, 13.05; assessed value	$67,500
Electric power plants—1; assessed value	$84,450
Number of acres irrigated	6,000
Telegraph lines, miles, 65	4,360
Telephone lines, miles, 2,500	28,365

Fruits, Vegetables, Etc.

Green—	*Total Production. Pounds.*	*Value.*
Apples	50,000	$750
Apricots	30,000	300
Celery	4,000	100
Cauliflower	6,000	200
Grapes	2,760,000	23,600
Grape fruit	300	10
Lemons, boxes	50	100
Nectarines	2,000	30
Oranges, boxes	750	1,500
Pears	1,200,000	10,000
Peaches	1,600,000	1,600
Plums	50,450	600
Prunes*		
Quinces	20,000	600
Tomatoes	400,000	10,000
Cucumbers	1,600,000	40,000
Totals	8,443,550	$97,390

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*All shipped cured.

Dried—	*Pounds.*	*Value.*
Almonds	50,000	$5,000
Apples	1,000	50
Apricots	20,000	1,000
Currants	10,000	500
Figs	80,000	2,400
Pears	120,000	8,500
Peaches	220,000	5,400
Plums	7,000	350
Prunes	100,000	5,000
Raisins	100,000	7,000
Totals	708,000	$39,200

Canned—	*Cases.*	*Value.*
Peaches	65,000	......
Plums	5,000	......
Totals	70,000	....

No return has been made of the value of the canned production; the market fluctuates.

Wines, Brandies, Etc.

	Gallons.	*Value.*
Beer, barrels	2,500	$16,250
Brandy*		

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*Distillery just started; no output as yet.

Number of distilleries, 1; breweries, 1.

Number of Fruit Trees and Vines.

	Bearing.	*Non-Bearing.*	*Total.*
Apple	7,200	900	8,100
Apricot	18,000	3,000	21,000
Cherry	12,000	4,500	16,500
Fig	5,000	2,600	7,600
Lemon	4,100	2,000	6,100
Olive	9,000	1,500	10,500
Orange	36,000	28,000	64,000
Peach	68,000	25,000	93,000
Pear	17,000	2,500	19,500
Prunes	5,500	3,200	8,700
Quince	100	.....	100
Total fruit trees	181,900	73,200	255,100
Almond	7,000	1,500	8,500
Walnut	2,600	800	3,400
Total nut trees	9,600	2,300	11,900
Grapevines	700	.....	700
Berries, acres	250	.....	250

Above figures are from the report of the County Assessor.

Dairy Industry.

	No.	*Production.*	*Value.*
Creameries	1	......	......
Skimming stations*			
Butter, pounds		1,450,000	$38,000

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*Farmers use separators and send butter fat to creameries in this and other counties.

Manufactories.

	No.	*No. of Employes.*	*Value of Product.*
Brick and cement blocks	1	40	$100,000
Carriages and wagons	3	8	3,500
Cigars	2	4	6,200
Confectionery	2	5	10,000
Flouring mills	1	25	183,750
Foundries and iron works	3	155	2,700,000
Leather goods	5	12	40,000
Machinery*			
Malt	1	4	3,000
Meat products—			
Hides	..	.....	5,000
Lard	..	.....	44,600
Meat packed	..	.....	225,000
Tallow	..	.....	1,540
Planing mills	2	25	150,000
Granite and marble	1	2	4,000
Tiling§			
Tin and galvanized iron	2	25	160,000
Woolen mills	1	125	250,000
Wool scouring works	1	20	300,000
Soda works	2	.....	30,000
Tent and awning factory	1	.....	5,000

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*See foundries.
§Included in brick.

Manufactured Output.

	Quantity.
Brick, thousand	2,000,000
Cigars, thousand	124
Flour, barrels	35,000
Malt, tons	156
Hides, pounds	72,000
Lard, pounds	446,000
Meat packed, pounds	1,800,000
Tallow, barrels	110

SECOND BIENNIAL REPORT

OF THE

STATE FORESTER

OF THE

STATE OF CALIFORNIA.

SACRAMENTO:
W. W. SHANNON - - - - - - - - - - Superintendent State Printing.
1908.

STATE BOARD OF FORESTRY.

JAMES N. GILLETT	Governor.
C. F. CURRY	Secretary of State.
U. S. WEBB	Attorney General.
G. B. LULL	State Forester.

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REPORT OF THE STATE FORESTER.

State Capitol, Sacramento, November 30, 1908.

To His Excellency, James N. Gillett, *Governor of California.*

Sir: I have the honor to submit herewith my second biennial report on the work of the State Board of Forestry from October 31, 1906, to October 31, 1908.

During the past two years the business of the State Forester's office has increased beyond all expectations. Four years ago the State of California, with a forest area of 66,000,000 acres, had no State Forester and no clear idea as to what the business of forestry meant to accomplish. In July, 1905, by an act of the legislature, the State Board of Forestry was created, largely as an experimental measure. Its duties as outlined in the creating act were to conduct an educational campaign in forestry, to coöperate with timber landowners in the management of their property, to encourage landowners to plant trees, and to enforce the legal provisions relating to the use of fire.

I believe this report will show conclusively that this experiment has proven successful. It will be my aim to set forth the results accomplished in the way of forestry education, to show the results of our work to control forest fires, and to describe the advancing interest in tree planting to a position which entitles it to recognition as a coming staple industry of the State. These results, having been accomplished under an appropriation wholly disproportionate to their value to the State, indicate the possibilities to be attained if an appropriation be made now of sufficient size to encourage the hope that we may be able to handle our growing affairs.

REVIEW OF WORK DONE.

Forest Protection.

In my report two years ago the problem of protecting the forest from fire was indicated as the most important work before the State Board of Forestry. During the past two years, and particularly during the past summer, the need for more facilities to handle this great problem has been strongly emphasized.

The boundaries of the national forests of California, administered by the Forest Service of the Department of Agriculture, include an area approximately 23,000,000 acres. They include, however, large areas of private land upon which the forest officers have jurisdiction in case of fire only through their appointments as firewardens by the State. Hence these areas may be considered as being under State protection. Outside the National Forests the great mountainous area of the State, as well as the areas devoted to grazing and agriculture, are under State protection.

The act creating the State Board of Forestry provides that the State Forester may appoint firewardens, who shall have power to arrest for violation of the sections prohibiting the use of fire, to grant or refuse burning permits during a dry season, without which burning is unlawful, and to compel the assistance of citizens in fighting fires. Under this act 721 firewardens have been appointed. They are located as shown in the following list:

County.	Total Number of Firewardens.	Number Employed by Forest Service.	Number Employed by Counties.	Number of Voluntary Firewardens.
Alameda	24	0	0	24
Amador	2	1	0	1
Alpine	1	1	0	0
Butte	25	0	0	25
Calaveras	12	4	0	8
Colusa	2	1	0	1
Del Norte	1	0	0	1
El Dorado	6	3	0	3
Fresno	19	5	3	11
Glenn	8	4	1	3
Humboldt	8	3	0	5
Imperial	1	0	0	1
Inyo	7	7	0	0
Kern	34	7	20	7
Lake	16	2	0	14
Lassen	3	3	0	0
Los Angeles*	88	37	17	33
Madera	10	7	2	1
Marin	6	0	0	6
Mariposa	2	2	0	0
Mendocino	6	0	0	6
Merced	1	0	1	0
Modoc	7	7	0	0
Mono	1	1	0	0
Monterey	10	8	0	2
Napa	2	0	0	2
Nevada	14	5	0	9
Orange	6	0	0	6
Placer	17	4	0	13
Plumas	17	12	0	5
Riverside	30	21	3	6
Sacramento	4	0	0	4
San Benito	13	1	0	12
San Bernardino†	47	27	11	8
San Diego	47	8	27	12
San Joaquin	1	0	0	1
San Luis Obispo	16	4	0	12
San Mateo	3	0	0	3
Santa Barbara	22	16	5	1
Santa Clara	6	0	0	6
Santa Cruz	16	0	10	6
Shasta	14	5	0	9
Sierra	7	2	0	5
Siskiyou	30	11	0	19
Sonoma	12	0	0	12
Stanislaus	1	0	0	1
Tehama	7	2	0	5
Trinity	12	11	0	1
Tulare	40	17	17	6
Tuolumne	24	10	10	4
Ventura	10	9	1	0
Yolo	1	0	0	1
Yuba	2	1	0	1
Totals	721	269	128	322

* One Firewarden paid by "Committee of Nine," of Azusa, Cal.
† One Firewarden paid by city of San Bernardino.

It will be noticed that 269 firewardens are employed by the Forest Service. This number covers the forest officers whose appointments have been requested by the Forester to enable them to handle violations of the forest laws of the State.

Also, that 128 are employed by thirteen counties. This results from the fact that these counties have taken advantage of section 33½ of the County Government Act to appropriate money from the general fund of the counties to secure fire protection.

Three hundred and thirty-two are volunteer firewardens; these men serve without any pay. In all cases they have requested appointments as firewardens to aid them in the protection of their own or their employers' interests.

On appointment each firewarden is furnished a badge, a letter of instructions and book of burning permits, several copies of the State forest laws, a number of fire warnings printed on cloth, and blanks on which he is asked to submit a report on each fire that he attends or has definite knowledge of.

The right use by the firewardens of the material furnished results in an effective educational campaign. The letter of instruction acquaints the firewarden in a detailed way with the action he should take in bringing any violator of the forest laws to trial. He is impressed with the need of making due allowance for violations committed through lack of acquaintance with the law and instructed to refrain, so far as possible, from arousing friction. At the same time it is made plain to him that careless or criminal violations are to be prosecuted vigorously.

He is asked to apply for as many warning notices as he can use and instructed to post these conspicuously so that no one may remain unacquainted with the provisions against the use of fire. The extension of this information is carried still further by having the forest laws printed in separate circulars, which may be distributed to the public. Each firewarden is furnished with as many copies as he can place advantageously. Having the wardens distributed so widely over the State, as the list shows, the result is that at this time practically no one in the State is ignorant of the forest laws. That the knowledge of the law has a deterrent effect upon those who might otherwise be careless is certain. It is probable that many fire are prevented in this way.

Each firewarden is furnished with as many burning permits as he can use. These are furnished in books containing ten or twenty blank forms, which may be filled out quickly. The number used has varied greatly in different localities. Many firewardens have not used any; others have used as many as 300 or 400 in a single season. So far, we have had no fires escape where the provisions of the permit were followed, and that the permit would be followed is practically guaranteed by the fact that the one who desires to use fire makes a voluntary application for the permit. He thus directs attention to his operation, and could hardly escape punishment if he failed to follow the regulations and through his carelessness the fire escaped. The burning permit is a good way of impressing upon the public the need of using care with fires and has a great fire-preventive effect.

With the warnings posted thickly, the law circulars in the hands of the people, the duties of the firewarden consist in holding himself ready to consider impartially requests for burning permits. Each firewarden is furnished with a badge, which adds dignity to his appointment and impresses the public with the authority behind him. The law confers considerable authority upon the firewardens, and it might reasonably be anticipated that when they are chosen largely at random that some would be appointed who would misuse their authority. I have taken great pains to select the firewardens carefully, and in practically all cases require them to have their application for appointment endorsed by one or two well known citizens who are acquainted with them. This system of selection has worked well. Very few cases have come up where the firewardens have misused their authority to the detriment of the forest work.

From the fact that practically all the wardens have a business of their own to carry on it follows that they are not able to do much more than has been outlined. They are usually alert to extinguish fires as soon as they learn of their occurrence, and this doubtless prevents many fires from spreading to the extent they would if left unattended. But this does not operate to prevent fires, and therein lies the weakness of our present system.

In addition to the material mentioned each firewarden is furnished with blanks on which he is requested to make reports of the fires that come within his notice. These reports are due at the end of each month, or at the time the fire occurs, in case it is a large one.

The reports received during the past two years show that there have been 942 forest fires in California which burned over 394,496 acres and caused the death of two persons, besides a loss of $608,055.20 worth of property. Fourteen hundred and six burning permits were issued, and out of 45 prosecutions for violations of the forest laws, 32 conviction have followed, resulting in the collection of $775 in fines. This amount has been or will be covered into the State Treasury to the credit of the Forestry Fund. In addition 3 of those convicted have been sentenced to ten days each in the county jail and one to five months in the county jail. In one case the jury disagreed, but the case was not retried owing to the fact that it was taken up by the Federal Court where a trial resulted in its dismissal. Thirteen out of the 45 cases were dismissed.

Last spring the Forest Service offered, through this office, to coöperate with any county in which was situated a foothill forest adjacent to the National Forest boundary by putting up with the county a joint sum for fire protection purposes. This offer held good during the early part of the season, and during that time I was able to secure on this basis an appropriation from San Diego, Kern, Fresno, Madera, and Tulare counties sufficient for the support of two firewardens during the summer season. These firewardens were appointed by me, but worked under the supervisor of the forest in which the county area was situated. An equal number of men were added to the local force of the forest in each case. The result has justified the expenditure, and the system will continue next year if the Forest Service is able to make a similar offer.

In my last report I was able to show that San Diego, Riverside, Santa Barbara, Kern, Tulare, Los Angeles, Santa Cruz, and Tuolumne counties were appropriating money for the support of firewardens to protect their forest areas. Since then Santa Barbara has discontinued its coöperation, but the remainder are maintaining theirs, and in addition Merced, Glenn, Madera, and Santa Clara counties have appropriated money for this purpose. It is probable that this list could be increased considerably if we had sufficient force in the office to enable us to visit the supervisors of the different counties and urge the need of coöperation upon them. As it is, the supervisors meet but once each month, and on account of the distance from one county seat to another it is impossible to reach more than one or two counties during the short period they continue in session.

It will be apparent, without lengthy discussion, that our present system of controlling forest fires is faulty in many respects. Our only method of reaching violators of the forest laws is through the firewardens, and, except for the few instances I have mentioned, they act in a voluntary capacity without salary and without being reimbursed for their expenses. It is unnecessary to explain why I do not feel at liberty to call upon them to use their own time and funds in working up sufficient evidence to justify a prosecution. Yet it is evident that a man on the ground who is acquainted with the general features of the case could work up evidence less expensively than one who is detailed from the office for this special purpose. Moreover, we have not had the men or the funds to handle work of this kind except in cases where the evidence was readily gathered.

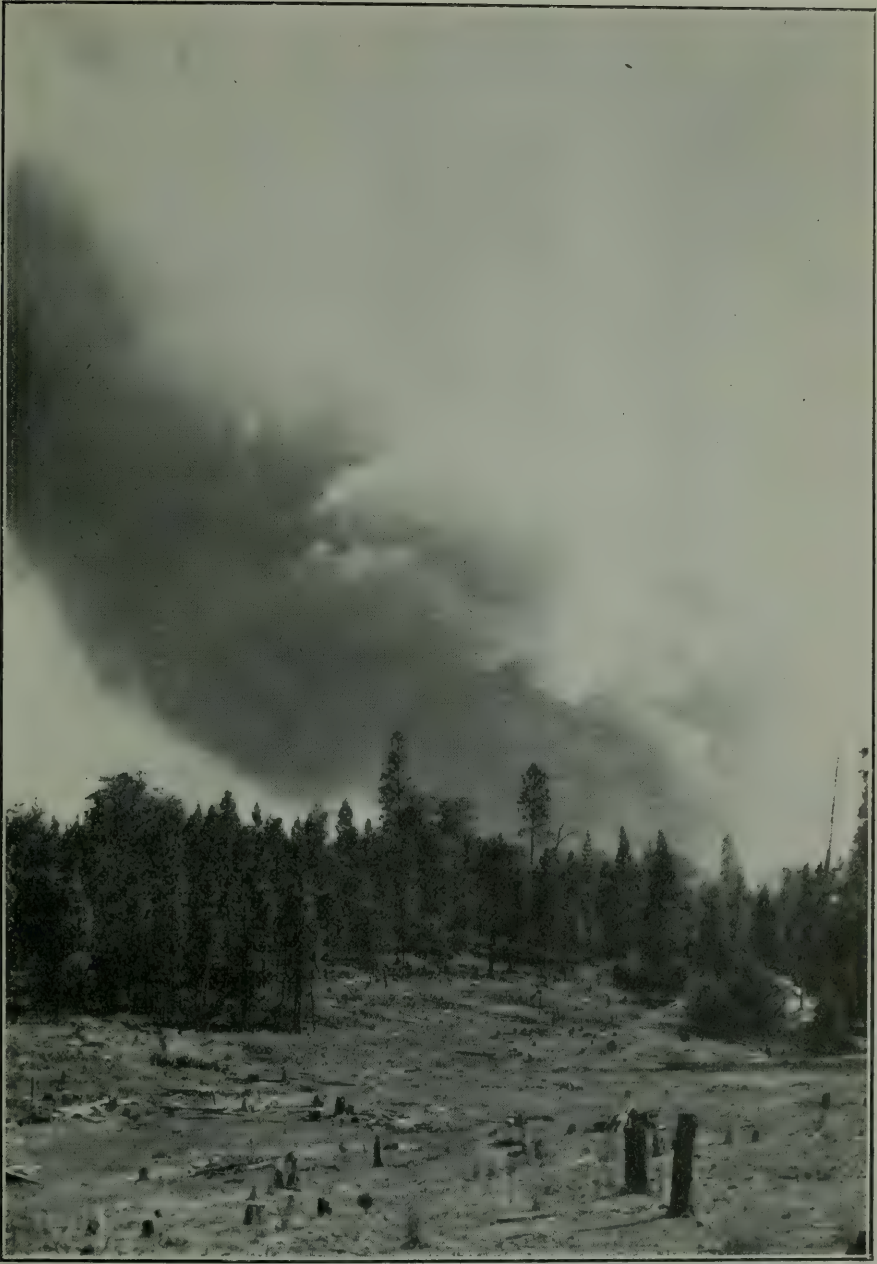
Obviously, if we had sufficient funds to pay a volunteer firewarden for his services when detailed on special work of this kind this would decrease the number of fires considerably. Yet there is imperative need of having a paid firewarden in each county who can give his entire time to patrol work during the dry season. In Santa Clara, Santa Cruz, Los Angeles, and Madera counties, where this system has been in operation during the past summer, there have been practically no fires of any consequence. This would seem to indicate that the system might be extended advantageously.

I believe if the county supervisors generally were approached with a proposition under which the State would pay one half of the expenses of a firewarden if they would appropriate funds to pay the other half, that the fire situation in California could be improved very greatly. The expenses to the State of a system of this kind in fifty of the fifty-eight counties should not exceed $15,000 per year, and the results should be a saving of property worth ten times this amount. It might be that this would not prove an effective system, but it promises so much in advantage of what we have at the present time that I submit it for your consideration. If we are able by this system, or any other, to prevent one fire a year of the magnitude of the Humboldt fire of last summer, the expenditure will have been more than justified.

A paid patrolman would be able to give his entire time during the summer season to patrol work. It would be his duty to travel through the county posting warning signs, distributing copies of the regulations regarding fires, issuing or refusing burning permits, as in his judgment appeared best, educating the people regarding the forest laws, taking charge of fires on their occurrence and gathering evidence against those responsible for them. He would be appointed by the State Forester and his work would be directed from this office. Each patrolman should own a horse, and should be equipped with fire-fighting tools. I believe efficient men for such work can be secured for $75 per month. It would not be necessary to employ them during the rainy season; consequently, I believe that it is safe to count on a period of six months each during which they should be employed. The length of this period will vary somewhat in different parts of the State, but its average will not differ greatly from this time.

Recommendations.

For the reasons I have given I recommend that a special appropriation be made for the purpose of fire protection with the understanding that whatever portion of this amount is used will be duplicated by the counties for the same purpose. It is evident that there is need of doing something to secure better control of the fire situation, and the plan I have outlined seems to promise the best results with the least expense.



FOREST FIRE IN TUOLUMNE COUNTY, AUGUST, 1908.

PROPOSED ORGANIZATION OF LUMBERMEN.

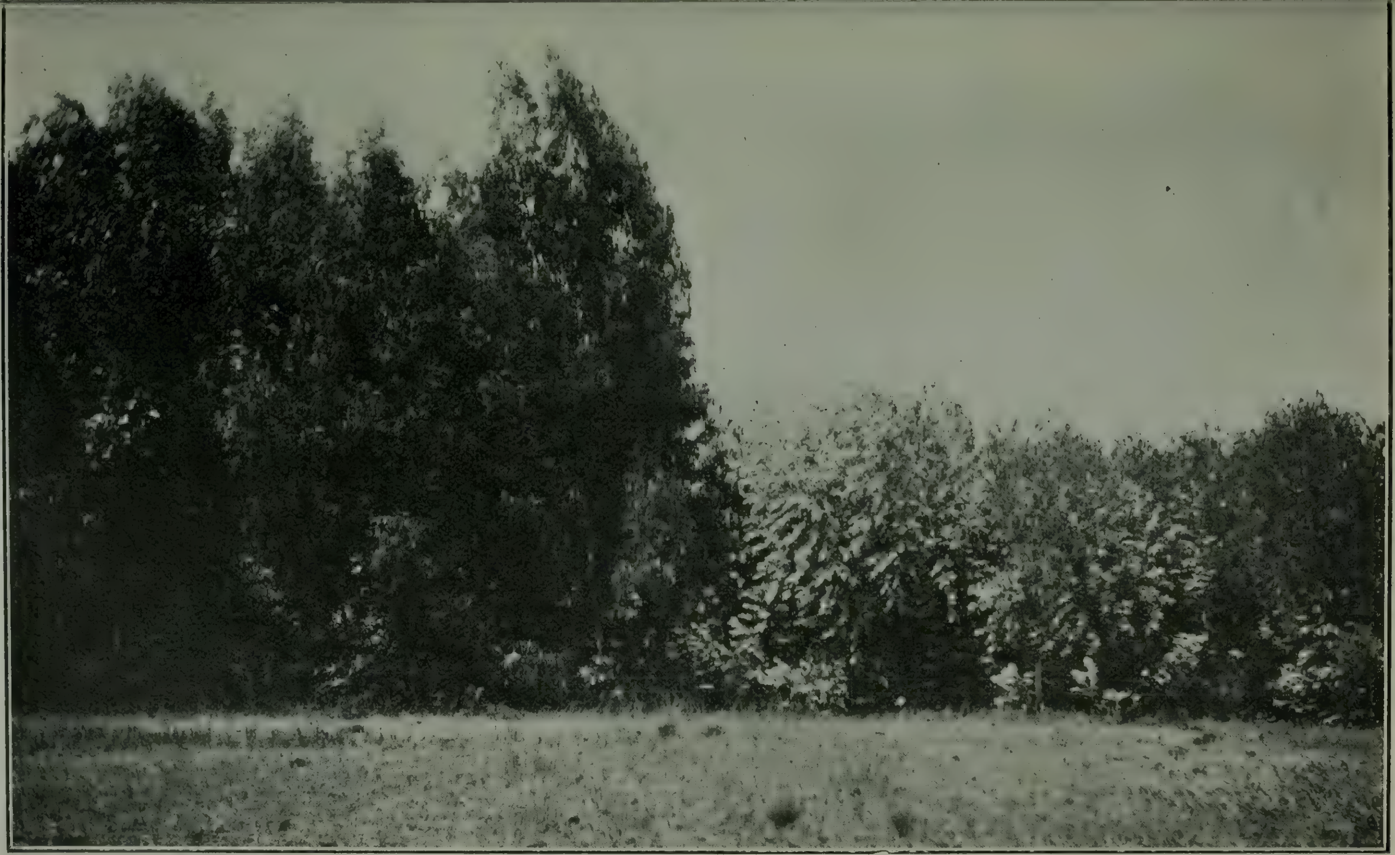
Several timber owners in the State have suggested the desirability of forming among California lumbermen an organization similar to the Washington Forest Fire Association. This association was incorporated under the laws of the State of Washington "for the preservation of the forests of the State of Washington generally, and particularly from loss by forest fire and the enlistment of the aid of the United States of America and the State of Washington in preserving said forests and preventing their destruction by fire." It has 138 members, representing about 2,600,000 acres of timber land, 75 per cent of which is represented by eight or ten companies. At the beginning of last summer the association levied an assessment of 1 cent per acre, the last half cent of which was called August 4th. This carried the association through the season, although an additional assessment of one half cent probably would have been necessary if the rains had not commenced early.

The timber owners were compelled to organize for this purpose on account of the insufficient appropriation by the legislature for fire protective purposes, it being only $7,500, which was just enough to maintain the office of State Forester and pay the salary and expenses of the deputies in the different counties.

The association had seventy-five men in the field from June 15th to September 15th, and accomplished a great deal. Its men were appointed rangers-at-large under the State forest laws. The association divided the State into districts, each man covering about four townships, more or less, according to the topography. It maintained seven inspectors, each one having charge of from seven to twelve rangers. The rangers were required to submit weekly reports stating where they went and what they did on each day. They were furnished with a badge and commission showing their authority, and were equipped with fire-fighting tools. Most of them were mounted on horses, though about twelve used wheels, and a few went on foot where the country was too rough to use either a horse or a wheel. Each man was required to notify the deputy firewarden of the county and the manager of the association in case he had a bad fire.

The total expenses of the association were about $4,000. They had a total of 1,102 fires, which burned over 18,753 acres, of which were 743 acres of timber, about one half of which was damaged.

From what I have learned of the sentiment of the timber owners in California, I believe it will be possible to effect an organization here similar to that in Washington. I shall make an attempt in this direction just as soon as time permits. If an association can be formed in California and a coöperative plan, such as I have outlined above can be put in force, the fire problem should become much less serious than at the present time.



TWO-STORY EUCALYPTUS FOREST, TREES AGED 4 YEARS AND 18 MONTHS, RESPECTIVELY, THE LATTER BEING SPROUT GROWTH.

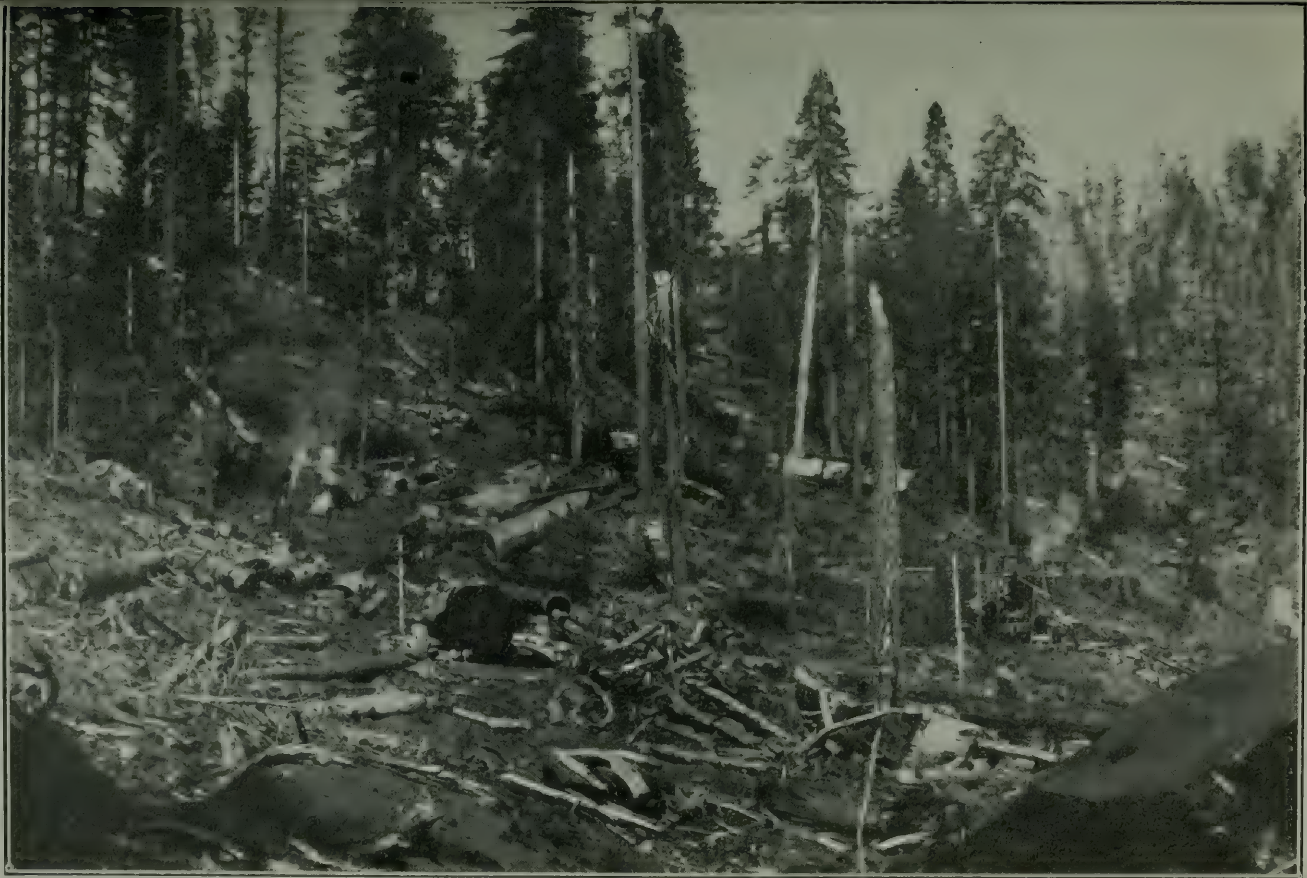
TECHNICAL FORESTRY.

Two years ago I was not able to show that much had been accomplished in the line of technical forestry, but in December, 1907, as a result of the coöperative work in forestry between the Forest Service of the Department of Agriculture and the State of California, the State Board of Forestry issued Circular No. 2, "A Handbook for Eucalyptus Planters." This circular called attention to the yield from eucalyptus grown in California. It emphasized the fact that eucalyptus grows fully five times as fast as any other hardwood tree, and gave full instructions as to the methods of propagating these trees.

As a result twenty-three companies have been incorporated in the State since that time, for the purpose of dealing in eucalyptus lands and the products from eucalyptus plantations. In addition, fifteen companies engaged in the sale of real estate have turned their attention to eucalyptus, so that at the present time thirty-eight companies in California are devoting all or the greater part of their energy to the propagation of this genus. A great number of landowners have commenced the propagation of eucalyptus on their own account. From present indications it seems safe to predict that the growing of eucalyptus for revenue has become a fixed industry in the State. The majority of the companies are operating on a large scale, many of them owning from 1,000 to 5,000, or even 10,000, acres of land.

The general plan is to secure the land and plant the seedlings when they are from six to eight inches in height, cultivate and irrigate them until they are two years old, after which time, if the land and species have been properly selected, there is no need of further attention being given, except to see that they are protected from fire. The prospect of securing very large returns with a minimum of care seems to appeal very strongly to investors in this and other states, as well as in other countries. This industry has attracted many people to California, and is proving an alluring investment for many who reside in other states. It seems possible to predict that on the maturity of the plantations now being started there will be attracted to California the large vehicle and furniture manufacturing plants that have contributed so largely to the prosperity of the hardwood states of the East.

The fact that eucalyptus will not withstand severe frosts confines its propagation to the temperate portions of California, and thus gives to this State a practical monopoly upon the hardwood supplies of the future. It does not seem possible to estimate what this industry may mean to this State. Certainly it will result in the immediate conversion of large areas of land that are now producing low returns into properties yielding a very high revenue. It may mean eventually that the eucalyptus industry will be even a more fruitful source of revenue to the State of California than the orange industry has been.



TYPICAL SCENE AFTER LUMBERING. SCATTERED DEBRIS CONSTITUTE A GREAT FIRE MENACE. FRESNO COUNTY.

Section 4 of the State Forest Law provides that the State Forester shall, upon request, make an examination of land to determine its adaptability to tree growth, and shall prepare plans for the planting of tracts. Under this section we have examined 39,860 acres of land since May, 1907. On account of our small office force it has been impossible to make as careful examinations as the circumstances warranted. Moreover, it has been impossible to find time to prepare detailed plans for planting. The best we have been able to do was to make hurried field examinations and report the results by letter. This has been unsatisfactory, for the reason that in many cases these lands have been sold to parties who have never seen them and who have depended on the report of this office in their purchases. If we accept the responsibility which devolves upon us in the starting of this industry we should have more men, so that we could take time to become thoroughly familiar with the conditions on each tract, and thus reduce the probability of any mistake.

Furthermore, we have not been able to meet all the demands made upon us for land examinations. At the present time there are three examinations pending which have been on file for several months; several for shorter periods. One of these is aimed to improve the slopes of Mount Hamilton and thus better the conditions for making observations. It appears from the letter of the Director of the Lick Observatory, who requested an examination on June 30, 1908, that the uncovered soil and rocks become too highly heated by the sun's radiations and, remaining heated for a considerable time after dark, cause currents of heated air to ascend. In the early evening the observing conditions are made poorer on account of the fact that it is necessary for the observers to look through these disturbed currents. For these reasons it seems desirable to establish some sort of forest cover on the barren slopes to prevent the rocks from becoming heated. Such work is so obviously important that means should be at hand to give it immediate attention.

Recommendations.

To meet the rapidly increasing demands on the office for land examinations, and for work of more general nature, I strongly recommend that the force of the office be increased by at least one technically-trained forester.

EXPENDITURES.

As I have already explained, the work of this office on its establishment was of a pioneer character and the people of the State being unfamiliar with the ends it sought to accomplish were slow in making use of its services. My predecessor in office was confronted with many difficulties in the way of organization. The Forest Law fixes the salary of Assistant State Foresters at $1,200 per annum, and at this figure it was impossible to secure men of forestry training and exceedingly difficult to find those without it who possessed the originality and ability to interest the people in a new business. Without these accomplishments the money would have been poorly spent. On that account the greater part of the year which he held office passed without the employment of any assistants. In the latter part of that year he was able to secure one of approved qualifications, but the place of the other was not filled during his term of office.

For these reasons the greater part of the appropriation for the first two years remained unexpended at the time I became State Forester, and during the fiscal year following the amount of work required of the office was not great enough, under the careful plans followed, to demand the expenditure of the relatively large balance remaining. Hence, at the end of the two fiscal years for which the first appropriation was made an unexpended balance remained.

In my last report I furnished a detailed statement of the expenditures from the establishment of the office until October 31, 1907, at which time a balance of $10,102.90 remained. The expenditures during the balance of that fiscal year were as follows:

EXPENDITURES OF STATE FORESTER'S OFFICE.

November 1, 1906, to June 30, 1907.

Balance November 1, 1906		$10,102 90
Salaries	$3,160 00	
Traveling expenses	969 89	
Stenography and typewriting	775 00	
Printing and binding	1,314 85	
Postage	355 85	
Office rent	160 00	
Incidentals	1,192 73	
		7,928 32
Unexpended balance at end of the fifty-eighth fiscal year		$2,174 58

The unexpended balance was returned to the General Fund in the State treasury.

It will be noticed that the expenditures of the last part of the fifty-eighth fiscal year greatly exceeded its proportionate amount of the appropriation of $17,600 made by the legislature for the fifty-seventh and fifty-eighth fiscal years. This in itself indicated that the expenditures of the fifty-ninth and sixtieth fiscal years would exceed the appropriation made for the two fiscal years preceding. We were fortunate enough to secure for the fifty-ninth and sixtieth fiscal years an appropriation of $22,100, representing an increase of $4,500. It was divided as follows:

For salary of State Forester	$4,800 00
For salaries of two Assistant Foresters	4,800 00
For support of the State Board of Forestry, including field and traveling expenses	10,000 00
For printing, binding, and ruling, and all work and materials furnished by the State Printing Office	2,500 00
	$22,100 00

The expenditures under this appropriation follow:

Appropriation for salary of State Forester		$4,800 00
Salary, State Forester		3,200 00
Balance		$600 00
Appropriation for salaries of Assistant Foresters		$4,800 00
Salaries, Assistant State Foresters		3,200 00
Balance		$600 00
Appropriation for support of the State Board of Forestry		$10,000 00
Traveling expenses	$2,611 39	
Stenography and typewriting	1,618 07	
Postage	857 00	
Expressage	169 57	
Incidentals	3,090 46	
		8,346 49
Balance November 1, 1908		$1,653 51

Our support fund became exhausted in June of the fifty-ninth fiscal year, and it became necessary to draw $164.93 from the Forestry Fund, accumulated by fines paid for violations of the forest laws, in order to tide us over until the support appropriation for the sixtieth fiscal year became available. A more serious condition confronts us at the present time. From the statement above it will be noticed that our support fund on November 1, 1908, contained only $1,653.51. This will permit of an average monthly expenditure during the balance of the fiscal year of only $206.70. Out of this amount $100 per month must be paid for the services of the stenographer and janitor. The balance is so small that it will barely cover the most necessary expenses of the office, such as postage, expressage, etc., leaving practically no money available for traveling purposes.

Recommendations.

I called attention above to the fact that at the end of the fifty-seventh fiscal year an unexpended balance of $2,174.58 was turned back into the General Fund. I strongly recommend that the coming legislature be requested to return this sum to the credit of the support fund of the State Board of Forestry, to be used during the balance of this fiscal year.

I wish to direct special attention to the low salaries paid the employees of the State Board of Forestry. It is impossible to find elsewhere, even in State employ, men of equal ability who are not paid fully twice as much. It has been related that great difficulty was experienced in the beginning to find men qualified to fill the positions of Assistant State Foresters at the salary fixed by statute. The present incumbents are both men of forestry training and of considerable experience in this and other states. It may not be expected that they will be willing much longer to remain in the employ of the State at salaries less than are paid ordinary clerks in other departments. The experience they have gained of conditions in California makes their services more valuable to the State than when they came or than those of men who could be secured outside. For these reasons, I strongly recommend that the salaries of Assistant State Foresters be increased to $2,400 per year.

The State Forester is paid $2,400 per year and is thus placed on a plane with the deputies in other State offices. At the present time there is a strong demand from the newly formed eucalyptus companies for foresters' service. Their offers are from two to three times what the State Forester is now receiving. It would appear that the State should maintain in the position of State Forester a man who, by his training and experience, is able not only to meet the general forestry problems of the State, but who should be qualified to gather information for the encouragement of the eucalyptus industry. Furthermore, as more companies are formed, it will become increasingly necessary for him to pass upon the claims as to the returns of the different companies in order to safeguard the interests of the investing public. It is the State's duty, in my opinion, to furnish this information, and it can be done capably only if the State stands ready to employ as good or better men than the eucalyptus companies themselves. No satisfaction or advantage will accrue to the State from making changes in the head of the Forestry Department, yet this result will naturally follow unless the salary of the State Forester is put at such a figure that he will not be tempted away by alluring offers from private parties.

The success of the constitutional amendment increasing the salaries of certain elective State officers would seem to indicate that the people generally are favorably inclined in this direction. I doubt if at the present time there is sufficient appreciation of the importance of the Forestry Department, but I am equally impressed with the belief that this lack of appreciation is due to lack of understanding of its work. No one who is thoroughly familiar with the extent of the demands being made upon it at the present time can fail to urge, for the State's interest alone, that the Forestry Department be strengthened. For these reasons alone I strongly recommend that the salary of the State Forester be placed at $4,800.

Elsewhere in this report I recommended a special appropriation to be used only in coöperating with counties for fire protection. This would have no bearing upon our support fund for the sixty-first and sixty-second fiscal years. I have shown that with the strictest economy we have practiced in the fifty-ninth and sixtieth fiscal years we are confronted with the necessity of requesting an immediate appropriation. The economic use of this appropriation may be exemplified by the statement that the stenographer in this office, who really occupies a clerk's position, is paid only $85 a month, although her work is coördinate with that performed by similar employees in other departments who are paid from $1,600 to $1,800 per year. It should be immediately apparent that there is need, from the standpoint of fair play alone, to remedy this condition. If the business of the Forestry Department proceeds during the coming two years at no more than its past rate of growth the work will demand an expenditure of at least $30,000. I strongly recommend that the support fund for the sixty-first and sixty-second fiscal years be not less than this amount.

I am glad to be able to report that the prospects are that our Printing Fund will be sufficient to carry us through the present fiscal year. I would recommend that the Printing Fund for the sixty-first and sixty-second fiscal years be placed at $3,500 instead of $2,500 in order to admit of the printing of such additional publications as will naturally follow from the growth in other directions.

CALIFORNIA REDWOOD PARK.

In July, 1907, the State Board of Forestry issued a circular descriptive of California Redwood Park, in order to call the attention of the people of this great pleasure ground which the State is maintaining for their use. It seems to have had the result of increasing the number of visitors to the Park greatly. For example, in 1907, 2,230 visitors registered at the Park and probably 10 per cent of those who visited it failed to register. During the past season 2,757 registered, with probably about the same percentage in addition. California Redwood Park is fast becoming a popular summer resort for those who desire rest and quiet with unexcelled forest scenery.

To facilitate the handling of the increasing number of visitors the Board of Forestry erected a substantial two-story cottage made of redwood logs of uniform size and surrounded on three sides by a broad veranda. The cottage is used in summer as a dining-room for visitors to the Park. It is fitted with a fireplace, which adds to its comfort in the evening and during cool days in the spring and fall.

Prior to the time California Redwood Park was transferred to the care of the State Board of Forestry there were several cottages of unfinished redwood boards built near the present site of the cottage, at what is known as "Governor's Camp," and these are now used so far as possible for the sleeping accommodations of the guests. It is always necessary in summer to use several tents to accommodate those whom the cottages will not hold. The tents are provided with board floors, washstands, and bedding furniture, and prove fully as desirable during the summer season as the cottages. With the present facilities we can accommodate overnight about thirty people, but during the past season there have been, at times, double this number who desired accommodations, and they had to be turned away owing to the lack of tents.

The Park cost the State in the beginning $250,000, and more than $50,000 has since been spent in maintaining it. It would seem to be only good business economy to equip a property of this value with accommodations for all who care to visit it.

The general administrative work at the Park has proceeded uneventfully during the past two years. It has consisted, first of all, in completing a system of fire lines around the Park. These fire lines are from 40 to 60 or more feet in width, and from them all inflammable material has been removed. In most cases the roots of the trees were grubbed out at the time the fire line was constructed. In a few instances, however, on account of our haste to encircle the Park, the roots were not removed when the first clearing was made. It has been necessary, during the past two seasons, to go over these portions and grub out the stumps in order to prevent them from coppicing. This work has required the services of from two to three men during the summer season. Their presence would have been necessary, or at least desirable in any case, consequently the work of clearing the fire lines may be looked upon as giving them employment while they were really stationed on the rim of the basin in which the Park is located to see that fires did not come in from the outlying country. I consider that it will be desirable for a long time to keep two or more men stationed at different points on the edge of the basin to give notice of neighboring fires. This will give time to summon men to the fire line where back-firing may be commenced to prevent any fire from entering the Park. I am able to report that there has been no fire in the Park since it has been under the care of the State Board of Forestry.

In addition to work on the fire trails a small number of men were engaged, in the early part of the season, to clear the roads and trails of fallen trees and limbs. This will be necessary from season to season.

During the early part of last year a private telephone line was constructed from Boulder Creek to the Park. This affords a very much needed convenience, and would be of great service in summoning men in case a fire should break out.

The Park is reached by train from San Francisco to Boulder Creek, and thence by stage over a scenic mountain road 12 miles in length. The stage is run about four or five months each year, and makes daily trips. It carries the mail from Boulder Creek to California Redwood Park, the new post office secured for the Park through the efforts of Congressman Needham.

Until two years ago the road became very dusty in summer and the trip was rather unpleasant. This has been remedied recently by sprinkling, the county of Santa Cruz sprinkling from Boulder Creek to the Park boundary and the Board of Forestry conducting the sprinkling from there to Governor's Camp. This has not only placed the road in good order, but removed the dust. During the past summer some of the supply tanks along the road became dry on account of the unusual drought, and sections of the road were unsprinkled for a considerable period. This temporarily caused annoyance from dust. It is probable, however, that the present facilities for sprinkling the road will be adequate during ordinary seasons.

The lodging and boarding accommodations at the Park were conducted during the summer of 1907 by Mrs. Rambo, the wife of Senator S. H. Rambo, the present warden. On his request the Board of Forestry sought another party to conduct this business last summer in order to relieve Mrs. Rambo. We were fortunate in securing the services of Mrs. Abbie A. Elsom of Stockton, who has proved an efficient hostess.

In my last report I stated that a cottage would be built at the Park entrance on the 5-acre tract donated to the State by Mr. H. L. Middleton of Boulder Creek. This was considered necessary for the headquarters of the foreman. In winter the dampness under the large redwood trees at Governor's Camp is so great that it is impossible for any one to live there, yet it is desirable to have some one at the Park who can have general oversight. In the summer it is desirable to have the foreman located somewhere on the higher land so that he can keep a general lookout over the surrounding country for forest fires. His location at the entrance to the Park is of value also to those who go there because they can obtain from him general information regarding the Park. Accordingly, the cottage was constructed at the Park entrance.

In September, 1904, a disastrous fire occurred in the Park near Sempervirens Camp. It killed most of the fir, oak, and madrone trees in its path, and many redwood trees which, on account of previous fires, were of low vitality. These dead trees remained standing in the Park and were a menace to it and to those who visited it, because they afforded dry fuel for any chance fire, and were decayed to the point where they were commencing to shed their limbs. In order to remove this menace I recommended to the State Board of Forestry that a contract for cutting them be entered into. It would have been more desirable, for many reasons, for the Board of Forestry to have handled their removal, but this was impossible on account of the low condition of our appropriation. Following the consent of the State Board of Forestry I entered into a contract with Wm. M. Elson, of Santa Cruz, for the removal of the fire-killed trees. This work was commenced in the early part of last winter and proceeded until August 31st of this year, when the contract expired. During this period a large number of trees were cut and their contents removed. The work has been conducted in a very satisfactory manner, and the results have been beneficial in many ways. Following the removal of the trees the workmen at the Park piled and burned the limbs and other débris, which left the ground in very good condition for reproduction. It is safe to say that the fire scars in this area will soon be hidden by a strong growth of young redwoods and firs.

There remains, particularly near the entrance to the Park, a considerable area of fire-killed firs which are fast losing their value for any purpose, and which will ultimately decay and fall. Under instructions from the State Board of Forestry in September, 1908, I advertised for a contract for the removal of these trees. Only one bid was received, and this called for a change in the terms of the contract. On account of the stress of other work the contract has not yet been awarded. This work will receive early attention.

EXPENSES OF CALIFORNIA REDWOOD PARK.

November 1, 1906, to October 31, 1908.

Balance November 1, 1906		$8,675 88
Expenditures November 1, 1906, to June 30, 1907:		
Warden's salary	$1,000 00	
Foreman's salary (April to June, inclusive)	300 00	
Construction of telephone line	596 00	
Labor and supplies	6,509 24	
Printing	270 50	
		8,675 74
Unexpended balance end of fifty-eighth fiscal year		$0 14
Appropriation, fifty-ninth and sixtieth fiscal years		$10,000 00
Warden's salary (16 months)	$2,000 00	
Foreman's salary (16 months)	1,600 00	
Labor and supplies	2,923 05	
		6,523 05
Balance November 1, 1908		$3,476 95
Appropriation for printing fiftieth and sixtieth fiscal years		$100 00
Balance November 1, 1908		$100 00

Recommendations.

At its session in 1906 the legislature reduced the appropriation for the support and maintenance of California Redwood Park from $10,000 to $5,000 per year, and created a printing fund of $50 per year; there seems to have been no reason for either of these changes. The result has been that we have not been able to conduct any improvement work at the Park, that considerable necessary work has been left undone, and the work of removing from the Park the fire-killed timber which otherwise could have been done by the State has had to be done by contract.

From the time of the purchase of California Redwood Park until it came into the hands of the State Board of Forestry very little work in the way of making it accessible to visitors was done, consequently this work has devolved upon the State Board of Forestry. During the first two years the Board had control of the Park it had an appropriation of $10,000 a year to work on and a great deal of necessary improvement work was accomplished. When this work was at its height the legislature, without reason, cut the appropriation exactly in half. This forced retrenchments in every direction and prevented the continuance of the work. It would seem that if the State intends to maintain this property for the benefit of the people that it would be only good policy to maintain it properly. This can not be done for $5,000 per year; consequently, I recommend that the appropriation of California Redwood Park be restored to $10,000 per year, and that the printing fund, for which there has been no use, be cut off. The small amount of supplies required from the State Printing Office may very well be purchased from the general appropriation.

WATER SUPPLY AND SEWAGE DISPOSAL.

During the past season, which was unusually dry, the water supply of the Park gave out, and it became necessary to carry water from the stream for camp use. This entailed a great amount of work and considerable inconvenience, and caused much dissatisfaction, because the water near the camp is of uncertain purity.

It seems desirable to furnish the camp with an abundant supply of pure water. On that account I asked the State Engineer to make a survey to show the best available source of water and the approximate cost of installing a water system. The report of Mr. P. N. Narboe, Assistant State Engineer, who was detailed on this work, follows:

"October 17, 1908.

Mr. N. Ellery, *State Engineer, Sacramento, California.*

Dear Sir: In compliance with your verbal instructions, made at the request of Mr. G. B. Lull, State Forester, I visited the California Redwood Park near Santa Cruz, and investigated the feasibility of installing water supply and sewage disposal systems for the main camp.

That portion of the Park which attracts most visitors is a small valley in the middle of the "Big Basin," at the junction of the East Fork of Waddell Creek with Bloom's Creek. The floor of the valley is slightly rolling, covered with a heavy growth of virgin forest and dense undergrowth. The administration headquarters and main camping ground, known as Governor's Camp, is situated in the north arm of the valley, along Waddell Creek, and at the terminus of the road from Boulder Creek. From this point trails radiate in several directions to different points of interest, but no wagon roads as yet have been constructed.

About ten (10) acres of the valley have been partly cleared of underbrush, and it is here that the administration buildings, boarding and lodging houses and camps are established.

The number of inhabitants, campers, and visitors have seldom exceeded two hundred (200) in one day, but as the Park becomes better known and its beauties appreciated, the number of visitors and of campers will be greatly increased, so that facilities should be provided for about one thousand (1,000) people.

The only water supply now available is Waddell Creek, flowing along one side of the camp ground. The only means of disposing of sewage and refuse is by depositing on the surface of the ground or in pits. In either case it finally reaches the creek, and in a short time will become a menace to the health of all using the water of the creek.

Water Supply.—Water can be brought to the grounds in pipes under pressure, sufficient for several thousand people, either from Bloom's Creek, Union Mill Creek, Sempervirens Creek, or Maddock Creek, or all combined, if need be. All but the last named, however, have their watersheds on private lands used for grazing, sawmills, shake and post makers, camps, etc., so that the water is subject to more or less pollution.

The last named, Maddock Creek, has its source removed from accessible timber to tempt the lumbermen, and with but little grazing land. At a distance of less than six thousand (6,000) feet from the camp, the creek is at an elevation of 104 feet above the bed of Waddell Creek at Governor's Camp. Water may be piped from here and delivered into tanks on the hillsides above the camp at sufficient elevation to give ample pressure for fire protection to the buildings.

At the time of my visit, October 9th, I measured the water flowing in Maddock Creek, and found it to be eighteen (18) gallons per minute, equivalent to 25,920 gallons in twenty-four (24) hours, and the creek was lower than has been known in twenty-five (25) years, so that it seems to be safe to estimate this source as sure to provide enough water at all times for over a thousand people at the camp. Should the population be enough greater to require all the supply for domestic use, then by an expenditure of say $150 a hydraulic ram can be installed in Waddell Creek at the camp which will supply the grounds for sprinkling and watering stock.

Sewage Disposal.—As above stated, the method of disposing of sewage matter now in practice is to deposit in pits or on the surface of the ground. Much excreta is deposited on the ground in secluded spots for the reason that there are no public toilets. Camp slops and refuse are thrown on the ground. As the population increases, these practices will become unbearable nuisances as well as menaces to health, even when the source of water supply is removed beyond chance for contamination.

To provide a means of proper disposal of the camp sewage there should be a number of automatic flushing range toilets and urinals placed at convenient and inconspicuous points about the grounds. These to discharge through sewer pipes into a trunk sewer traversing the grounds along near the creek bank, and terminating in a septic tank situated far enough so that any slight odor arising therefrom shall not reach the camp. The effluent from the tank, after undergoing the cleansing septic action, may be discharged into the creek without harm.

I submit a plat of the portion of the Park embracing Governor's Camp and vicinity, also a sketch showing a tentative plan for water supply and sewage disposal plants, to cost about $5,000.

I desire to acknowledge my indebtedness to Senator S. H. Rambo, warden, and Mr. J. H. Creed, foreman, for many courtesies and much assistance in my investigations.

Respectfully,

(Signed) P. N. Narboe."

Up to the present time the sewage of the camp has been deposited in holes dug in the earth without any means of escape except through seepage to the stream. This system was tolerable so long as there were only a few visitors to the camp, but with the increasing number of visitors the problem of sewage disposal has become of vital importance. Unless something is done to remedy existing conditions it seems only a question of time until the camp will become disease-infected. The report of the Assistant State Engineer includes a plan for the disposal of sewage. I urge that funds be appropriated to meet the expenses necessary for the installation of both a water and a sewage system.

PROPOSED STATE REGULATION OF TIMBER CUTTING ON PRIVATE LANDS LOCATED ON THE WATERSHEDS OF IRRIGABLE STREAMS.

In September, 1907, the Fifteenth National Irrigation Congress, at its session in Sacramento, passed the following resolution:

"*Resolved*, That the Fifteenth National Irrigation Congress urges upon the people of California the need of enacting a law giving the State Board of Forestry power to examine all private forest holdings on the watersheds of irrigable streams, and to designate and enforce such rules for cutting as in its judgment will secure the continuity of said forests and pervent injury to said streams."

The opinion of the more thoughtful men in California and in the United States is favorable to the enactment of a law conferring upon the State Board of Forestry the power implied by this resolution. It is unquestioned that the State will face the necessity of taking action in this direction ultimately and it would appear that it is better to commence before the watersheds of the State have suffered irreparable damage by careless lumbering operations. The need for this arises from the fact that under the present methods of logging in our pine forests, where the trees are approximately even-aged, practically all the merchantable species are removed leaving as parent trees for the second crop inferior species worthless for market purposes. Moreover, the logging operations in many cases are conducted in such a careless manner as regards débris that after the removal of the timber the area is easily susceptible of visitation by forest fires. If fires follow, as they usually do, the few trees of inferior kinds that are left are killed and the site is soon occupied by chaparral to the exclusion of forest species. This has happened so frequently that chaparral has come to be regarded as the successor of the forest.

Statistics show that between the years 1899 and 1904 the lumber cut of California increased 83.7 per cent. This is a greater increase than that of any other state except Washington and Oregon, where the percentages were 212.5 per cent and 118 per cent respectively. These percentages show in an alarming way the Western movement of the lumber industry for virgin supplies. There can be no doubt that the forest area of California, upon which the irrigation of the valleys and the control of the streams depends so vitally, will not be able to withstand the onslaughts of many years at the increasing rate of cutting.

If the contention that some action will be required of the State ultimately to protect her forest resources be true, it would appear much better to take the step now before any greater injury results. It would not appear that the regulation of cutting would cause serious hardship to the owners of timber lands. In a general way it would mean that the State would demand that when an area was lumbered that sufficient trees of the more valuable species be left to re-seed the area; that the limbs, tops and unused portions of the trunks of the trees be piled and burned or removed so that the second crop would not be menaced by their presence. The difference between present methods and those which a law of this kind would require are not great enough to diminish markedly the lumber cut on an area, nor would the expense entailed by destroying the débris be sufficient to make a serious inroad on the profits. But it would mean much for the future of the area lumbered in that the prospects would favor the reproduction of a valuable forest thereon.

It may be argued that when the timber supplies of California are exhausted that substitutes for wood can be found or that wood supplies may be imported from other sections. Granting, for the sake of argument, that these things might be done, there still remains the great unanswerable argument that the water conditions of California require that the mountains be covered with forest growth. Water for domestic and irrigation use must be obtained at home. Whether or not this is looked at from the standpoint of the agriculturist or from the power-producing standpoint, certain it is that the future of California depends most vitally upon the condition of the forest on her mountain slopes.

That the transporting power of our rivers and the power-producing value of our streams, as well as the steady flow of water for irrigation and domestic use is being damaged by the removal of forest from the mountain slopes, is generally admitted. These interests exceed in present importance the value of the timber removed and their future value may not be estimated. It would seem that wise foresight would require that conditions for the steady development of these interests be preserved, especially when the ends may be accomplished at only small cost to the lumber industry. It would seem good policy on the part of the State to remunerate the timber owners for the amount of timber required for seeding purposes rather than to allow the watersheds to be permanently deforested.

When this question first arose many considered that the Constitution would prevent the State from taking action in regulating the operations of the lumbermen. The decision of the Supreme Court of the State of Maine seems to have disposed of this obstacle. This decision holds that it is within legislative power to restrict the cutting of trees in wild lands in the interest of forestry, the preservation of water power and rainfall and general utilities of public interest. It contends that the proposed legislation would be within legislative power and would not operate as a taking of private property for which compensation must be made.

The question was propounded to the Supreme Court as follows:

In order to promote the common welfare of the people of Maine by preventing or diminishing injurious droughts and freshets and by protecting, preserving, and maintaining the natural water supply of the springs, streams, ponds, lakes, and of the lands, and by preventing or diminishing injurious erosion of the land and the filling up of the rivers, ponds and lakes, and as an efficient means necessary to this end has the legislature power under the constitution—

1. By public general law to regulate or restrict the cutting or destruction of small trees growing on wild or uncultivated land by the owner thereof without compensation therefor to such owner:

2. To prohibit, restrict, or regulate the wanton, wasteful or unnecessary cutting or destruction of small trees growing on any wild or uncultivated land by the owner thereof, without compensation therefor to such owner, in case such small trees are of equal or greater value standing and remaining for their future growth than for immediate use, and such trees are not intended or sought to be cut for the purpose of clearing and improving such land for use or occupation in agriculture, mining, quarrying, manufacturing or business or for pleasure purposes or for a building site; or

3. In such manner to regulate or restrict the cutting or destruction of trees growing on wild or uncultivated lands by the owners thereof as to preserve or enhance the value of such lands and trees thereon and protect and promote the interests of such owners and the common welfare of the people;

4. Is such regulation of the control, management or use of private property a taking thereof for public uses for which compensation must be made?

The opinion of the court is as follows:

"*To the President of the Senate*: The undersigned justices, in obedience to the requirement of the constitution, severally give the following as their advisory opinion upon the questions submitted to the justices of the supreme judicial court by the Senate order of March 27, 1907:

We find that the legislature has by the constitution 'full power to make and establish all reasonable laws and regulations for the defense and benefit of the people of this State, not repugnant to this constitution nor that of the United States:' Constitution of Maine, Article IV, Part III, Section 1. It is for the legislature to determine from time to time the occasion and what laws and regulations are necessary or expedient for the defense and benefit of the people; and however inconvenienced, restricted or even damaged particular persons and corporations may be, such general laws and regulations are to be held valid unless there can be pointed out some provision in the state or United States Constitution which clearly prohibits them. Those we understand to be universally accepted principles of constitutional law.

As to the proposed laws and regulations named in the Senate order, the only provision of the United States Constitution having any possible application to such legislation by a State would seem to be that in Fourteenth Amendment. As to that provision, we think it sufficient to quote the language of the United States Supreme Court in *Barbier* vs. *Connolly*, 113 U. S. 27, where, speaking of the Fourteenth Amendment, the court said: 'But neither the amendment, broad and comprehensive as it is, nor any other amendment was designed to interfere with the power of a State, sometimes termed its 'police power,' to prescribe regulations to promote the health, peace, morals, education, and good order of its people, and to legislate so as to increase the industries of the State, develop its resources and add to its wealth and prosperity.' It may be added that the proposed laws and regulations would not discriminate between persons or corporations but only between things and situations, with a classification not merely arbitrary but based on real differences in the nature, situation, and condition of things.

We think the only provisions in the State constitution that could be reasonably invoked against the proposed laws and regulations are the guaranteed right of 'acquiring, possessing, and defending property' and the provision that 'private property shall not be taken for public use without just compensation.' If, however, the proposed legislation would not conflict with the latter provision, it evidently would not with the former, hence only the latter one need be considered.

The question of what constitutes a 'taking' of private property in the constitutional sense of the term has been much considered and variously decided. In the earlier cases and in the older states the provision has been construed strictly. In some states, in later cases, it has been construed more widely to include legislation formerly not considered within the provision. Still more recently, however, the tendency seems to go back to the principles enunciated in the earlier cases. In Massachusetts, one of the earliest states to adopt the constitutional provision, and in Maine, adopting the same provision in succession, the courts have uniformly considered that it was to be construed strictly as against the police power of the legislature."

There follows citations from various cases to uphold the opinion above rendered. Continuing the opinion says:

"We think it a settled principle, growing out of the nature of well ordered civil society, that every holder of property, however absolute and unqualified may be his title, holds it under the implied liability that his use of it shall be so regulated that it shall not be injurious to the equal enjoyment of others having an equal right to the enjoyment of their property, nor injurious to the rights of the community. All property in this commonwealth, as well as that in the interior as that bordering on tide waters, is derived directly or indirectly from the government and held subject to those general regulations which are necessary for the common good and general welfare. Rights of property, like all other social and conventional rights, are subject to such reasonable limitations in their enjoyment as shall prevent them from being injurious, and to such reasonable restraints and regulations established by law as the legislature, under the governing and controlling power vested in them by the Constitution, may think necessary and expedient. This is very different from right of eminent domain, etc.

In the case *Wadleigh* vs. *Gilman*, 12 Maine, 403, decided in 1835, only fifteen years after the adoption of our constitution, there was upon the plaintiff's land a wooden building. A city ordinance was passed by legislative authority prohibiting the erection of wooden buildings within certain limits, which included the plaintiff's building. After the passage of the ordinance the plaintiff moved his building to another place within the same inhabited limits. The defendant, as city marshal, acting under the ordinance, entered upon the plaintiff's land, took the building down. The court held the ordinance valid and the defendant protested and declared as follows: 'Police regulations may forbid such a use and such modifications of private property as would prove injurious. This is one of the benefits which men derive from associating in communities. It may sometimes occasion inconvenience to an individual, but he has compensation in participating in the general advantage. Laws of this character are unquestionably within the scope of the legislative power without impairing any constitutional provision. It does not appropriate private property to public use but merely regulates its enjoyment.' "

Other citations follow and the opinion continues:

"There are two reasons of great weight for applying this strict construction of the constitutional provision to property in land: First, such property is not the result of productive labor, but is derived solely from the State itself, the original owner; second, the amount of land being incapable of increase, if the owners of large tracts can waste them at will without state restriction, the state and its people may be helplessly impoverished and one great purpose of government defeated.

Regarding the question submitted, in the light of the doctrine above stated (being that of Maine and Massachusetts at least) we do not think the proposed legislation would operate to 'take' private property within the inhibition of the constitution. While it might restrict the owner of wild and uncultivated lands in his use of them, might delay his taking some of the product, might delay his anticipated profits, and even thereby might cause him some loss of profit, it would nevertheless leave him his lands, their product and increase untouched and without diminution of title, estate or quantity. He would still have large measure of control and large opportunity to realize values. He might suffer delay but not deprivation. While the use might be restricted it would not be appropriated or 'taken.'

The foregoing considerations lead us to the opinion at present that the proposed legislation for the purposes and with the limitations named in the senate order would be within the legislative power and would not operate as a taking of private property for which compensation must be made.

Respectfully submitted.

(Signed) LUCIUS A. EMERY.
WILLIAM P. WHITEHOUSE.
S. C. STROUT.
HENRY C. PEABODY.
ALBERT M. SPEAR.
LESLIE C. CORNISH."

March 10, 1907.

Whether action in the direction above outlined would conflict with the constitution of the State of California may be left for legal minds to decide. If not, it would seem advisable for the legislature to take this matter in hand at an early date in order to protect the great industries threatened by deforestation. Realizing the importance of placing in the hands of the legislature data which will help it to a decision as to whether or not this legislation is imperative, with the consent of the State Board of Forestry I have conducted an examination of the private timber holdings located on the watersheds of irrigable streams in this State. This examination is practically finished and its findings will be incorporated in a separate report which may be expected at an early date.

PROPOSED DONATION OF LAND TO THE STATE.

Mrs. Annie E. K. Bidwell, owner of Rancho Chico, Chico, California, desires to donate to the State of California certain streams and land contiguous thereto which form part of her rancho. Her object is to preserve in their natural condition these streams and their bordering vegetation for their beauty and for the welfare of the people owning adjacent property. She fears that after her death the value of adjacent property will be impaired if the water from these streams were diverted and if the fine growth of trees along them were destroyed. For these reasons she wishes to donate this property to the State in order that it may be preserved in its present condition. In this connection the letter of Colonel C. C. Royce, the manager of Rancho Chico, sheds considerable light. His letter is as follows:

CHICO, CALIFORNIA, March 3, 1908.

The State Forester, Sacramento, Cal.

DEAR SIR: Referring to your recent interview with Mrs. Bidwell on the subject of placing certain lands on Rancho Chico under the ownership of the State Board of Forestry, I have to say that her proposal covers the following conditions:

First. She proposed to convey to the State Board of Forestry the following described lands, viz: All that strip of land of varying width bounded on the west by the Sacramento River and an inlet thereof; on the east by the west line of Sutter avenue and the west line of the county road, said strip of land extending from the north boundary of Rancho Arroyo Chico in the northwest quarter of section 22, township 22 north, range 1 west, M. D. M., to the southerly extremity of said Rancho Arroyo Chico on the north bank of Chico Creek near its confluence with the Sacramento River in section 2, township 21 north, range 1 west, M. D. M., excepting and reserving therefrom Lot 32 of the meridian subdivision of the John Bidwell Rancho.

Second. A strip of land of varying width, including both banks and the channel of Lindo Channel, otherwise called Sandy Gulch, from the point where said Lindo Channel intersects the line of the park deeded by Annie E. K. Bidwell to the city of Chico, July 10, 1905, to the point where said Lindo Channel disembogues into Chico Creek. Said strip herein proposed to be conveyed includes all lands lying between the 7th, 6th and 3d subdivisions of the John Bidwell Rancho, the Cussick Tract, the lands of H. B. Reed and Park Henshaw, the 12th and 15th subdivisions of the John Bidwell Rancho and the said park line, all on the northwest side of said Lindo Channel, and the 7th, 2d, 4th, and 14th subdivisions of the John Bidwell Rancho and a strip between the said 14th subdivision and the said park line, all on the south and east side of said Lindo Channel.

Third. A strip of land of varying width on the north side of Chico Creek and running to the center of said creek, extending from the point where the Southern Pacific railroad right of way crosses said creek westerly and down said stream to the mouth thereof; said strip of land being bounded on the north by the 2d and 7th meridian subdivisions of the John Bidwell Rancho and on the south by the center of the channel of Chico Creek.

It is Mrs. Bidwell's proposal to insert in her deed to the State Board of Forestry the following conditions:

A. That the grantee shall not use, cause to be used or allow to be used, directly or indirectly, said land or any part thereof for the purpose of making or selling intoxicating liquors, and should said condition be broken the title herein granted by this deed shall cease, revert to and be vested in said Annie E. K. Bidwell, her heirs or assigns.

B. That the grantor will reserve to herself, during her lifetime, the use and control of such of said lands above described as lie east of the Shasta and Oregon road for all purposes, and that she reserves during her lifetime all present water rights in either of said streams, together with the right to use or sell any sand, gravel, earth or timber within any of the above described tracts as she may deem wise and proper.

And furthermore, it is to be one of the conditions of this conveyance that nothing shall abridge or interfere, now or hereafter, with the custom of closing Lindo Channel during the summer months, at its point of exit at Chico Creek, in order that a steady flow of water may be maintained in the channel of said Chico Creek throughout the entire year.

C. The object of the grantor in conveying this property to the State Board of Forestry is to preserve after her death the forest growth along said water courses; to prevent the diversion and use of the water for private purposes; to minimize the loss of water by evaporation, so that the sub-irrigation of the adjoining lands may be maintained to its natural extent and to maintain the natural beauty of said streams and the integrity of their banks.

It is expected that the State Board of Forestry shall retain the title to the lands herein granted in perpetuity.

Very truly yours.

(Signed) C. C. Royce."

This letter describes the location of the property which Mrs. Bidwell proposes to donate and the terms under which she wishes the State to assume its ownership and management. Very little needs to be said regarding it except that the width of the strip along the streams varies somewhat as required by the boundaries of the subdivisions, but averages, in most cases, between 30 and 60 feet. The objects which the proposed donation seeks to accomplish are worthy ones, for the present conditions are important to preserve. Their chief value, however, will accrue to the residents of the town of Chico and Butte County, consequently it is a question for the legislature to decide as to whether the State desires to assume the care of this property.

When the deed was received I was of the impression that the language of section 3, Statutes 1905, Chapter 264, was sufficient for acceptance by the State Board of Forestry. The Attorney General states, however, that the legislature only has the power to accept donations for the State, consequently the deed to this land has been placed in the hands of the State Treasurer for safekeeping. Should the legislature decide to accept this donation I would recomemnd that an appropriation of $1,500 be made for its maintenance during the sixty-first and sixty-second fiscal years.

SUMMARY OF RECOMMENDATIONS.

That a special appropriation of $30,000 be made for the purpose of fire protection, provided that at least fifty counties in this State will expend collectively an equal amount for the same purpose;

That the salary fund of the State Board of Forestry be increased sufficiently to admit of the employment of at least one additional technically-trained forester;

That the unexpended balance of $2,174.58, which was returned to the

ANNUAL REPORT

OF THE

RAILROAD COMMISSION

OF THE

STATE OF CALIFORNIA

Year 1908.

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1909.

RAILROAD COMMISSIONERS

OF THE

STATE OF CALIFORNIA.

A. C. IRWIN, President	Sacramento, Cal.
H. D. LOVELAND	San Francisco, Cal.
THEODORE SUMMERLAND	Los Angeles, Cal.

W. D. WAGNER, Secretary	San Bernardino, Cal.
E. S. BLASDEL, Assistant Secretary	Los Angeles, Cal.

General Office, San Francisco, Cal.
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PRELIMINARY REPORT FILED DECEMBER 14, 1908; COMPLETE REPORT COVERING DELAYED STATISTICAL MATTER HEREWITH, FEBRUARY 18, 1909.

Office of the Board of Railroad Commissioners,
San Francisco, California.

To His Excellency, James N. Gillett,
Governor of California.

Sir: Referring to our preliminary report to you under date of December 14, 1908, in which we stated that the delay in submitting our complete report was occasioned by the failure of some of the railroad companies to file with this commission their statistical report, we now have the honor of submitting to you, this, our final and complete report for the fiscal year 1907-8.

It seems to us, if your Excellency please, that this report would not be complete without calling your attention to that which we fully realize you are cognizant of, namely, the provisions of the Constitution, as follows:

Section 21 of Article XII of the Constitution forbids discrimination, but provides no penalty, it being presumed that the Legislature would provide for that, as it is given the authority to do so under Section 22 of Article XII, which provides that "The Legislature shall pass all laws necessary to the carrying out of this chapter."

No such action has ever been taken by the Legislature, and Section 21, Article XII of the Constitution, therefore stands as inoperative, for the reason that no penalty is provided.

While we need statutory enactment at this time defining discrimination, and placing the Commission in a better position to guard the interests of the shippers, such enactment will not do away with the necessity for a constitutional amendment providing a penalty for discrimination, and clearly interpretating the definition of the words "establish" and "conform" as used in Section 22, Article XII of the Constitution, if we are to accept as definite the significant language of Chief Justice Beatty in the case of *Edson* vs. *Southern Pacific,* 144 California, by which he clearly intimates that under the provisions of the Constitution the Commission has the authority to establish maximum rates only.

We also beg to submit for your consideration the following suggestions, which, if adopted and enacted by the Legislature into a statute, would result in enlarging the duties and powers of this Commission and enable it to perform services for the people of the State of California which the framers of the Constitution undoubtedly intended it to perform.

It should be the duty of this Commission to investigate, or cause to be investigated by the proper representative of their office, every railroad or steamboat wreck attended with loss of life or serious injury, as soon thereafter as possible and to report their findings to the Governor, and to give such report full publicity.

It should be their duty to investigate, or cause to be investigated, every issue as to grade crossings where the public safety is involved, and order the proper safeguards to be installed, and they should be given power to institute action in the proper court to compel compliance with their orders.

It should be their duty to see that the railroads and transportation lines of boats plying on the waters of this State put into use such life-saving and safeguarding appliances as are requisite for the safety of the traveling public and of the servants and operatives of such railroad and steamboat companies.

It should be their duty to coöperate with the Interstate Commerce Commission in enforcing, so far as practical within this State, wholesome regulations and provisions touching interstate commerce as prescribed by the Interstate Commerce Commission.

The term "transportation companies" should be deemed to mean and include:

All companies owning or operating railroads within this State.

All companies owning or operating steamships engaged in the transportation of freight or passengers from and to ports within this State.

All companies owning or operating steamboats used in transporting freight or passengers upon the rivers or inland waters of this State.

All companies owning or operating interurban electric railroads engaged in the transportation of freight or passengers within this State.

All express, dispatch or sleeping car companies engaged in the transportation of freight or passengers within this State.

The word "company" should mean and include corporations, associations, partnerships, trustees, agents, assignees, and individuals.

Whenever any railroad company owns and operates in connection with its road, for the purpose of transporting its cars, freight, or passengers, any steamer or water craft, such steamer or water craft should be deemed a part of its road, and whenever any steamship company owns and operates any barge, canal boat, steamer, tug, ferryboat, or lighter in connection with its ships or boats, the things so operated should be deemed to be part of its main line.

Whenever any street railroad company owns and operates any street railroad in connection with any railroad operated by electric motive power, engaged in the transportation of freight or passengers to and from points between one county and another within this State, the street railroad so owned or operated should be deemed a part of the railroad operated between the two or more counties.

The commission should investigate the cause of any accident on railroad or steamboat which it may deem to require investigation, and any evidence secured by such investigation should be reduced to writing, filed in the office of the Commission, and be subject to public inspection.

Every officer, agent, or employe of any transportation company who should willfully neglect or refuse to make or furnish any report required by the Commission for the purpose of such investigation, or who should willfully or unlawfully hinder, delay, or obstruct the Commission in the discharge of the duties imposed upon it, should forfeit and pay a fine of five hundred dollars for each offense, to be recovered in an action in the name of the State. A delay of ten days to make and furnish any such report should raise the presumption that the same was willful.

Any railroad or other transportation company which violates or refuses to conform to or obey any rule, order, or regulation of the Railroad Commission, as provided above, should forfeit and pay to the State of California five hundred dollars for each offense, to be recovered in an action to be instituted in the Superior Court of the City and County of San Francisco, State of California, on the relation of the Railroad Commission; and each day such company continues to violate any rule or regulation or refuses to obey any order of the Commission, should be a separate offense.

The Railroad Commission should be authorized to require the construction of sidetracks by any railroad company to industries already established, *provided* it is shown that the proportion of such revenue accruing to such sidetrack is sufficient within a stated period of time to pay the expenses of its construction. This should not be construed to give the Commission authority to require railroad companies to construct sidetracks of more than five hundred feet in length.

All common carriers who, according to their powers, afford all reasonable, proper, and equal facilities for the interchange of traffic between their respective lines and for the forwarding and delivering of passengers and freight to and from their several lines and those connecting therewith, should not discriminate in their rates and charges against such connecting lines, and connecting lines should be required to make as close connection as practicable for the convenience of the traveling public.

Whenever any railroad company or corporation has a controversy with another corporation or persons, and all the parties to such controversy agree in writing to submit such controversy to the Commission, as arbitrators, the Commission should have the power to act as such, and after due notice to all parties interested, should proceed to hear the same, and their award should be final. Such award should be recorded in the county or counties where the subject matter thereof was effected, and should by the clerk be docketed in the judgment docket for such county or counties, and from such docketing should be a judgment as of the Superior Court.

From all decisions or determinations made by the Railroad Commission, any party affected thereby should be entitled to an appeal. Before such party should be allowed to appeal he should, within ten days after notice of such decision or determination, file with the Commission exceptions to the decision or determination of the Commission, which exceptions should state the grounds of objection to such decision or determination. If any such exceptions should be overruled, then such parties should appeal from the order overruling the exception and should within ten days after the decision overruling give notice of his appeal. When an exception is made to the facts as found by the Commission, the appeal should be to the Superior Court. The party appealing should, within ten days after the notice of appeal has been served, file with the Commission exceptions to the decisions or determinations overruling the exception, which statement should assign the errors complained and the grounds of the appeal.

Upon the filing of such statement, the Commission should, within ten days, transmit all the papers and evidence considered by it, together with the assignment of errors filed by the appellant, to a judge of the Superior Court holding court or residing in some county in which such company operates or the party resides. The cause should be entitled "State of California on relation of the Railroad Commission (name of appellant)," and if there are exceptions to any facts found by the Commission, it should be placed on the civil docket of such court and should be tried under the same rules and regulations as are prescribed for other civil causes, except that the rates fixed or the decision or determination made by the Commission should be prima facie just and reasonable.

By consent of all the parties, the appeal should be heard and determined by any judge holding court in any county through or into which the railroad may extend, or in which the person or company does business.

Either party may appeal to the Supreme Court from the judgment of the Superior Court under the same rules and regulations as are prescribed by law for appeals, except that the State of California, if it should appeal, should not be required to give any undertaking or make any deposit to secure the cost of such appeal, and such court may advance the cause on its docket so as to give the same a speedy hearing.

In case of an appeal from the decision of the Commission, the rates of freight and fare fixed by the Commission should be and remain the established rates, and should be so observed and regarded by corporations appealing until the same is changed, reversed, or modified by the judgment of the Superior Court, or until changed by the Commission.

Any freight or passenger rate fixed by the Commission, when approved or confirmed by the judgment of the Superior Court, should be and remain the established rate, and should be so observed and regarded by an appealing corporation until the same is changed, revised, or modified by the final judgment of the Supreme Court, if there should be an appeal thereto, or until changed by the Commission.

It goes without saying that should these recommendations be accepted by your Excellency and incorporated in legislative enactment, the necessary appropriations should be made in order to carry into effect and accomplish the purposes herein desired.

RAILROAD MAP.

Nearly every state in the Union has published a map showing the different railroads in that state, which map they annually revise and keep up to date. The only railroad map issued by this State was compiled a number of years ago, and although the supply has long since been exhausted, we are receiving innumerable requests for maps from the various public libraries, schools, and colleges, as well as from individuals. We believe that an appropriation should be made to enable this Commission to compile and publish an up to date map of California, showing the various lines of railroads.

OFFICE FURNITURE.

The law contemplates that the Commission shall keep on file in their office the various tariffs of the different transportation companies, so that the same may be had for ready reference. This is impracticable unless the Commission is furnished with the necessary filing cases. Filing cases are also needed for the reports of the various railroads. The Commission is in possession of hundreds of volumes of reports of the various State Railroad Commissions, as well as the reports and proceedings of the Interstate Commerce Commission, but we have no book cases in which to keep them. No appropriation, so far as we know, has ever been made for the purpose of furnishing the office of the Railroad Commission, and we would now ask that such an appropriation be made.

COMPLAINTS AND OPINIONS.

During the period which has elapsed since our last report was filed with your Excellency, the Commission has been very active in the adjustment of complaints on the part of shippers, and has held investigations, rendering opinions as follows:

No. 101, *Bridgford-Cunningham Lumber Company* vs. *McCloud River Railroad Company*. This was a case involving the reasonableness of a rate; the hearing was held on formal complaint and answer. It is worthy of note that it is the only case ever heard and brought to final judgment on the reasonableness of the rate, and the opinion of the Commission, which the carrier accepted without appeal, reduced the rate 21½ per cent.

No. 102, No. 103, and No. 104. In these hearings proceedings were initiated by this Commission, such action arising from the facts developed at a hearing in this city before Interstate Commissioner Lane in October, 1907, as to alleged discrimination by the carriers.

The opinions in full as rendered by this Commission will be found in this report.

A large number of informal complaints have been made to the Commission, mostly by letter, and in every instance, though many of them related to matters that clearly do not come within the jurisdiction of this Commission, we endeavored to adjust the matters complained of, usually meeting with complete success, and to the entire satisfaction of the complainant.

STATISTICAL.

The statistical portion of this report we have endeavored to compile so as to be of benefit and give information to the people generally as well as to the shippers and common carriers. We believe that a close study of the statistics herein contained will result in a better understanding between the shipper and the carrier, and a better understanding must necessarily have beneficial results.

A. C. IRWIN,
Commissioner First District,

H. D. LOVELAND,
Commissioner Second District,

THEODORE SUMMERLAND,
Commissioner Third District,
Board of Railroad Commissioners.

W. D. WAGNER, Secretary.

RAILROADS REPORTING.

The following is a list of the railroad companies who have reported to the Commission as prescribed by law:

Name of Company.	General Office.
Arcata and Mad River Railroad	San Francisco, California.
Atchison, Topeka and Santa Fe Railway	Topeka, Kansas.
Boca and Loyalton Railroad	San Francisco, California.
Butte County Railroad	Jersey City, New Jersey.
Central Pacific Railway	San Francisco, California.
Coast Line Railway Company	San Francisco, California.
Colusa and Lake Railroad	Colusa, California.
California Northeastern Railway	San Francisco, California.
Crescent City and Smith River Railroad	Crescent City, California.
Diamond and Caldor Railway	San Francisco, California.
Eureka and Freshwater Railway	San Francisco, California.
Inter-California Railway Company	San Francisco, California.
Iron Mountain Railway	San Francisco, California.
Lake Tahoe Railway and Transportation Company	Tahoe, California.
McCloud River Railroad	San Francisco, California.
Mill Valley and Mt. Tamalpais Railway	San Francisco, California.
National City and Otay Railway	San Diego, California.
Nevada and California Railway	San Francisco, California.
Nevada-California-Oregon Railway	Reno, Nevada.
Nevada County Narrow Gauge	Grass Valley, California.
Northwestern Pacific Railroad	San Francisco, California.
Oregon and Eureka Railroad	Eureka, California.
Pacific Coast Railway	Seattle, Washington.
Pajaro Valley Consolidated Railway	San Francisco, California.
San Diego, Cuyamaca and Eastern Railway	San Diego, California.
San Pedro, Los Angeles and Salt Lake	Los Angeles, California.
San Juan Pacific Railway	San Francisco, California.
Sacramento Valley and Eastern Railway	Redding, California.
Sierra Railway Company	San Francisco, California.
Sierra Valleys Railway	Reno, Nevada.
South Pacific Coast Railway	San Francisco, California.
Southern Pacific	New York, New York.
Southern Pacific Railroad	San Francisco, California.
San Francisco and Napa Railway	San Francisco, California.
Sunset Railroad	Bakersfield, California.
Tonopah and Tidewater Railroad	Los Angeles, California.
Yosemite Valley Railway	San Francisco, California.
Yreka Railroad	San Francisco, California.

FAILING TO REPORT.

The following railroad companies have failed to comply with the Commission's request that they file their report for the year 1907-8:

The Ione and Eastern Railroad Company.

Sugar Pine Railway Company.

Los Angeles and San Diego Beach Railway Company.

NEW RAILROADS.

The following railroads are now or were under construction during the year and were for that reason unable to file complete reports with the Commission. They have, however, given us such data as they were able to give, and next year will in all probability file complete reports:

Northern Electric Company.

Ocean Shore Railway Company.

Western Pacific Railway Company.

Stone Canyon Pacific Railroad Company.

INDUSTRIAL RAILROADS.

The following is a list of railroads which do not report to this Commission and which may be classed as industrial railroads, being either ncorporated or unincorporated railroads, used exclusively in connecion with industrial operations, such as logging, lumbering, mining, and nanufacturing companies, which receive no revenue for the movement f freight, the use of tracks or other allowance.

A further investigation, however, may result in taking some of these oads out of the list of industrial companies and placing them in the ist of carrier companies:

Name of Company.	Mileage.
Albion Lumber Company	5.00
Anderson and Bella Vista Railroad	16.00
Bayside Logging Railroad	9.00
Birch and Smart Railroad	5.01
Brookings Lumber and Box Company	3.00
Borate and Daggett Railroad	10.00
Bucksport and Elk River Railroad	8.00
California Western Railway and Navigation Company	22.00
Caspar, South Fork and Eastern Railroad	15.00
Chino Valley Railroad	4.25
Crescent City Railway	3.50
Diamond Match Company	30.47
Duncan Mill Land and Lumber Company	3.00
El Dorado Lumber Company	34.00
Glendale Railroad	1.50
Greenwood Railroad	16.00
Gualala River Railroad	15.00
Hardy Creek and Eel River Railroad	3.00
Hetch-Hetchy and Yosemite Valley Railway	20.00
Humboldt Logging Railway	12.00
Humboldt Northern Railway	18.94
Kitts, Chas. W.	5.00
Klamath Lake Railroad	17.00
Ludlow and Southern Railway	7.58
Mammoth Copper Mining Company	4.48
Metropolitan Redwood Lumber Company	1.00
Mono Lake Railway and Lumber Company	35.00
Pacific Portland Cement Company	6.00
Placerville and Lake Tahoe Railroad	8.00
Pittsburg Railroad	5.67
Read Timber and Lumber Company	15.00
Selby Smelting and Lead Works	4.95
Shaver Lake Railroad	4.00
Sierra Nevada Wood and Lumber Company	26.70
Stearns Lumber Company	1.00
Union Sugar Company	2.91
Western Redwood Lumber Company	8.00
Wood Sheldon Lumber Company	8.00
Yosemite Short Line Railway	6.00
Total—39	420.96

CONSOLIDATIONS.

ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY.

Incorporated December 12, 1895.

Is a consolidation of the
- Atchison, Topeka and Santa Fe Railway Company.
- Santa Fe Pacific Railroad Company.
- San Francisco and San Joaquin Valley Railway Company.
- Southern California Railway Company.
- Eastern Oklahoma Railway Company.

CENTRAL PACIFIC RAILWAY COMPANY.

Incorporated July 29, 1899.

Acquired by purchase
- Central Pacific Railroad Company.

Colusa and Lake Railroad Company.

Incorporated November 27, 1886.

Is a consolidation of the
- Colusa Railroad Company.
- Colusa and Lake Railroad Company.

National City and Otay Railway Company.

Incorporated December 26, 1886.

Is a consolidation of the
- National City Railway Company.
- Otay Railway Company.

Nevada and California Railway Company.

Incorporated April 7, 1905.

Acquired by purchase the
- Carson and Colorado Railway Company.

Northern Electric Railway Company.

Incorporated September 19, 1907.

Is a consolidation of the
- Northern Electric Railway Company.
- Northern Electric Company.
- Chico Electric Street Railway Company.
- Marysville and Yuba City Street Railway Company.
- Shasta Southern Railway Company.

Northwestern Pacific Railroad Company.

Incorporated January 8, 1907.

Is a consolidation of the
- Northwestern Pacific Railroad Company.
- Eureka and Klamath Railroad Company.
- North Shore Railroad Company.
- San Francisco and North Pacific Railroad Company.
- California Northwestern Railway Company.
- Fort Bragg and Southeastern Railroad Company.
- San Francisco and Northwestern Railway Company.

Pacific Coast Railway Company.

Incorporated September 21, 1882.

Is a consolidation of the
- San Luis Obispo and Santa Maria Valley Railroad Company.
- Pacific Coast Railway Company.

Pajaro Valley Consolidated Railroad Company.

Incorporated December 9, 1897.

Is a consolidation of the
- Pajaro Valley Railroad Company.
- Pajaro Extension Railway Company.

SAN PEDRO, LOS ANGELES AND SALT LAKE RAILROAD COMPANY.

Incorporated March 20, 1901.

Acquired by purchase the
- Los Angeles Terminal Railway Company.
- Portion of Oregon Short Line Railroad Company.

SOUTH PACIFIC COAST RAILWAY COMPANY.

Incorporated May 23, 1887.

Is a consolidation of the
- Santa Cruz and Felton Railroad Company.
- South Pacific Coast Railroad Company.
- Bay and Coast Railroad Company.
- Oakland Township Railroad Company.
- Felton and Pescadero Railroad Company.
- San Francisco and Colorado River Railroad Company.
- Almaden Branch Railroad Company.

SOUTHERN PACIFIC RAILROAD COMPANY.

Incorporated March 10, 1902.

Is a consolidation of the
- Southern Pacific Railroad Company.
- San Francisco and San Jose Railroad Company.
- Santa Clara and Pajaro Valley Railroad Company.
- California Southern Railroad Company.
- Southern Pacific Branch Railroad Company.
- Los Angeles and San Pedro Railroad Company.
- San Jose and Almaden Railroad Company.
- Pajaro and Santa Cruz Railroad Company.
- Monterey Railroad Company.
- Monterey Extension Railroad Company.
- Southern Pacific Branch Railway Company.
- San Pablo and Tulare Railroad Company.
- San Pablo and Tulare Extension Railroad Company.
- San Ranion Valley Railroad Company.
- Stockton and Copperopolis Railroad Company.
- Stockton and Tulare Railroad Company.
- San Joaquin Valley and Yosemite Railroad Company.
- Los Angeles and San Diego Railroad Company.
- Los Angeles and Independence Railroad Company.
- Long Beach, Whittier and Los Angeles County Railroad Co.
- Southern Pacific Railroad Extension Company.
- Ramona and San Bernardino Railroad Company.
- Northern Railway Company.
- Northern California Railway Company.
- California Pacific Railroad Company.
- Southern Pacific Railroad Company of Arizona.
- Southern Pacific Railroad Company of New Mexico.

SOUTHERN PACIFIC COMPANY.

Incorporated March 17, 1884.

Operates the following roads:

- Southern Pacific Company.
- South Pacific Coast Railway Company.
- Southern Pacific Railroad Company.
- Oregon and California Railroad Company.
- Central Pacific Railway Company.
- New Mexico and Arizona Railroad Company.
- Union Pacific Railroad Company.
- Inter-California Railway Company.
- California Northeastern Railway Company.
- Coast Line Railway Company.
- San Francisco and Napa Railway Company.

EXPLANATORY.

In all the following tables the total cost, business, etc., of the whole systems of the Atchison, Topeka and Santa Fe, the San Pedro, Los Angeles and Salt Lake, the Southern Pacific and the Tonopah and Tidewater companies are given, the system of bookkeeping by the companies making it impossible to segregate entirely the State portion of Interstate business. This is not as it should be, and we hope to come to some understanding whereby the business of this State alone will be shown in their reports.

The total mileage of the Atchison, Topeka and Santa Fe system is 6,992.43 miles, of which 1,220.92 miles, or 17.5 per cent, is in California.

The total mileage of the San Pedro, Los Angeles and Salt Lake system is 978.89 miles, of which 241.22 miles, or 24.6 per cent, is in California.

The total mileage of the Southern Pacific system is 5,599.17 miles, of which 3,572.63 miles, or 63.8 per cent, is in California.

The total mileage of the Tonopah and Tidewater is 172.74 miles, of which 144.28 miles, or 83.5 per cent, is in California.

To assume that by taking the percentages herein enumerated of the total business of the companies mentioned would show the business done in California would be erroneous, for it is quite true that some portions of the road do a larger volume of business than others, hence it is impossible to arrive at the exact volume of business done by these roads in this State.

NAME OF COMPANY.	MILEAGE OPERATED.		MILEAGE OWNED.		GAUGE OF TRACK.		RAILS.		New Line During Year.
	Main Line.	Branches and Spurs.	Main Line.	Branches and Spurs.	Ft.	In.	Iron.	Steel.	
Arcata and Mad River Railroad	14.00	7.25	14.00	7.25	3	9¼	....	21.25	....
Atchison, Topeka and Santa Fe Railway	988.61	232.31	1,000.21	232.31	4	8½	....	1,232.52	....
Boca and Loyalton Railroad	45.20	11.29	45.20	11.29	4	8½	....	56.49	1.71
Butte County Railroad	31.50	....	....	....	4	8½	....	....	....
California Northeastern Railway	....	....	63.57	....	4	8½	....	63.57	38.73
Central Pacific Railway	....	....	733.47	14.57	4	8½	....	748.04	1.50
Coast Line Railway	....	....	11.88	....	4	8½	....	11.88	....
Colusa and Lake Railroad	22.00	....	22.00	....	3	.....	....	22.00	....
Crescent City and Smith River Railroad	16.75	....	16.75	....	4	8½	....	16.75	....
Diamond and Caldor Railway	33.63	1.82	33.63	1.82	3	.....	5.24	30.21	....
Eureka and Freshwater Railway	2.50	....	2.50	....	4	8½	....	2.50	....
Inter-California Railway	....	....	41.44	....	4	8½	....	41.44	....
Iron Mountain Railway	11.00	....	11.00	....	3	.....	....	11.00	....
Lake Tahoe Railway and Transportation Co.	16.00	....	16.00	....	3	.....	....	16.00	....
McCloud River Railroad	46.10	21.00	46.10	21.00	4	8½	....	67.10	6.12
Mill Valley and Mount Tamalpais Scenic Railway	8.19	2.43	8.19	2.43	4	8½	....	10.62	....
National City and Otay Railway	18.70	8.20	18.70	8.20	4	8½	....	26.90	.56
Nevada and California Railway	108.05	....	108.05	....	4	8½	....	108.05	....
Nevada-California-Oregon Railway	136.10	....	136.10	....	3	.....	....	136.10	20.40
Nevada County Narrow Gauge	22.50	....	22.50	....	3	.....	....	22.50	....
Northwestern Pacific Railroad	295.72	77.13	322.09	82.27	4	8½	29.98	374.38	1.55
Oregon and Eureka Railroad	1.09	3.56	1.09	3.56	4	8½	....	4.65	....
Pacific Coast Railway	76.38	16.74	76.38	16.74	3	.....	....	93.12	5.34
Pajaro Valley Consolidated Railway	27.24	14.31	27.24	14.31	3	.....	....	41.55	2.25
San Diego, Cuyamaca and Eastern Railway	25.37	....	25.37	....	.....	.....	....	25.37	....
San Francisco and Napa Railway	....	....	10.72	....	4	8½	....	10.72	....
San Pedro, Los Angeles and Salt Lake Railroad	187.72	53.50	187.72	53.50	4	8½	....	241.22	....
San Juan Pacific Railway	7.50	....	7.50	....	4	8½	....	7.50	....
Sacramento Valley and Eastern Railway	15.00	....	15.00	....	4	8½	....	15.00	....
Sierra Railway Company	56.50	19.30	56.50	19.30	4	8½	....	75.80	....
Sierra Valleys Railway	36.48	....	36.48	....	3	.....	32.93	3.55	....
South Pacific Coast Railway	....	....	31.46	70.36	4	8½	10.30	91.52	....
Southern Pacific	3,571.34	1.29	10.51	1.29	4	8½	....	11.80	11.80
Southern Pacific Railroad	....	....	1,695.76	1,065.53	4	8½	3.04	2,758.25	25.20
Sunset Railroad	32.84	....	32.84	....	4	8½	....	32.84	....
Tonopah and Tidewater Railroad	137.54	6.74	137.54	6.74	4	8½	....	144.28	41.61
Yosemite Valley Railway	77.90	1.18	77.90	1.18	4	8½	....	79.08	....
Yreka Railroad	7.50	....	7.50	....	4	8½	....	7.50	....
Total	6,076.95	478.05	5,110.89	1,633.65	.....	.....	81.49	6,663.05	156.77

CAPITAL STOCK.

NAME OF COMPANY.	Number of Shares	Par Value.	Total Authorized.	Issued and Outstanding.	Number of Stock-holders
Arcata and Mad River Railroad	15,000	$20	$300,000	$187,740	6
Atchison, Topeka and Santa Fe Railway	3,814,860	100	381,486,000	217,200,530	21,044
Boca and Loyalton Railroad	80,000	15	1,200,000	1,200,000	11
Butte County Railroad	1,250	100	125,000	41,800	5
California Northeastern Railway	54,000	100	5,400,000	5,400,000	6
Central Pacific Railway	872,755	100	87,275,500	80,875,500	12
Coast Line Railway	30,000	100	3,000,000	100,000	5
Colusa and Lake Railroad	4,000	100	400,000	100,500	53
Crescent City and Smith River Railroad	....	......	....	....	......
Diamond and Caldor Railway	4,800	50	240,000	240,000	6
Eureka and Freshwater Railway	2,000	100	200,000	200,000	6
Inter-California Railway	43,200	100	4,320,000	216,000	8
Iron Mountain Railway	1,000	100	100,000	100,000	5
Lake Tahoe Railway and Transportation Company	5,000	100	500,000	500,000	7
McCloud River Railroad	12,000	100	1,200,000	1,200,000	5
Mill Valley and Mount Tamalpais Scenic Railway	2,000	100	200,000	200,000	71
National City and Otay Railway	7,000	100	700,000	700,000	8
Nevada and California Railway	150,000	100	15,000,000	4,837,000	6
Nevada-California-Oregon Railway	22,000	100	2,200,000	2,200,000	10
Nevada County Narrow Gauge	4,000	100	400,000	250,200	56
Northwestern Pacific Railroad	350,000	100	35,000,000	35,000,000	11
Oregon and Eureka Railroad	1,250	100	125,000	125,000	4
Pacific Coast Railway	26,285	100	2,628,500	1,370,400	10
Pajaro Valley Consolidated Railway	11,000	100	1,100,000	1,100,000	6
San Diego, Cuyamaca and Eastern Railway	70,000	100	7,000,000	769,000	20
San Francisco and Napa Railway	15,000	100	1,500,000	55,000	6
San Pedro, Los Angeles and Salt Lake Railroad	250,000	100	25,000,000	25,000,000	13
San Juan Pacific Railway	15,000	100	1,500,000	1,500,000	7
Sacramento Valley and Eastern Railway	5,000	100	500,000	500,000	6
Sierra Valleys Railway	50,000	100	5,000,000	3,248,000	15
Sierra Railway Company	15,000	100	1,500,000	942,100	7
South Pacific Coast Railway	60,000	100	6,000,000	6,000,000	14
Southern Pacific	3,000,000	100	300,000,000	272,715,796	14,700
Southern Pacific Railroad	1,600,000	100	160,000,000	160,000,000	16
Sunset Railroad	5,000	100	500,000	500,000	7
Tonopah and Tidewater Railroad	10,000	100	1,000,000	1,000,000	9
Yosemite Railway	50,000	100	5,000,000	5,000,000	7
Yreka Railroad	4,000	25	100,000	100,000	24
Totals	10,662,400	......	$1,057,700,000	$830,674,466	36,212

Name of Company.	Capital Stock Outstanding.	Bonds, etc., Outstanding.	Current Liabilities.	Total.	Per Mile of Line.	
					Miles.	Amount.
Arcata and Mad River Railroad	$187,740 00	....	$21,309 13	$209,049 13	21.25	....
Atchison, Topeka and Santa Fe Railway	217,200,530 00	$311,916,350 00	....	529,116,880 00	....	$51,383 00
Boca and Loyalton Railroad	1,200,000 00	557,000 00	87,543 16	1,844,543 16	56.49	32,653 00
Butte County Railroad	41,800 00	....	121,220 99	163,020 99	31.50	5,175 27
California Northeastern Railway	5,400,000 00	....	....	5,400,000 00	63.57	84,940 00
Central Pacific Railway	80,875,500 00	125,610,271 00	....	206,485,771 00	1,451.00	142,306 00
Coast Line Railway	100,000 00	....	....	100,000 00	11.88	8,414 00
Colusa and Lake Railroad	100,500 00	50,000 00	663 66	151,163 66	22.00	6,871 07
Crescent and Smith River Railroad	....	....	....	....	....	....
Diamond and Caldor Railway	240,000 00	47,000 00	157,347 18	444,347 18	34.21	12,988 00
Eureka and Freshwater Railway	....	....	....	....	....	....
Inter-California Railway	216,000 00	....	....	216,000 00	73.76	2,928 00
Iron Mountain Railway	100,000 00	....	....	100,000 00	....	....
Lake Tahoe Railway and Transportation Co.	500,000 00	325,000 00	175,086 24	1,000,086 24	16.00	62,505 39
McCloud River Railroad	1,200,000 00	1,200,000 00	....	2,400,000 00	67.10	35,767 51
Mill Valley and Mt. Tamalpais Scenic Ry.	200,000 00	100,000 00	39,289 05	339,289 05	10.62	40,329 00
National City and Otay Railway	700,000 00	451,000 00	181,779 51	1,332,779 51	26.90	6,758 00
Nevada and California Railway	4,837,000 00	2,000,000 00	....	6,837,000 00	330.76	20,671 00
Nevada-California-Oregon Railway	2,200,000 00	796,000 00	171,294 04	3,167,294 04	164.24	19,284 00
Nevada County Narrow Gauge	250,200 00	210,000 00	30,004 59	490,204 59	22.50	21,787 00
Northwestern Pacific Railroad	35,000,000 00	12,316,000 00	411,432 75	47,727,432 75	372.85	128,007 00
Oregon and Eureka Railroad	125,000 00	....	18,653 26	143,653 26	4.65	30,893 00
Pacific Coast Railway	1,370,400 00	1,370,000 00	380,910 35	3,121,310 35	93.12	33,518 00
Pajaro Valley Consolidated Railway	1,100,000 00	....	68,929 91	1,168,929 91	41.55	28,133 00
San Diego, Cuyamaca and Eastern Railway	769,000 00	550,000 00	640,899 69	1,959,899 69	25.37	77,252 00
San Francisco and Napa Railway	55,000 00	....	....	55,000 00	10.72	5,131 00
San Pedro, Los Angeles and Salt Lake	25,000,000 00	40,000,000 00	7,386,752 41	72,386,752 41	945.99	76,519 00
San Juan Pacific Railway	1,500,000 00	320,000 00	4,445 21	1,824,445 21	7.50	243,258 00
Sacramento Valley and Eastern Railway	500,000 00	....	32,888 33	532,888 33	15.00	35,526 00
Sierra Valleys Railway	3,248,000 00	2,099,000 00	111,513 47	5,458,513 47	75.80	72,012 00
Sierra Railway Company	942,100 00	300,000 00	161,135 48	1,403,235 48	36.48	38,466 00
South Pacific Coast Railway	6,000,000 00	5,500,000 00	....	11,500,000 00	101.83	112,934 00
Southern Pacific	272,715,796 00	39,457,500 00	72,061,063 00	384,234,359 00	11.80	735,304 00
Southern Pacific Railroad	160,000,000 00	125,092,500 00	....	285,092,500 00	3,322.66	85,802 00
Sunset Railroad	500,000 00	316,000 00	100,711 52	916,711 52	32.84	27,914 00
Tonopah and Tidewater Railroad	1,000,000 00	3,285,344 00	....	4,285,344 00	172.74	24,808 06
Yosemite Railway	5,000,000 00	3,000,000 00	1,188,985 58	9,188,985 58	79.08	116,198 00
Yreka Railroad	100,000 00	....	37,287 58	137,287 58	7.50	18,305 00
Total	$830,474,566 00	$676,868,965 00	$83,591,146 09	$1,590,934,677 09	7,761.26	

COST OF ROAD.

NAME OF COMPANY.	Construction.	Equipment.	Total.	Cost per Mile.
Arcata and Mad River Railroad	$228,837 60	$92,484 00	$321,321 60	$15,121 02
Atchison, Topeka and Santa Fe Railway	471,364,640 24	45,347,388 99	516,712,029 23	50,918 03
Boca and Loyalton Railroad	1,855,651 08	63,469 35	1,919,120 43	33,972 75
Butte County Railroad	....	....	....	....
California Northeastern Railway	2,406,891 61	203,542 39	2,610,434 00	41,061 34
Central Pacific Railway	216,062,800 63	....	216,062,800 63	148,910 00
Coast Line Railway	637,966 57	51,809 17	689,775 74	58,037 51
Colusa and Lake Railroad	173,024 83	42,536 27	215,561 10	9,800 00
Crescent City and Smith River Railroad	287,931 98	47,927 79	335,859 77	20,051 00
Diamond and Caldor Railway	388,798 91	58,607 22	447,406 13	12,621 00
Eureka and Freshwater Railway	....	....	....	....
Inter-California Railway	1,151,730 62	180,741 81	1,332,472 43	18,064 97
Iron Mountain Railway	229,002 04	15,650 00	244,652 04	....
Lake Tahoe Railway and Transportation Company	1,108,438 79	....	1,108,438 79	69,277 42
McCloud River Railroad	2,160,424 09	373,901 32	2,534,325 41	37,769 37
Mill Valley and Mount Tamalpais Scenic Railway	208,287 25	65,832 36	274,119 61	....
National City and Otay Railway	1,146,283 41	152,343 58	1,298,626 99	48,276 10
Nevada and California Railway	6,640,189 47	....	6,640,189 47	20,075 55
Nevada-California-Oregon Railway	2,852,591 00	115,336 60	2,967,927 60	18,070 68
Nevada County Narrow Gauge	572,655 11	93,518 63	666,173 74	29,607 71
Northwestern Pacific Railroad	555,022 25	292,186 78	847,209 03	2,095 15
Oregon and Eureka Railroad	27,632 02	99,253 09	126,885 11	....
Pacific Coast Railway	2,293,959 74	275,512 10	2,569,471 84	27,593 12
Pajaro Valley Consolidated Railway	425,840 90	153,517 77	579,358 67	13,943 65
San Diego, Cuyamaca and Eastern Railway	1,330,221 25	68,435 05	1,398,656 30	54,933 10
San Francisco and Napa Railway	284,511 70	....	284,511 70	26,540 27
San Pedro, Los Angeles and Salt Lake Railroad	62,538,929 92	5,885,323 68	68,424,253 60	72,330 84
San Juan Pacific Railway	1,820,000 00	....	1,820,000 00	242,666 00
Sacramento Valley and Eastern Railway	512,464 30	17,271 19	529,735 49	35,315 70
Sierra Valleys Railway	224,738 89	3,600 00	228,338 89	6,259 29
Sierra Railway Company	5,603,497 81	....	5,603,497 81	73,930 00
South Pacific Coast Railway	11,500,000 00	....	11,500,000 00	112,934 00
Southern Pacific	8,542,495 45	134,091 36	8,676,586 81	735,304 00
Southern Pacific Railroad	255,572,142 73	10,012,882 84	265,585,025 57	....
Sunset Railroad	820,746 36	336 57	821,082 93	25,002 53
Tonopah and Tidewater Railroad	3,940,801 25	217,920 12	4,158,721 37	24,075 03
Yosemite Railway	9,038,464 04	130,215 80	9,168,679 84	115,941 00
Yreka Railroad	101,428 59	13,423 09	114,851 68	....
Total	$1,074,609,042 43	$64,209,058 92	$1,138,818,101 35	

STOCKS AND BONDS OWNED.

NAME OF COMPANY.	STOCKS.		BONDS.		TOTAL.	
	Par Value.	Valuation.	Par Value.	Valuation.	Par Value.	Valuation.
Arcata and Mad River Railroad						
Atchison, Topeka and Santa Fe Ry.	$193,008,517 00	not given	$156,322,165 00	not given	$349,330,682 00	not given
Boca and Loyalton Railroad						
Butte County Railroad						
California Northeastern Railway						
Central Pacific Railway	5,439,500 00	$152,736 78	927,150 00	$929,693 99	6,366,650 00	$1,082,430 77
Coast Line Railway						
Colusa and Lake Railroad						
Crescent City and Smith River R. R.						
Diamond and Caldor Railway						
Eureka and Freshwater Railway						
Inter-California Railway						
Iron Mountain Railway						
Lake Tahoe R'y and Transportation Co.						
McCloud River Railroad						
Mill Valley and Mt. Tamalpais S. Ry.						
National City and Otay Railway						
Nevada and California Railway	200 00	1 00			200 00	1 00
Nevada-California-Oregon Railway	1,300 00	700 00	209,000 00	209,000 00	210,300 00	209,700 00
Nevada County Narrow Gauge						
Northwestern Pacific Railroad						
Oregon and Eureka Railroad						
Pacific Coast Railway						
Pajaro Valley Consolidated Railway						
San Diego, Cuyamaca and Eastern Ry.	272 00	272 00			272 00	272 00
San Francisco and Napa Railway	50,000 00	50,000 00	428,000 00	346,272 28	478,000 00	396,272 28
San Pedro, Los Angeles and Salt Lake						
San Juan Pacific Railway						
Sacramento Valley and Eastern Ry.						
Sierra Valleys Railway						
Sierra Railway Company			114,000 00	114,000 00	114,000 00	114,000 00
South Pacific Coast Railway						
Southern Pacific	434,916,369 84	245,392,389 19	106,430,553 06	75,100,696 71	541,346,922 90	320,493,085 90
Southern Pacific Railroad	36,605 50	1,108 95	78,000 00	73,842 41	114,605 50	74,951 36
Sunset Railroad						
Tonopah and Tidewater Railroad						
Yosemite Railway						
Yreka Railroad	9,800 00	9,800 00			9,800 00	9,800 00
Total	$633,462,564 34	$245,607,007 92	$264,508,868 06	$76,773,505 39	$897,971,432 40	$322,380,513 31

INCOME AND EXPENSE OF OPERATION FOR 1908.

Name of Company.	Income from Operation.	Expense of Operation.	Percentage of Income to Operation.
Arcata and Mad River Railroad.....	$120,306 58	$127,287 33	105.80
Atchison, Topeka and Santa Fe Ry...	75,574,381 94	48,100,629 23	63.65
Boca and Loyalton Railroad	214,767 76	135,016 73	62.87
Butte County Railroad.............	195,889 49	114,518 32	58.00
Colusa and Lake Railroad...........	30,408 46	26,859 70	88.00
Crescent City and Smith River R. R..	32,514 37	24,945 87	76.00
Diamond and Caldor Railway........	62,811 70	41,899 16	66.70
Eureka and Freshwater Railway.....	6,879 41	5,110 91	74.30
Iron Mountain Railway.............	36,674 30	43,127 75	117.59
Lake Tahoe Ry. and Transportation Co.	55,078 74	44,330 73	80.05
McCloud River Railroad	427,089 65	266,156 26	62.00
Mill Valley and Mt. Tamalpais S. Ry..	62,957 70	26,308 28	41.78
National City and Otay Railway.....	104,025 16	111,740 98	107.40
Nevada and California Railway......	1,432,997 61	860,896 20	60.08
Nevada-California-Oregon Railway ..	338,668 20	171,565 07	50.66
Nevada County Narrow Gauge.......	133,158 24	76,874 58	57.28
Northwestern Pacific Railroad.......	3,165,450 17	2,443,769 46	79.17
Oregon and Eureka Railroad........	210,106 81	120,499 03	....
Pacific Coast Railway	189,971 60	154,081 08	81.19
Pajaro Valley Consolidated Railroad..	54,568 49	55,713 88	102.10
San Diego, Cuyamaca and Eastern Ry.	109,384 21	83,224 50	76.08
San Pedro, Los Ang. & Salt Lake R. R.	7,518,511 68	5,998,018 01	79.77
San Juan Pacific Railway...........	9,610 40	13,520 80	140.68
Sacramento Valley and Eastern Ry...	42,847 21	24,301 78	57.00
Sierra Valleys Railway	414,738 95	253,675 70	61.16
Sierra Railway Company	88,883 26	40,602 61	45.68
Southern Pacific	82,706,552 26	52,565,201 61	63.56
Sunset Railroad	116,501 48	50,051 14	42.96
Tonopah and Tidewater Railroad.....	352,460 55	232,517 57	65.96
Yosemite Valley Railway	154,706 61	120,949 33	78.18
Yreka Railroad	25,262 78	23,437 26	92.00
Total	$173,988,165 77	$112,356,830 86	64.57

RECAPITULATION OF OPERATING EXPENSES.

NAME OF COMPANY.	Maintenance of Ways and Structures.	Maintenance of Equipment.	Conducting Transportation.	General Expenses.	Total.
Arcata and Mad River Railroad	$33,381 23	$7,012 91	$31,531 64	$55,361 55	$127,287 33
Atchison, Topeka and Santa Fe Railway	11,297,835 44	11,868,811 11	23,626,528 07	1,307,454 61	48,100,629 23
Boca and Loyalton Railroad	39,548 64	29,088 49	56,586 91	9,792 69	135,016 73
Butte County Railroad	18,985 62	19,616 96	54,707 40	21,208 34	114,518 32
California Northeastern Railway	....	....	....	....	....
Central Pacific Railway	....	....	....	....	....
Coast Line Railway	....	....	....	....	....
Colusa and Lake Railroad	9,986 45	3,094 25	13,539 00	240 00	26,859 70
Crescent City and Smith River Railroad	4,242 28	3,529 27	13,814 25	3,360 07	24,945 87
Diamond and Caldor Railway	12,283 87	8,494 73	16,402 14	4,718 42	41,899 16
Eureka and Freshwater Railway	933 09	463 05	3,714 77	....	5,110 91
Inter-California Railway	....	....	....	....	....
Iron Mountain Railway	....	20,303 60	22,427 90	396 25	43,127 75
Lake Tahoe Railway and Transportation Company	10,266 63	3,872 07	17,540 59	12,651 44	44,330 73
McCloud River Railroad	70,159 30	47,335 14	121,735 49	26,926 33	266,156 26
Mill Valley and Mount Tamalpais Scenic Railway	5,862 24	8,792 72	18,499 32	7,676 81	40,831 09
National City and Otay Railway	30,108 24	23,817 84	48,477 84	9,337 06	111,740 98
Nevada and California Railway	169,975 66	162,644 44	483,744 77	44,531 33	860,896 20
Nevada-California-Oregon Railway	47,458 97	39,465 17	59,412 90	25,228 03	171,565 07
Nevada County Narrow Gauge	15,896 38	16,207 96	35,060 02	9,710 22	76,874 58
Northwestern Pacific Railroad	683,893 31	458,819 41	1,160,344 94	140,711 80	2,443,769 46
Oregon and Eureka Railroad	32,838 01	25,973 08	56,121 64	5,566 30	120,499 03
Pacific Coast Railway	54,741 67	34,555 24	55,636 55	9,147 62	154,081 08
Pajaro Valley Consolidated Railroad	14,388 78	10,839 71	16,505 29	13,980 10	55,713 88
San Diego, Cuyamaca and Eastern Railway	22,542 17	18,412 99	32,600 31	9,669 03	83,224 50
San Francisco and Napa Railway	....	....	....	....	....
San Pedro, Los Angeles and Salt Lake Railroad	1,526,205 87	1,127,438 74	3,158,763 03	185,610 37	5,998,018 01
San Juan Pacific Railway	1,079 84	1,155 02	8,906 41	2,379 53	13,520 80
Sacramento Valley and Eastern Railway	14,372 49	2,567 19	6,337 42	1,024 68	24,301 78
Sierra Railway Company	89,186 98	50,856 59	96,157 95	17,474 18	253,675 70
Sierra Valleys Railway	16,846 29	6,275 38	17,031 77	449 17	40,602 61
South Pacific Coast Railway	....	....	....	....	....
Southern Pacific	13,178,747 92	10,814,863 94	26,322,038 04	2,249,551 71	52,565,201 61
Southern Pacific Railroad	....	....	....	....	....
Sunset Railroad	23,035 46	4,684 52	21,015 66	1,315 50	50,051 14
Tonopah and Tidewater Railroad	66,153 98	27,886 03	127,743 84	10,733 72	232,517 57
Yosemite Railway	35,462 20	27,145 93	51,660 51	6,680 69	120,949 33
Yreka Railroad	4,456 07	5,173 53	13,167 48	640 18	23,437 26
Total	$27,530,875 08	$24,879,197 01	$55,767,753 85	$4,193,527 73	$112,371,353 67

EARNINGS FOR 1908.

NAME OF COMPANY.	Passenger Earnings.	Freight Earnings.	Other Earnings.	Gross Earnings.
Arcata and Mad River Railroad	$16,947 01	$103,359 57	....	$120,306 58
Atchison, Topeka and Santa Fe Railway	22,748,886 07	51,375,455 38	$1,450,040 40	75,574,381 94
Boca and Loyalton Railroad	31,925 30	176,185 70	6,656 76	214,767 76
Butte County Railroad	40,752 14	154,749 22	388 13	195,889 49
Colusa and Lake Railroad	17,841 42	12,567 04	....	30,408 46
Crescent City and Smith River Railroad	475 80	32,038 57	....	32,514 37
Diamond and Caldor Railway	1,212 63	61,453 43	145 64	62,811 70
Eureka and Freshwater Railway	....	6,879 41	....	6,879 41
Iron Mountain Railway	....	36,674 30	....	36,674 30
Lake Tahoe Railway and Transportation Company	31,673 25	23,405 49	....	55,078 74
McCloud River Railroad Company	18,354 95	407,468 77	1,265 93	427,089 65
Mill Valley and Mount Tamalpais Scenic Railway	62,814 80	142 90	9,417 86	72,375 56
National City and Otay Railway	60,433 47	36,453 07	7,138 62	104,025 16
Nevada and California Railway	471,752 07	952,513 36	8,732 18	1,432,997 61
Nevada-California-Oregon Railway	123,351 10	209,233 25	6,083 85	338,668 20
Nevada County Narrow Gauge	63,275 90	69,882 34	1,056 13	134,214 37
Northwestern Pacific Railroad	1,894,585 45	1,140,960 93	129,903 79	3,165,450 17
Oregon and Eureka Railroad	38,761 40	168,049 97	3,295 44	210,106 81
Pacific Coast Railway	48,876 09	140,810 08	85 43	189,771 60
Pajaro Valley Consolidated Railway	5,499 71	46,914 57	2,154 20	54,568 48
San Diego, Cuyamaca and Eastern Railway	45,942 37	62,782 74	659 10	109,384 21
San Pedro, Los Angeles and Salt Lake Railroad	2,954,757 59	4,425,697 62	138,056 47	7,518,511 68
San Juan Pacific Railway	3,414 08	6,196 32	....	9,610 40
Sacramento Valley and Eastern Railway	40,759 88	....	2,087 33	42,847 21
Sierra Valleys Railway	137,434 00	274,460 95	2,844 00	414,738 95
Sierra Railway Company	26,470 74	59,691 89	2,720 63	88,883 26
Southern Pacific	32,222,460 46	49,682,470 05	49,372,615 32	131,277,545 83
Sunset Railroad	14,854 49	97,885 55	3,761 44	116,501 48
Tonopah and Tidewater Railroad	99,392 93	234,014 05	19,053 57	352,460 55
Yosemite Valley Railway	98,647 96	55,304 69	753 96	154,706 61
Yreka Railroad	15,041 38	9,307 23	914 17	25,262 78
Total	$61,336,594 44	$110,063,008 44	$51,169,830 44	$222,569,433 32

EXPENSES FOR 1908.

NAME OF COMPANY.	Operating Expenses.	Interest.	Rents, Taxes, Etc.	Gross Expenses.
Arcata and Mad River Railroad	$127,287 33	....	$2,792 18	$130,079 51
Atchison, Topeka and Santa Fe Railway	48,100,629 23	$12,342,544 88	4,147,644 19	64,590,818 30
Boca and Loyalton Railroad	135,016 73	35,603 51	52,831 78	223,452 02
Butte County Railroad	114,518 32	....	80,254 32	194,772 64
California Northeastern Railway	....	72,343 70	....	72,343 70
Central Pacific Railway	....	4,835,687 89	1,724,157 76	6,559,845 65
Coast Line Railway	....	34,851 51	....	34,851 51
Colusa and Lake Railroad	26,859 70	3,231 67	816 20	30,907 57
Crescent City and Smith River Railroad	24,945 87	....	....	24,945 87
Diamond and Caldor Railway	41,899 16	7,539 15	3,507 17	52,945 48
Eureka and Freshwater Railway	5,110 91	....	57 82	5,168 73
Inter-California Railway	....	45,092 33	....	45,092 33
Iron Mountain Railway	43,127 75	....	738 96	43,866 71
Lake Tahoe Railway and Transportation Company	44,330 73	16,250 00	1,811 25	62,391 98
McCloud River Railroad	266,156 26	63,176 73	87,916 48	417,249 47
Mill Valley and Mount Tamalpais Scenic Railway	26,308 28	5,275 47	15,731 62	47,315 37
National City and Otay Railway	111,740 98	....	6,024 27	117,765 25
Nevada and California Railway	860,896 20	183,436 35	149,816 26	1,194,148 81
Nevada-California-Oregon Railway	171,565 07	35,476 67	70,389 27	277,431 01
Nevada County Narrow Gauge	76,874 58	14,700 00	68,696 78	160,271 36
Northwestern Pacific Railroad	2,443,769 46	567,207 19	173,375 79	3,184,352 44
Oregon and Eureka Railroad	120,499 03	....	60,889 43	181,388 46
Pacific Coast Railway	154,081 08	82,200 00	6,419 31	242,700 39
Pajaro Valley Consolidated Railway	55,713 88	740 35	3,241 01	59,695 24
San Diego, Cuyamaca and Eastern Railway	83,224 50	33,023 00	2,171 87	118,419 37
San Francisco and Napa Railway	....	11,639 98	....	11,639 98
San Pedro, Los Angeles and Salt Lake Railroad	5,998,018 01	1,876,661 44	494,619 24	8,369,298 69
San Juan Pacific Railway	13,520 80	....	....	13,520 80
Sacramento Valley and Eastern Railway	24,301 78	....	....	24,301 78
Sierra Railway Company	253,675 70	114,592 69	24,501 77	392,770 16
Sierra Valleys Railway	40,602 61	10,750 00	3,948 16	55,300 77
South Pacific Coast Railway	....	220,000 00	126,593 38	346,593 38
Southern Pacific	52,846,078 16	1,868,681 24	38,699,480 60	93,414,240 00
Southern Pacific Railroad	....	5,579,134 80	3,551,059 28	9,130,194 08
Sunset Railroad	50,051 14	12,640 01	20,242 62	82,933 77
Tonopah and Tidewater Railroad	232,517 57	97,959 90	5,102 76	335,580 23
Yosemite Valley Railway	120,949 33	211,998 60	6,634 72	339,582 65
Yreka Railroad	23,437 26	2,416 80	610 00	26,464 06
Total	$112,637,707 41	$28,384,855 86	$49,592,076 25	$190,614,639 52

INCOME AND EXPENSES.

The following table shows the total income and expenses of the several railroads, together with the dividends paid and the surplus or deficit.

The gross income is shown to have been $254,805,665.44, while the gross expenses were $190,614,639.52, or 74 per cent of the gross income.

Only six of the companies paid dividends during the year, and these dividends aggregated $55,090,453.24, of which sum $13,269,574.01 was from earnings of former years.

Fourteen companies show a deficit for the year aggregating $1,148,193.69, while the remaining twenty-four companies show an aggregate surplus, in addition to the dividends paid, of $23,518,340.11.

Name of Company.	Gross Income.	Gross Expenses.	Dividends Paid.	Surplus.
Arcata and Mad River Railroad	$125,028 52	$130,079 51	†	$5,050 99
Atchison, Topeka and Santa Fe Railway	77,847,994 87	64,590,818 30	$11,371,297 50	1,885,879 07
Boca and Loyalton Railroad	214,772 06	223,452 02	†	8,679 96
Butte County Railroad	195,908 39	194,772 64	....	1,135 75
California Northeastern Railway	71,273 24	72,343 70	†	1,070 46
Central Pacific Railway	11,667,334 84	6,559,845 65	4,576,530 00	530,959 19
Coast Line Railway	34,851 51	34,851 51	....	....
Colusa and Lake Railroad	30,408 46	30,907 57	†	499 11
Crescent City and Smith River Railroad	32,514 37	24,945 87	....	7,568 50
Diamond and Caldor Railway	62,811 70	52,945 48	....	9,866 22
Eureka and Freshwater Railway	6,879 41	5,168 73	....	1,710 68
Inter-California Railway	45,092 33	45,092 33	....	....
Iron Mountain Railway	36,674 30	43,866 71	†	7,192 41
Lake Tahoe Railway and Transportation Company	98,515 75	62,391 98	....	36,123 77
McCloud River Railroad Company	427,089 65	417,249 47	....	9,840 18
Mill Valley and Mount Tamalpais Scenic Railway	72,375 56	47,315 37	....	25,060 19
National City and Otay Railway	104,025 16	117,765 25	†	13,740 09
Nevada and California Railway	1,480,883 80	*1,194,148 81	1,209,250 00	....
Nevada-California-Oregon Railway	358,592 16	277,431 01	37,500 00	43,661 15
Nevada County Narrow Gauge	134,214 37	160,271 36	†	26,056 99
Northwestern Pacific Railroad	3,224,976 65	3,184,352 44	....	40,624 21
Oregon and Eureka Railroad	210,106 81	181,388 46	....	28,718 35
Pacific Coast Railway	195,504 83	242,700 39	†	47,195 56
Pajaro Valley Consolidated Railway	54,568 49	59,695 24	†	5,126 75
San Diego, Cuyamaca and Eastern Railway	110,684 71	118,419 37	†	7,734 66
San Francisco and Napa Railway	16,858 00	11,639 98	....	5,218 02
San Pedro, Los Angeles and Salt Lake Railroad	7,533,439 70	8,369,298 69	†	835,858 99
San Juan Pacific Railway	9,610 40	13,520 80	†	3,910 40
Sacramento Valley and Eastern Railway	42,847 21	24,301 78	....	18,545 43
Sierra Valleys Railway	414,738 95	392,770 16	....	21,968 79
Sierra Railway Company	88,883 26	55,300 77	....	33,582 49
South Pacific Coast Railway	346,593 38	346,593 38	....	....
Southern Pacific	131,277,545 83	93,414,240 00	17,095,875 74	20,767,430 09
Southern Pacific Railroad	17,583,135 35	9,130,194 08	*20,800,000 00	....
Sunset Railroad	116,501 48	82,933 77	....	33,567 71
Tonopah and Tidewater Railroad	352,460 55	335,580 23	....	16,880 32
Yosemite Valley Railway	154,706 61	339,582 65	†	184,876 04
Yreka Railroad	25,262 78	26,464 06	†	1,201 28
Total	$254,805,665 44	$190,614,639 52	$55,090,453 24	

*Of the dividends paid $12,347,059.00 and $922,515.01 were from surplus earnings of former years. †Deficit.

ASSETS AND LIABILITIES.

Following is given a copy of the general balance sheets of the various railroad companies taken from their reports to this Commission, showing their assets and liabilities:

ARCATA AND MAD RIVER RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$228,837 60	Capital stock	$187,740 00
Cost of equipment	92,484 00	Current liabilities	21,309 13
Cash and current assets	10,358 48	Profit and loss	131,090 45
Materials and supplies	8,459 50		
Total	$340,139 58	Total	$340,139 58

ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$471,364,640 24	Capital stock	$217,200,530 00
Cost of equipment	45,239,219 10	Funded debt	311,916,350 00
Stocks owned	1,695,673 50	Current liabilities	10,248,068 37
Bonds owned	3,332,930 00	Accrued interest on funded debt not yet payable	3,734,508 34
Other permanent investments	1,131,105 72	Equipment replacement reserve	348 55
General expenditures	108,169 89	Rail renewal reserve	977,181 81
Additions and betterments auxiliary companies	9,056,730 65	Tie renewal reserve	808,782 40
Lands owned	4,945,020 76	Bridge renewal reserve	215,255 60
Cash and current assets	17,566,606 77	Reserve for fuel lands	154,730 53
Materials and supplies	11,111,248 77	Accrued taxes not yet due	1,220,061 81
Sundries	1,327,337 51	Unascertained liabilities accrued prior to January 1, 1896—estimated	50,000 00
		Profit and loss	20,352,865 50
Total	$566,878,682 91	Total	$566,878,682 91

BOCA AND LOYALTON RAILROAD COMPANY.

Assets		*Liabilities.*	
Cost of road	$1,855,651 08	Capital stock	1,200,000 00
Cost of equipment	63,469 35	Funded debt	557,000 00
Cash and current assets	47,381 02	Current liabilities	87,543 16
Materials and supplies	20,840 44	Accrued interest on funded debt not yet payable	8,355 00
Profit and loss	22,846 12	Sinking fund	45,800 00
		First mortgage sinking fund bonds retired through sinking fund of Roberts Lumber Co.	96,000 00
		Premium on bonds retired through Roberts Lumber Co. sinking fund	9,600 00
		Other liabilities	5,889 85
Total	$2,010,188 01	Total	$2,010,188 01

BUTTE COUNTY RAILROAD COMPANY.

Assets.		*Liabilities.*	
Franchise account	$41,800 00	Capital stock	$41,800 00
Cash and current assets	126,132 11	Current liabilities	121,220 99
Materials and supplies	10,260 62	Profit and loss	21,660 51
Sundries	6,488 77		
Total	$184,681 50	Total	$184,681 50

CALIFORNIA NORTHEASTERN RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$2,488,125 39	Capital stock	$5,400,000 00
Cost of equipment	122,308 61	Funded debt	2,640,211 51
Southern Pacific Company account agreement of July 29, 1905	5,400,000 00		
Unadjusted accounts	28,707 05		
Profit and loss	1,070 46		
Total	$8,040,211 51	Total	$8,040,211 51

CENTRAL PACIFIC RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road and equipment	$216,062,800 63	Capital stock	80,875,500 00
Stocks owned	152,736 78	Funded debt	125,610,271 56
Bonds owned	929,693 99	Current liabilities	808,532 58
Land contracts	84,620 08	Principal of deferred payments on land contracts	84,620 08
Land owned	114,289 77	Sinking funds uninvested	1,106 87
Cash and current assets	4,242,961 17	Unadjusted accounts	12,346 99
Sinking fund	8,596,677 37	Profit and loss	22,791,577 82
Sundries	54 29		
Unadjusted accounts	121 82		
Total	$230,183,955 90	Total	$230,183,955 90

COAST LINE RAILWAL COMPANY.

Assets.		*Liabilities.*	
Cost of road	$689,775 74	Capital stock	$100,000 00
		Current liabilities	589,775 74
Total	$689,775 74	Total	$689,775 74

COLUSA AND LAKE RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$173.024 83	Capital stock	$100,500 00
Cost of equipment	42,536 27	Funded debt	50,000 00
		Current liabilities	663 66
		Profit and loss	64,397 44
Total	$215,561 10	Total	$215,561 10

DIAMOND AND CALDOR RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$388.798 91	Capital stock	$240,000 00
Cost of equipment	58,607 22	Funded debt	47,000 00
Cash and current assets	15,496 67	Current liabilities	157,347 18
		Profit and loss	18,555 62
Total	$462,902 80	Total	$462.902 80

INTER-CALIFORNIA RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$1,332,472 43	Capital stock	$216,000 00
		Current liabilities	1,116,472 43
Total	$1,332,472 43	Total	$1,332,472 43

LAKE TAHOE RAILWAY AND TRANSPORTATION COMPANY.

Assets.		*Liabilities.*	
Cost of road and equipment	$1,108,438 79	Capital stock	$500,000 00
Cash and current assets	10.617 33	Funded debt	325,000 00
Materials and supplies	14,253 00	Current liabilities	185,703 57
Sinking fund	12,300 00	Accrued interest on funded debt not yet payable	4,062 50
		Profit and loss	130,843 05
Total	$1,145,609 12	Total	$1,145,609 12

McCLOUD RIVER RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$2,160,424 09	Capital stock	$1,200,000 00
Cost of equipment	373,901 32	Funded debt	1,200,000 00
Cash and current assets	42,190 23	Current liabilities	101,952 89
Materials and supplies	59,129 32	Accrued interest on funded debt not yet payable	15,000 00
		Profit and loss	118,692 07
Total	$2,635,644 96	Total	$2,635,644 96

MILL VALLEY AND MT. TAMALPAIS SCENIC RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$208,287 25	Capital stock	$200,000 00
Cost of equipment	65,832 36	Funded debt	100,000 00
Other permanent investments	86,015 90	Current liabilities	39,289 05
Lands owned	11,291 99	Profit and loss	72,419 69
Cash and current assets	8,761 18		
Materials and supplies	9,831 09		
Sinking fund	21,688 97		
Total	$411,708 74	Total	$411,708 74

NATIONAL CITY AND OTAY RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$1,146,283 41	Capital stock	$700,000 00
Cost of equipment	152,343 58	Funded debt	451,000 00
Cash and current assets	22,950 56	Current liabilities	181,779 51
Materials and supplies	27,819 41	Profit and loss	18,598 31
Sundries	1,980 86		
Total	$1,351,377 82	Total	$1,351,377 82

NEVADA AND CALIFORNIA RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road and equipment	$6,640,189 47	Capital stock	$4,837,000 00
Stocks owned	1 00	Funded debt	2,000,000 00
Cash and current assets	467,247 02	Current liabilities	40,000 00
		Rolling stock replacement fund	2,685 14
		Profit and loss	227,752 35
Total	$7,107,437 49	Total	$7,107,437 49

NEVADA-CALIFORNIA-OREGON RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$2,852,591 00	Capital stock	$2,200,000 00
Cost of equipment	115,166 59	Funded debt	796,000 00
General expenditures	170 01	Current liabilities	171,294 04
Stocks owned	700 00	Accrued interest on funded debt not yet payable	6,310 42
Bonds owned	209,000 00	Renewal fund	11,757 56
Cash and current assets	199,735 63	Replacement fund	10,392 39
Surplus account	80,000 00	Improvement fund	50,000 00
Materials and supplies	41,495 85	Profit and loss	299,290 14
Extension of road in course of construction	46,185 47		
Total	$3,545,044 55	Total	$3,545,044 55

NEVADA COUNTY NARROW GAUGE RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$572,655 11	Capital stock	$250,200 00
Cost of equipment	93,518 63	Funded debt	210,000 00
Cash and current assets	40,762 32	Current liabilities	30,004 59
Materials and supplies	8,954 07	Profit and loss	225,685 54
Total	$715,890 13	Total	$715,890 13

NORTHWESTERN PACIFIC RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$517,806 25	Capital stock	$35,000,000 00
Cost of equipment	292,186 78	Funded debt	12,316,000 00
General expenditures	37,216 00	Current liabilities	411,432 75
Cost of properties, securities, franchises and claims	47,309,257 14	Accrued interest on funded debt not yet payable	101,535 07
Cash and current assets	291,273 31	Sinking fund contributions applied to retire bonds	482,615 00
Materials and supplies	500,514 19	Funds in hands of trustees for retiring bonds	39,885 00
Sundries	823 11	Replacement fund, unadjusted accounts, taxes accrued	19,321 72
Discount on bonds	280,730 00	Profit and loss	859,017 24
Total	$49,229,806 78	Total	$49,229,806 78

OREGON AND EUREKA RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$27,632 02	Capital stock	$125,000 00
Cost of equipment	99,253 09	Current liabilities	18,653 26
Cash and current assets	199,543 45	Profit and loss	201,636 08
Materials and supplies	18,860 78		
Total	$345,289 34	Total	$345,289 34

PACIFIC COAST RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$2,293,959 74	Capital stock	$1,370,400 00
Cost of equipment	275,512 10	Funded debt	1,370,000 00
Cash and current assets	28,297 13	Current liabilities	380,910 35
Materials and supplies	89,964 34		
Profit and loss	433,577 04		
Total	$3,121,310 35	Total	$3,121,310 35

PAJARO VALLEY CONSOLIDATED RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$425,840 90	Capital stock	$1,100,000 00
Cost of equipment	153,517 77	Current liabilities	68,929 91
Cash and current assets	8,404 15	Profit and loss	167,582 10
Materials and supplies	8,749 19		
Subscription to capital stock	740,000 00		
Total	$1,336,512 01	Total	$1,336,512 01

SACRAMENTO VALLEY AND EASTERN RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$512,464 30	Capital stock	$500,000 00
Cost of equipment	17,271 19	Current liabilities	32,888 33
Cash and current assets	21,424 43	Profit and loss	18,545 43
Sundries	273 84		
Total	$551,433 76	Total	$551,433 76

SAN DIEGO, CUYAMACA AND EASTERN RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$1,330,221 25	Capital stock	$769,000 00
Cost of equipment	68,435 05	Funded debt	550,000 00
Stocks owned	272 00	Current liabilities	640,899 69
Cash and current assets	33,528 14	Real estate mortgages	2,300 00
Sinking fund	4,907 93		
Profit and loss	524,835 32		
Total	$1,962,199 69	Total	$1,962,199 69

SAN FRANCISCO AND NAPA RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road..........	$302,907 71	Capital stock	$55,000 00
Cash and current assets..	11,172 12	Current liabilities	241,060 66
		Profit and loss..........	18,019 17
Total	$314,079 83	Total	$314,079 83

SAN JUAN PACIFIC RAILWAY COMPANY.

Assets.		*Liabilities.*	
Cost of road	$1,820,000 00	Capital stock	$1,500,000 00
Cash and current assets..	534 81	Funded debt	320,000 00
Profit and loss..........	3,910 40	Current liabilities	4,445 21
Total	$1,824,445 21	Total	$1,824,445 21

SAN PEDRO, LOS ANGELES AND SALT LAKE RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road...........	$62,538,929 92	Capital stock	$25,000,000 00
Cost of equipment......	5,885,323 68	Funded debt	40,000,000 00
Stocks owned	50,000 00	Current liabilities	7,386.752 41
Bonds owned	346,272 58		
Other permanent investments	443,174 90		
Cash and current assets..	766,760 37		
Materials and supplies...	1.520,431 97		
Profit and loss..........	835,858 99		
Total	$72,386,752 41	Total	$72.386,752 41

SIERRA RAILWAY COMPANY OF CALIFORNIA.

Assets.		*Liabilities.*	
Cost of road and equipment	$5,603,947 81	Capital stock	$3,248,000 00
Bonds owned	114,000 00	Funded debt	2,099,000 00
Cash and current assets..	180,836 29	Current liabilities	111,513 47
Materials and supplies...	20,303 22	Accrued interest on funded debt not yet payable..	26,986 16
Sinking fund	670 00	Equipment replacement..	17,042 36
Discount on 5 per cent gold mortgage bonds—sold	31,640 00	Profit and loss..........	480,679 33
Yosemite Short Line Railway coupons	31,824 00		
Total	$5,983,221 32	Total	$5,983,221 32

SIERRA VALLEYS RAILWAY COMPANY.

Assets.		*Liabilities.*	
For adjustments	$1.202,888 30	Capital stock	$942,100 00
Cost of road...........	224,738 89	Funded debt	300,000 00
Cost of equipment......	3.600 00	Current liabilities	161,135 48
Cash and current assets..	4,823 44	Replacement account	1,140 00
		Profit and loss..........	31,675 15
Total	$1,436,050 63	Total	$1,436,050 63

SOUTHERN PACIFIC RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road...........	$255,572.142 73	Capital stock	$160,000,000 00
Cost of equipment......	10,012,882 84	Funded debt	125,092,500 00
Stocks owned	1.108 95	Current liabilities	38,701 66
Bonds owned	73,842 41	Principal of deferred payments on land contracts	129,811 49
Other permanent investments	1,653.008 03	Overlaps in land grant..	148,468 23
Land contracts	129,811 49	Sinking funds uninvested.	70,179 97
Cash and current assets..	26.629,526 25	Fund for refunding expenses	13,700 13
Sinking funds	7,046,877 22	Unadjusted accounts	6,843 35
Trust funds	280,648 69	Profit and loss..........	15,899,643 78
Total	$301,399,848 61	Total	$301,399,848 61

SOUTH PACIFIC COAST RAILWAY COMPANY.

Assets		*Liabilities.*	
Cost of road and equipment	$11,500 00	Capital stock	$6,000 00
		Funded debt	5,500 00
Total	$11,500 00	Total	$11,500 00

SOUTHERN PACIFIC COMPANY.

Assets.		*Liabilities.*	
Cost of road	$8,542,495 45	Capital stock	$272,715,796 64
Cost of equipment	19,775 40	Funded debt	39,457,500 00
General expenditures	114,315 96	Current liabilities	72,061,063 08
Stocks owned	271,944,406 48	Accrued interest on funded debt not yet payable	2,134,101 11
Funded debt owned	48,548,679 02	Taxes estimated to June 30	209,020 63
Other permanent investments	45,212,228 75	Wells, Fargo & Co.'s Express contract	208,000 00
Lands owned	104,105 19	Proprietary companies	11,773,593 03
Advances for construction new lines	35,633,607 30	Marine insurance fund	3,195,687 63
Advances for acquisition of new lines and other property	10,309,290 94	Steamship insurance fund	1,607,697 54
Advances for acquisition electric lines	5,526,914 13	Floating equipment replacement fund	3,955,462 65
Cash and current assets	15,376,762 90	Rolling stock replacement fund	208,462 71
Equipment trusts, materials and supplies	10,541,985 09	Reserve for depreciation of stock	2,502,164 52
Sinking, insurance and other funds	144 00	Insurance fund	32,630 45
Sundries	2,325,968 60	Principal of deferred payments on land contracts	141,061 62
Advances for closing Colorado River crevasse	3,518,152 65	Unadjusted claims and accounts	1,944,561 41
San Antonio Arkansas Pass Railway Co.	1,196,436 14	Profit and loss	46,768,464 98
Total	$458,915,268 00	Total	$458,915,268 00

SUNSET RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$820,746 36	Capital stock	$500,000 00
Cost of equipment	336 57	Funded debt	316,000 00
Cash and current assets	102,382 44	Current liabilities	100,711 52
Materials and supplies	8,541 70	Accrued interest on funded debt not yet payable	3,159 99
		Profit and loss	12,135 56
Total	$932,007 07	Total	$932,007 07

TONOPAH AND TIDEWATER RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$3,940,801 25	Capital stock	$1,000,000 00
Cost of equipment	217,920 12	Funded debt	3,285,344 10
Cash and current assets	155,625 31	Current liabilities	36,384 74
Materials and supplies	19,516 97	Accrued interest on funded debt not yet payable	41,174 49
Sinking fund	52,765 91	Equipment replacement account	1,254 30
		Profit and loss	22,471 93
Total	$4,386,629 56	Total	$4,386,629 56

YOSEMITE VALLEY RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$9,038,464 04	Capital stock	$5,000,000 00
Cost of equipment	130,215 80	Funded debt	3,000,000 00
Cash and current assets	72,647 31	Current liabilities	1,188,985 58
Materials and supplies	39,654 14	Assessment No. 1	250,000 00
Sundries	46,644 50		
Profit and loss	111,359 79		
Total	$9,438,985 58	Total	$9,438,985 58

YREKA RAILROAD COMPANY.

Assets.		*Liabilities.*	
Cost of road	$101,428 59	Capital stock	$100,000 00
Cost of equipment	13,423 09	Current liabilities	37,287 58
Stocks owned	9,800 00	Assets due and credited to adjustment account	95 15
Cash and current assets	2,414 30		
Due on capital stock	23,868 51	Profit and loss	13,551 76
Total	$150,934 49	Total	$150,934 49

RECAPITULATION.

The following is a recapitulation of the balance sheets of all the foregoing railroads. It will be seen that the combined assets total the enormous sum of $1,740,977,558.93. The cost of the roads and equipment is given as $1,175,062,009.13. The cash value of the stocks and bonds owned by the railroad companies is placed at $327,440,940.71. The cash and current assets are given as $66,715,985.51, while the current liabilities total $98,842,449.32. The total capital stock and mortgage bonds issued and outstanding against the railroad companies is $1,498,395,243.81.

ASSETS.

Cost of road	$1,111,452,968 62
Cost of equipment	63,609,040 51
Cash and current assets	66,715,985 51
Material and supplies	24,126,999 13
Stocks owned	273,854,698 71
Bonds owned	53,586,242 00
Other permanent investments	48,525,533 30
General expenditures	259,871 86
Lands owned	5,174,707 71
Land contracts	214,431 57
Additions and betterments	9,056,730 65
Due on capital stock	763,868 51
Southern Pacific agreement	5,400,000 00
Sundries	3,709,571 48
Discount on bonds	312,370 00
Advances for construction, etc.	52,666,248 51
Advances for closing break in the Colorado River	3,518,152 65
Sinking funds	15,736,031 40
Trust funds	280,648 69
Surplus accounts	80,000 00
Profit and loss	1,933,458 12
Total	$1,740,977,558 93

LIABILITIES.

Capital stock	$824,380,566 64
Funded debt	674,014,677 17
Current liabilities	98,842,449 32
Accrued interest on funded debt	6,075,193 08
Reserve funds for renwals, etc.	2,231,408 03
Equipment replacement reserve	4,196,788 10
Accrued taxes not due	1,448,404 16
Sinking funds	745,186 84
Land contracts	503,961 42
Real estate mortgages	2,300 00
Wells, Fargo & Company contract	208,000 00
Proprietary companies	11,773,593 03
Insurance funds	4,836,015 62
Reserve for depreciation of stocks	2,502,164 52
Assessments	250,000 00
Profit and loss	108,966,851 00
Total	$1,740,977,558 93

PASSENGER TRAFFIC.

Name of Company.	Number of Passengers Carried.	Number of Passengers Carried One Mile.	Number Carried One Mile per Mile of Road.	Average Distance Carried.	Average Amount Received from Each Passenger.	Average Receipt per Passenger per Mile.
Arcata and Mad River Railroad	....	....	....	....	....	....
Atchison, Topeka and Santa Fe Railway	8,927,874	867,414,919	122,160	97.16	$2.010	$.02069
Boca and Loyalton Railroad	18,571	489,668	9,734	26.36	1.505	.05710
Butte County Railroad	30,261	767,363	24,360	25.35	1.231	.04857
California Northeastern Railway	....	....	....	....	....	....
Central Pacific Railway	....	....	....	....	....	....
Coast Line Railway	....	....	....	....	....	....
Colusa and Lake Railroad	18,671	201,724	9,170	11.00	.840	.07784
Crescent City and Smith River Railroad	1,850	....	....	....	....	....
Diamond and Caldor Railway	849	28,551	849	30.00	1.428	.04247
Eureka and Freshwater Railway	....	....	....	....	....	....
Inter-California Railway	....	....	....	....	....	....
Iron Mountain Railway	....	....	....	....	....	....
Lake Tahoe Railway and Transportation Company	25,500	408,000	25,500	16.00	1.197	.07487
McCloud River Railroad	18,544	331,112	4,935	17.86	.835	.04679
Mill Valley and Mount Tamalpais Scenic Railway	....	....	....	....	....	....
National City and Otay Railway	416,633	3,377,973	68,602	8.10	.13859	.01709
Nevada and California Railway	118,410	9,192,260	27,815	7.76	3.22065	.04149
Nevada-California-Oregon Railway	25,313	1,559,637	9,828	61.61	4.04888	.06572
Nevada County Narrow Gauge	87,374	1,019,740	45,321	11.67	.60937	.05221
Northwestern Pacific Railroad	6,710,012	107,040,635	287,088	15.95	.25212	.01508
Oregon and Eureka Railroad	72,466	1,514,539	54,091	20.90	.51278	.02453
Pacific Coast Railway	79,831	1,426,428	16,209	17.87	.51170	.02863
Pajaro Valley Consolidated Railway	31,137	221,864	5,339	7.12	.17157	.02408
San Diego, Cuyamaca and Eastern Railway	144,639	2,085,814	82,216	14.42	.28309	.01958
San Francisco and Napa Railway	....	....	....	....	....	....
San Pedro, Los Angeles and Salt Lake Railroad	1,383,929	113,143,854	104,492	81.76	1.94400	.02378
San Juan Pacific Railway	6,880	47,284	630	6.87	.46484	.06763
Sacramento Valley and Eastern Railway	....	....	....	....	....	....
Sierra Railway Company	57,584	1,990,981	26,266	34.58	2.05229	.05935
Sierra Valleys Railway	17,024	365,865	10,029	21.49	1.40328	.06530
South Pacific Coast Railway	....	....	....	....	....	....
Southern Pacific	36,564,058	1,315,738,872	221,555	33.52	.74100	.02213
Southern Pacific Railroad	....	....	....	....	....	....
Sunset Railroad	7,441	268,493	6,406	36.08	1.77478	.04918
Tonopah and Tidewater Railroad	18,426	1,865,206	11,805	101.23	4.86005	.04801
Yosemite Railway	23,089	1,279,848	16,184	55.43	3.96714	.07156
Yreka Railroad	24,004	180,030	24,004	7.50	.53829	.07178
Total	54,830,370	2,431,960,660	....	....	....	....

FREIGHT TRAFFIC.

NAME OF COMPANY.	Tons of Freight Carried.	Tons Carried One Mile.	Tons Carried One Mile per Mile of Road.	Average Distance Carried.	Average Amount Received for Each Ton.	Average Receipt per Ton per Mile.
Arcata and Mad River Railroad						
Atchison, Topeka and Santa Fe Railway	13,957,290	5,434,966,245	765,417	389.40	$3.680	$.00945
Boca and Loyalton Railroad	195,239	3,539,022	70,358	17.97	.902	.04980
Butte County Railroad	127,827	3,833,607	121,701	29.99	1.210	.04036
California Northeastern Railway						
Central Pacific Railway						
Coast Line Railway						
Colusa and Lake Railroad	18,373	218,164	9,918	11.00	.684	.05759
Crescent City and Smith River Railroad						
Diamond and Caldor Railway	21,436	720,892	21,436	33.00	2.866	.08524
Eureka and Freshwater Railway	12,400					
Inter-California Railway						
Iron Mountain Railway						
Lake Tahoe Railway and Transportation Company				16.00		
McCloud River Railroad	350,772	6,612,014	98,539	18.85	1.152	.06116
Mill Valley and Mount Tamalpais Scenic Railway						
National City and Otay Railway	53,518	56,479	114	10.54	.68106	.06462
Nevada and California Railway	332,105	39,168,030	118,519	117.94	2.86811	.02432
Nevada-California-Oregon Railway	56,770	4,315,730	27,194	76.02	3.68563	.04848
Nevada County Narrow Gauge	32,984	639,258	28,411	19.38	2.11867	.10931
Northwestern Pacific Railroad	763,564	29,330,367	78,665	38.41	1.49426	.03890
Oregon and Eureka Railroad	223,255	5,014,307	179,082	22.46	.75273	.03351
Pacific Coast Railway	120,829	2,791,266	31,719	23.10	1.16325	.05035
Pajaro Valley Consolidated Railroad	112,106				.41848	
San Diego, Cuyamaca and Eastern Railway	77,847	1,509,459	59,498	19.39	.80649	.04159
San Francisco and Napa Railway						
San Pedro, Los Angeles and Salt Lake Railroad	1,640,857	326,597,534	301,623	199.04	2.69719	.01355
San Juan Pacific Railway	14,217	97,553	130	6.86	.43582	.06351
Sacramento Valley and Eastern Railway	13,930	208,950	928	15.00	2.92605	.19507
Sierra Railway Company	106,849	4,799,522	63,319	44.92	2.56421	.05709
Sierra Valleys Railway	37,266	1,033,717	28,336	27.74	1.60178	.05774
South Pacific Coast Railway						
Southern Pacific	14,611,961	4,118,507,783	742,812	281.20	3.275	.01165
Southern Pacific Railroad						
Sunset Railroad	182,277	7,018,266	167,460	38.50	.53702	.01395
Tonopah and Tidewater Railroad	61,058	6,124,282	38,761	100.30	3.83265	.03821
Yosemite Railway	43,212	1,739,340	21,995	40.25	1.27984	.03179
Yreka Railroad	7,319	54,893	7,319	7.50	1.27161	.16955
Total	33,175,261	9,998,896,680			$3.31762	$.01100

ACCIDENTS TO PERSONS.

By the following table it will be seen that out of a total of 16,791 trainmen employed, 718, or a little more than 4 per cent, met with some kind of an accident. Of the 54,958 other employees, 1,838, or a little more than 3 per cent, met with some injury.

Of the 54,830,370 passengers carried during the year ending June 30, 1908, but 20, or only one out of every 2,741,518, were killed, and but 328, or only one out of every 167,166, were injured.

When it is understood that accidents of all kinds, such minor ones as getting a cinder in the eye, etc., are included, it will be seen that the year 1907-8 was remarkably free from accidents.

The following roads, with a total of 804 employees and 272,499 passengers, were entirely free from accidents to either employees or passengers during the year:

Boca and Loyalton Railroad.
Butte County Railroad.
Colusa and Lake Railroad.
Crescent City and Smith River Railroad.
Diamond and Caldor Railway.
Eureka and Freshwater Railway.
Lake Tahoe Railway and Transportation Company.
Mill Valley and Mount Tamalpais Scenic Railway.
Nevada County Narrow Gauge Railroad.
San Juan Pacific Railway.
Sierra Valleys Railway.
Sunset Railroad.
Tonopah and Tidewater Railroad.
Yosemite Valley Railway.
Yreka Railroad.

In addition to the above named roads, the following, with 748,368, had no accidents to the said passengers:

McCloud River Railroad.
National City and Otay Railway.
Pacific Coast Railway.
Pajaro Valley Consolidated Railroad.
San Diego, Cuyamaca and Eastern Railway.
Sierra Railway.

A comparison with the year 1906-7 shows that during that year there were 253 per cent more accidents to employees and 261 per cent more accidents to passengers than during the year 1907-8.

ACCIDENTS TO PERSONS.

NAME OF COMPANY.	TRAINMEN.				ALL OTHER EMPLOYEES.				PASSENGERS.				ALL OTHERS.			GRAND TOTAL.	
	Number Employed	Killed	Injured	Total	Number Employed	Killed	Injured	Total	Number of Passengers.	Killed	Injured	Total	Killed	Injured	Total	Killed	Injured
Arcata and Mad River Railroad																	
Atchison, Topeka and Santa Fe Railway	6,093	9	97	106	31,869	11	1,066	1,077	8,927,874		32	32	17	40	57	37	1,235
Boca and Loyalton Railroad	26				113				18,571								
Butte County Railroad	15				52				30,261								
California Northeastern Railway																	
Central Pacific Railway																	
Coast Line Railway																	
Colusa and Lake Railroad	7				40				18,671								
Crescent City and Smith River Railroad									1,850								
Diamond and Caldor Railway	8				27				849								
Eureka and Freshwater Railway	3				3												
Inter-California Railway																	
Iron Mountain Railway																	
Lake Tahoe Ry. and Transportation Co.									25,500								
McCloud River Railroad	39		1	1	121				18,544								1
Mill Valley and Mt. Tamalpais Scenic Ry.	9																
National City and Otay Railway	10		1	1	68		1	1	416,633								2
Nevada and California Railway	36		8	8	220		2	2	118,410				3	5	8	3	15
Nevada-California-Oregon Railway	12				112		1	1	25,313		1	1					2
Nevada County Narrow Gauge	15				51				87,374								
Northwestern Pacific Railroad	234	2	16	18	1,323	1	3	4	6,710,012	3	10	13				6	29
Oregon and Eureka R. R.	21	1		1	88				72,466				1		1	2	
Pacific Coast Railway	17		1	1	147				79,831								1
Pajaro Valley Consolidated Railroad	13		1	1	34				31,137								1
San Diego, Cuyamaca and Eastern Ry.	17				68		1	1	144,639								1
San Francisco and Napa Railway																	
San Pedro, Los Angeles & Salt Lake R. R.	488	4	38	42	3,069	1	12	13	1,383,929	1	22	23	9	29	38	15	101
San Juan Pacific Railway	3				9				6,880								
Sacramento Valley and Eastern Railway	8		1	1	100												1
Sierra Railway Company	24				197		5	5	57,584								5
Sierra Valleys Railway	4				25				17,024								
South Pacific Coast Railway																	
Southern Pacific	9,630	30	508	538	16,858	53	681	734	36,564,058	16	263	279	247	314	561	346	1,766
Sunset Railroad	6				14				7,441								
Tonopah and Tidewater Railroad	29				144				18,426								
Yosemite Railway	12				174				23,089								
Yreka Railroad	3				13				24,004								
Total	16,791	46	672	718	54,958	66	1,772	1,838	54,830,370	20	328	348	277	388	665	409	3,160

EMPLOYEES SALARIES.

NAME OF COMPANY.	Number of Employees.	Days Worked.	Total Compensation.	Average Daily Compensation.
Arcata and Mad River Railroad	66	21,783	$86,685 29	$3 98
Atchison, Topeka and Santa Fe Railway	37,962	11,710,894	28,296,110 55	2 42
Boca and Loyalton Railroad	139	27,346	75,332 35	2 76
Butte County Railroad	67	22,945	70,173 34	3 05
California Northeastern Railway				
Central Pacific Railway				
Coast Line Railway				
Colusa and Lake Railroad	47	10,167	17,956 30	1 76
Crescent City and Smith River Railroad				
Diamond and Caldor Railway	35	8,368	24,508 01	2 92
Eureka and Freshwater Railway	6	1,106	2,827 40	2 56
Inter-California Railway				
Iron Mountain Railway				
Lake Tahoe Railway and Transportation Company				
McCloud River Railroad	160	40,504	127,889 03	3 15
Mill Valley and Mount Tamalpais Scenic Railway	28	8,764	26,717 00	3 40
National City and Otay Railway	78	29,702	74,836 07	2 52
Nevada and California Railway	256	178,193	424,981 77	2 38
Nevada-California-Oregon Railway	124	41,996	112,006 32	2 67
Nevada County Narrow Gauge	66	16,849	49,266 93	2 92
Northwestern Pacific Railroad	1,557	523,301	1,416,258 43	2 71
Oregon and Eurkea Railroad	109	23,583	65,569 65	2 78
Pacific Coast Railway	164	39,166	96,741 29	2 47
Pajaro Valley Consolidated Railway	47	13,054	37,537 56	2 88
San Diego, Cuyamaca and Eastern Railway	85	25,824	61,641 66	2 39
San Francisco and Napa Railway				
San Pedro, Los Angeles and Salt Lake Railroad	3,557	1,156,832	3,030,544 08	2 62
San Juan Pacific Railway	12	3,288	7,205 00	2 22
Sacramento Valley and Eastern Railway	108	6,000	13,350 13	2 22
Sierra Valleys Railway	221	60,589	158,883 25	2 62
Sierra Railway Company	29	9,593	21,060 44	2 20
South Pacific Coast Railway				
Southern Pacific	26,497	13,310,503	35,631,268 53	2 68
Southern Pacific Railroad				
Sunset Railroad	20	8,191	19,074 58	2 33
Tonopah and Tidewater Railroad	173	61,098	163,983 28	2 68
Yosemite Railway	186	57,087	140,493 37	
Yreka Railroad	16	4,745	10,164 94	
Total	71,815	27,421,471	$70,263,066 55	$2 56

ROLLING STOCK IN SERVICE.

Name of Company.	Locomotives.					Cars.				
	Passenger	Freight	Switching	Total	With Train Brake	Passenger	Freight	In Comp'y Service	Total	With Automatic Coupler
Arcata and Mad River Railroad	1	4	1	6		5	208	40	253	
Atchison, Topeka and Santa Fe Railway	547	864	140	1,551	1,551	1,027	42,341	3,215	46,583	46,583
Boca and Loyalton Railroad	1	4	2	7	7	2	45	5	52	52
Butte County Railroad	2	2		4	4	4	67		71	71
California Northeastern Railway										
Central Pacific Railway										
Coast Line Railway										
Colusa and Lake Railroad	2	1		3	1	5	45	1	51	
Crescent City and Smith River Railroad										
Diamond and Caldor Railway		3		3	3	1	56		57	
Eureka and Freshwater Railway		1		1			27		27	
Inter-California Railway										
Iron Mountain Railway		3		3	3		25	3	28	
Lake Tahoe Railway and Transportation Company	2	1		3	3	8	11		19	19
McCloud River Railroad		9	2	11	11	2	351	31	384	384
Mill Valley and Mount Tamalpais Scenic Railway	5			5	5	16			16	12
National City and Otay Railway	7			7	7	18	123		141	109
Nevada and California Railway	7	14	1	22	22	14	198	18	230	150
Nevada-California-Oregon Railway	3	5		8	8	9	120	30	159	158
Nevada County Narrow Gauge	3	2		5	5	8	65	12	85	66
Northwestern Pacific Railroad		61		61	60	208	1,278	92	1,578	1,081
Oregon and Eureka Railroad	1	6		7	6	4	213	1	218	174
Pacific Coast Railway		8	2	10	8	10	200	2	212	32
Pajaro Valley Consolidated Railway		7		7	7	7	269		276	
San Diego, Cuyamaca and Eastern Railway	2	1		3	3	5	74	1	80	80
San Francisco and Napa Railway										
San Pedro, Los Angeles and Salt Lake Railroad	47	90	16	153	153	105	2,950	347	3,402	3,402
San Juan Pacific Railway		1		1	1	1	25		26	26
Sacramento Valley and Eastern Railway		2		2	2	1	6		7	7
Sierra Valleys Railway	9			9	9	9	58	13	80	80
Sierra Railway Company		2		2	1	1	4		5	5
South Pacific Coast Railway										
Southern Pacific	357	762	152	1,271	1,271	1,249	25,669	4,119	31,037	30,935
Southern Pacific Railroad										
Sunset Railroad										
Tonopah and Tidewater Railroad	10			10	10	8	45	10	63	63
Yosemite Railway	4	1		5	5	5	60	12	77	77
Yreka Railroad		2		2	2	3	2		5	4
Total	1,010	1,856	316	3,182	3,168	2,735	74,535	7,952	85,222	83,570

The above table shows the number of locomotives and cars of various kinds now in use by the railroad companies, together with the number of locomotives fitted with "train brake" and cars fitted with "automatic couplers."

It will be noted that there are still 14 locomotives without train brake and 1,652 cars without automatic couplers.

Of the total number of cars of all kinds, 7,952 or more than nine per cent are used for company service exclusively

The following table shows the total mileage of passenger, freight, mixed, switching, and construction trains. The total number of miles run was 72,606,768, of which switching and construction trains, from which the railroads received no direct revenue, run 11,351,492 miles, or nearly 16 per cent of the total.

The total car mileage of loaded freight cars was 579,324,670 and the car mileage of empty freight cars was 243,195,168, which shows that the railroads were compelled to haul empty freight cars from which no revenue was derived 42 per cent of as many miles as they hauled loaded cars.

MILEAGE OF TRAINS.

NAME OF COMPANY.	Passenger Trains.	Freight Trains.	Mixed Trains.	Switching Trains.	Construction Trains.	Total Miles Run.	Mileage of Loaded Freight Cars.	Mileage of Empty Freight Cars.	Average Tons of Freight in Each Loaded Car.
Arcata and Mad River Railroad									
Atchison, Topeka and Santa Fe Railway	13,247,431	13,731,997	1,936,777	5,669,019	3,250,953	37,836,177	308,783,700	120,885,878	17.60
Boca and Loyalton Railroad		34,995	19,228		9,150	63,373	177,499	145,337	19.94
Butte County Railroad	18,685	16,193	5,216	24,828	42	64,964	157,044	123,541	24.41
California Northeastern Railway									
Central Pacific Railway									
Coast Line Railway									
Colusa and Lake Railroad	21,900		16,425		9,152	47,477			
Crescent City and Smith River Railroad									
Diamond and Caldor Railway		9,885	12,039			21,924	10,962	10,962	11.00
Eureka and Freshwater Railway									
Inter-California Railway									
Iron Mountain Railway									
Lake Tahoe Railway and Transportation Co.									
McCloud River Railroad	25,855	24,148	61,766		13,711	125,480	229,837	206,544	28.76
Mill Valley and Mt. Tamalpais Scenic R. R.									
National City and Otay Railway	148,520	30,060	436		2,391	181,407	53,152	31,846	
Nevada and California Railway	128,565	161,408	154,351	15,936		460,260	2,285,311	839,136	17.14
Nevada-California-Oregon Railway	70	15,680	101,269	3,425	23,196	143,640	473,318	239,318	9.12
Nevada County Narrow Gauge	20,401	11,314	35,459		3,161	70,335	100,772	81,118	6.04
Northwestern Pacific Railroad	949,892	308,035	61,605		89,212	1,408,744	3,013,994	1,182,307	9.73
Oregon and Eureka Railroad	46,002	78,274			11,847	136,123	392,760	391,247	25.54
Pacific Coast Railway		539	100,691	34,605	6,410	142,245	301,679	130,999	9.25
Pajaro Valley Consolidated Railway	4,888	16,583	19,286			40,757			
San Diego, Cuyamaca and Eastern Railway	44,860	23,226	15,600		127	83,813	112,582	41,055	13.41
San Francisco and Napa Railway									
San Pedro, Los Angeles and Salt Lake R. R.	1,791,972	1,207,895	118,529	362,425	289,635	3,770,456	19,482,747	9,830,359	16.76
San Juan Pacific Railway			12,270			12,270			
Sacramento Valley and Eastern Railway		2,700				2,700	1,660	1,350	38.68
Sierra Railway Company	42,334	42,440	13,908	1,856	4,568	105,106	347,090	85,940	13.83
Sierra Valleys Railway		6,319	23,002	2,454	690	32,465	87,161	51,111	11.86
South Pacific Coast Railway									
Southern Pacific	14,716,720	10,484,788	844,902	1,457,703		27,504,113	242,507,940	108,361,995	16.96
Southern Pacific Railroad									
Sunset Railroad		760	26,188		9,869	36,817	244,837	217,105	26.67
Tonopah and Tidewater Railroad	73,744	34,809	41,760		40,360	190,673	409,127	256,887	14.97
Yosemite Railway	48,092	2,154	43,278		14,767	108,291	151,498	81,133	11.35
Yreka Railroad			17,158			17,158			
Total	31,329,931	26,244,202	3,681,143	7,572,251	3,779,241	72,606,768	579,324,670	243,195,168	

BRIDGES—TRESTLES—TUNNELS.

NAME OF COMPANY.	BRIDGES.						TRESTLES.		TUNNELS.	
	Stone.	Iron or Steel.	Wooden.	Combination.	Total Number.	Aggregate Length, Feet.	Number.	Aggregate Length, Feet.	Number.	Aggregate Length, Feet.
Arcata and Mad River Railroad			1	1	2	890	28	18,590		
Atchison, Topeka and Santa Fe Railway	520	2,055	33		2,608	149,655	4,389	397,088	7	11,512
Boca and Loyalton Railroad			1		1	120	77	2,710		
Butte County Railroad										
California Northeastern Railway		3			3	180	14	594		
Central Pacific Railway		168	3		171	25,971	1,140	132,785	32	25,474
Coast Line Railway							3	855		
Colusa and Lake Railroad			2		2	160	17	2,785		
Crescent City and Smith River Railroad										
Diamond and Caldor Railway		1			1	97	63	10,992		
Eureka and Freshwater Railway				1	1	80	18	60		
Inter-California Railway							72	2,797		
Iron Mountain Railway							26	200	1	250
Lake Tahoe Railway and Transportation Company				12	12	1,450				
McCloud River Railroad							7	671		
Mill Valley and Mount Tamalpais Scenic Railway							18	1,630		
National City and Otay Railway			30	1	31	3,080				
Nevada and California Railway		6			6	750	111	3,296	1	247
Nevada-California-Oregon Railway							71	3,788		
Nevada County Narrow Gauge				2	2	306	5	2,270	2	810
Northwestern Pacific Railroad		3	17	8	28	3,782	748	79,538	17	19,915
Oregon and Eureka Railroad			3		3	339	41	10,475		
Pacific Coast Railway	5			1	6	358	83	9,584		
Pajaro Valley Consolidated Railway				2	2	224	24	5,220		
San Diego, Cuyamaca and Eastern Railway			37		37	2,494				
San Francisco and Napa Railway			1		1	150	35	1,159		
San Pedro, Los Angeles and Salt Lake Railroad	30	19	514		563	39,422	362	22,587	8	3,216
San Juan Pacific Railway										
Sacramento Valley and Eastern Railway		2			2	300	9	1,800		
Sierra Railway Company				1	1	533	36	6,362		
Sierra Valleys Railway							43	2,675		
South Pacific Coast Railway		7	5		12	1,193	129	14,008	6	14,423
Southern Pacific		4			4	687	7	3,635	5	9,848
Southern Pacific Railroad		138	7	2	147	35,677	4,683	261,465	48	47,256
Sunset Railroad							49	1,065		
Tonopah and Tidewater Railroad			22		22	380	84	9,603		
Yosemite Railway		4			4	876	103	9,894		
Yreka Railroad							8	1,232		
Total	555	2,410	676	31	3,672	269,154	12,503	1,021,413	127	132,951

RAILS AND TIES LAID AND FUEL USED DURING YEAR.

NAME OF COMPANY.	Rails, Tons.	Average Price at Distributing Point.	Ties, Number.	Average Price at Distributing Point.	Coal, Tons.	Cost per Ton at Distributing Point.	Wood, Cords.	Cost per Cord.	Oil, Gallons.	Cost per Gallon.
Arcata and Mad River Railroad	......	......	4,300	$.350	......	......	1,395	$4.00	......	......
Atchison, Topeka and Santa Fe Railway	51,014.66	$30.49	2,431,138	.701	2,399,571	$1.51	18,184	2.12	122,332,412	$.00974
Boca and Loyalton Railroad	......	......	17,998	.413	......	......	4,427	2.07	382,978	.02620
Butte County Railroad	......	......	......	......	......	......	......	......	......	......
California Northeastern Railway	......	......	......	......	......	......	......	......	......	......
Central Pacific Railway	......	......	......	......	......	......	......	......	......	......
Coast Line Railway	......	......	......	......	......	......	......	......	......	......
Colusa and Lake Railroad	......	......	......	......	......	......	......	......	227,177	.02857
Crescent City and Smith River Railroad	......	......	......	......	......	......	......	......	......	......
Diamond and Caldor Railway	......	......	......	......	......	......	......	......	251,030	.02900
Eureka and Freshwater Railway	......	......	......	......	......	......	307	1.75	......	......
Inter-California Railway	......	......	......	......	......	......	......	......	......	......
Iron Mountain Railway	......	......	......	......	......	......	......	......	......	......
Lake Tahoe Railway and Transportation Co.	......	......	......	......	......	......	......	......	......	......
McCloud River Railroad	......	......	19,745	.515	......	......	7,427	4.63	955,511	.02500
Mill Valley and Mount Tamalpais Scenic R. R.	......	......	......	......	......	......	......	......	......	......
National City and Otay Railway	139.91	36.30	7,520	.856	......	......	......	......	392,647	.01768
Nevada and California Railway	......	......	42,617	.800	38,071	7.56	......	......	......	......
Nevada-California-Oregon Railway	239.38	44.47	20,755	.331	398	8.91	143	2.71	774,323	.02345
Nevada County Narrow Gauge	......	......	4,402	.330	......	......	119	......	340,536	......
Northwestern Pacific Railroad	2,643.00	40.33	64,539	.427	420	10.29	35,040	3.21	7,977,312	.01794
Oregon and Eureka Railroad	......	......	1,524	.278	......	......	......	......	8,069	.01809
Pacific Coast Railway	521.84	46.31	15,424	.468	......	......	......	......	821,184	.01380
Pajaro Valley Consolidated Railroad	180.47	42.29	11,345	.500	......	......	......	......	223,216	.01309
San Diego, Cuyamaca and Eastern Railway	......	......	......	......	......	......	......	......	97,448	.02143
San Francisco and Napa Railway	......	......	......	......	......	......	......	......	......	......
San Pedro, Los Angeles and Salt Lake R. R.	6,254.25	35.00	142,339	.867	133,578	4.02	......	......	30,327,780	......
San Juan Pacific Railway	......	......	......	......	......	......	......	......	......	......
Sacramento Valley and Eastern Railway	......	......	......	......	......	......	......	......	62,900	.04166
Sierra Railway Company	53.00	35.00	14,975	.700	......	......	......	......	1,272,138	.02357
Sierra Valleys Railway	138.00	35.00	9,383	.306	3,215	9.45	......	......	215,531	.02857
South Pacific Coast Railway	......	......	......	......	......	......	......	......	......	......
Southern Pacific	3,462,395.00	40.08	2,672,422	.760	436,348	3.97	1,762	3.61	342,160,098	.01100
Southern Pacific Railroad	......	......	......	......	......	......	......	......	......	......
Sunset Railroad	......	......	654	1.0077	......	......	......	......	381,450	.01676
Tonopah and Tidewater Railroad	......	......	......	......	......	......	......	......	1,407,544	.02000
Yosemite Railway	......	......	......	......	......	......	......	......	593,432	.01428
Yreka Railroad	......	......	1,793	.3700	......	......	854	4.50	......	......
Total	3,523,579.51	......	5,485,873	......	3,011,601	......	69,658	......	511,204,716	

The foregoing statement shows there were 3,523,579.51 tons of new steel rails laid during the year, the cost which ranged from $30.49 per ton to the Atchison, Topeka and Santa Fe Railway Company to $46.31 per ton to the Pacific Coast Railway.

There were 5,485,873 new ties laid during the year, the cost of which ranged from $.278 to the Oregon and Eureka Railroad to $1.0077 to the Sunset Railroad. As there is an average of 37⅓ feet of lumber in each tie, these new ties contained approximately 204,805,925 feet of lumber.

The oil used amounted to 511,204,716 gallons, ranging in cost to the roads from $.00974 per gallon to the Atchison, Topeka and Santa Fe Railway to $.04166 per gallon to the Sacramento Valley and Eastern Railway.

MOVEMENT OF FREIGHT.

The following table shows the number of tons and kinds of freight moved by each railroad as well as the total number of tons of the various commodities carried.

Some of the smaller roads have kept no statistics of this kind, hence those roads have been omitted from this table.

Of the total tons of freight, lumber formed the largest single item, there being 3,990,740 tons of that commodity hauled. Products of the forest totaled 5,269,333 tons, being over 16 per cent of all the freight moved.

Coal formed the second largest item, with a total of 3,516,470 tons. Products of mines, including coal, ores, stone, sand, etc., formed 32 per cent of the total tonnage of the roads, there being 10,669,664 tons of those products carried.

The third largest item was general merchandise, with a total of 2,599,292 tons.

Fruit and vegetables made a total of 2,410,899 tons, while grain comes next with 2,156,257 tons.

For every 100 pounds of flour carried there was 70 pounds of sugar carried, the total for flour being 472,389 tons, while sugar totaled 329,279 tons.

Many other interesting facts might be gained from a study of the table which follows:

MOVEMENT OF FREIGHT.

COMMODITY (Tons).	Atchison, Topeka and Santa Fe Railway Co.	Boca and Loyalton Railroad Co.	Butte County Railroad Co.	Colusa and Lake Railroad Co.	Diamond and Caldor Railway Co.	Eureka and Freshwater Railway Co.	McCloud River Railroad Co.	National City and Otay Railway Co.	Nevada and California Railway Co.
Grain	1,373,608	1,423	211	4,794	2	....	708	1,053	3,499
Flour	370,162	321	289	857	7	....	237	....	1,615
Other mill products	126,216	....	1,500	405	1	....	71	....	2,581
Hay	250,708	1,302	2,168	101	13	....	1,189	1,747	9,016
Fruit and vegetables	788,459	453	751	1,343	24	....	223	9,260	6,814
Other products of agriculture	235,612	....	73	....	1	....	....	....	44
Live stock	897,182	4,318	39	168	....	....	175	12	4,832
Dressed meats	74,004	....	79	....	8	....	4	460	1,132
Other packing house products	74,152	....	19	....	....	....	....	....	244
Poultry, fish and game	39,723	....	5	....	....	....	....	....	12
Wool	12,261	....	....	109	....	....	16	29	228
Other products of animals	94,449	80	15	....	....	....	19	97	584
Coal	2,865,163	234	102	50	6	....	32	326	40,941
Ores	354,997	....	9	....	....	....	....	....	138,866
Stone, sand, etc.	787,470	....	204	7,164	....	649	6	18,031	1,871
Other products of mines	945,402	....	....	....	....	....	....	....	6,224
Lumber	819,420	30,749	102,074	891	21,229	11,763	78,237	2,769	43,391
Other products of forests	432,858	141,233	13,359	....	....	2,570	259,964	1,170	2,153
Oil	203,221	4,555	2,001	....	17	....	141	1,981	1,813
Iron—pig and bloom	28,394	....	135	....	....	....	184	2	140
Iron and steel rails	79,587	2,323	103	....	43	....	16	....	184
Other castings and machinery	253,025	....	873	....	14	....	453	5	4,280
Bar and other sheet metal	93,294	934	7	....	3	....	....	46	616
Cement, brick and lime	768,852	1,803	586	147	2	....	288	875	9,475
Agricultural implements	52,078	....	3	....	....	....	43	....	49
Wagons, tools, etc.	29,704	....	203	....	1	....	4	....	587
Wines, liquors and beers	97,213	13	246	....	....	....	576	....	3,593
Furniture and household goods	103,230	....	193	31	4	....	97	42	481
Merchandise	965,375	3,038	2,119	1,542	48	58	2,832	7,211	30,391
Other commodities	89,104	2,490	335	771	6	....	5,124	5,511	7,954
Sugar	113,961	....	126	....	7	....	133	....	814
Naval stores	....	....	....	....	....	....	....	....	....
Other manufactures	538,406	....	....	....	....	....	....	2,891	7,681
Total	13,957,290	195,269	127,827	18,373	21,436	15,040	350,772	53,518	332,105

MOVEMENT OF FREIGHT—*Continued.*

COMMODITY (Tons).	Nevada-California-Oregon Railway.	Nevada County Narrow Gauge.	Northwestern Pacific Railroad Co.	Oregon and Eureka Railroad Co.	Pacific Coast Railway Co.	Pajaro Valley Consolidated Railroad Co.	San Diego Cuyamaca and Eastern Railway Co.	San Pedro, Los Angeles and Salt Lake Railroad Co	San Juan Pacific Railway Co.
Grain	870	2,748	29,315	472	17,059	878	680	44,378	7
Flour	627	1,480	3,055	362	745	....	....	6,921	24
Other mill products	1,604	1,060	41,095	98	639	28,809	13	8,947	15
Hay	62	4,636	23,398	627	1,391	186	1,800	13,881	54
Fruit and vegetables	1,103	1,899	51,695	384	35,404	72,011	8,648	96,628	35
Other products of agriculture	....	....	599	....	....	....	....	2,461	2,521
Live stock	15,626	117	19,561	64	408	....	....	22,069	1
Dressed meats	156	....	1,510	286	32	....	....	94	1
Other packing house products	83	....	....	42	61	....	....	4,709	5
Poultry, fish and game	6	....	1,085	14	19	....	....	1,171	1
Wool	1,379	....	997	18	48	....	....	3,718	1
Other products of animals	394	134	2,825	12	131	....	....	33,943	21
Coal	242	565	11,952	47	674	....	....	101,524	6
Ores	1	1,935	1,760	....	961	....	....	323,902	....
Stone, sand, etc.	909	192	37,638	3,874	1,291	2,728	52,300	280,455	3,300
Other products of mines	491	....	3,299	....	....	....	....	30,891	....
Lumber	18,362	1,588	159,325	213,728	22,406	2,661	4,669	334,840	1,842
Other products of forests	3,533	575	117,687	....	1,163	....	278	1,303	531
Oil	538	4,415	11,453	98	10,834	....	87	9,498	76
Iron—pig and bloom	1,051	253	....	....	....	....	....	3,883	....
Iron and steel rails	200	125	....	....	10	....	67	8,802	772
Other castings and machinery	523	1,013	2,842	136	7,465	....	110	37,388	2,805
Bar and other sheet metal	269	102	....	....	701	....	....	14,959	....
Cement, brick and lime	475	579	22,147	27	2,040	1	256	62,544	803
Agricultural implements	458	....	166	8	33	....	....	1,314	....
Wagons, tools, etc.	349	17	16,279	27	184	....	....	3,924	8
Wines, liquors and beers	1,232	871	75,945	32	1,557	....	....	8,932	78
Furniture and household goods	329	198	3,553	291	474	....	55	10,545	31
Merchandise	4,383	7,378	66,019	1,206	4,743	4,832	7,559	76,599	1,140
Other commodities	334	517	40,572	1,299	9,234	....	1,325	26,343	116
Sugar	647	....	....	103	1,122	....	....	28,352	7
Naval stores	....	587	....	....	....	....	....	10	....
Other manufactures	534	....	17,792	....	....	....	....	35,979	....
Total	56,770	32,984	763,564	223,255	120,829	112,106	77,847	1,640,907	14,201

MOVEMENT OF FREIGHT—*Continued.*

COMMODITY (Tons).	Sacramento Valley and Eastern Railway Co.	Sierra Railway Co.	Sierra Valleys Railway Co.	Southern Pacific Co.	Sunset Railroad Co.	Tonopah and Tidewater Railroad Co.	Yosemite Valley Railway Co.	Yreka Railroad Co.	Total.
Grain	117	777	6	664,804	414	219	896	7,319	2,156,257
Flour	....	1,599	489	83,413	17	91	78	....	472,389
Other mill products	....	4,881	1,317	160,903	113	184	118	....	380,570
Hay	....	4,621	523	45,923	2,791	1,031	903	....	368,071
Fruit and vegetables	....	744	524	1,333,581	470	222	224	....	2,410,899
Other products of agriculture	....	....	....	84,038	2	....	27	....	325,378
Live stock	....	88	1,000	367,219	634	203	167	....	1,333,883
Dressed meats	....	47	121	29,586	....	....	....	....	107,520
Other packing house products	1	....	59	43,339	1	....	....	....	122,715
Poultry, fish and game	....	....	1	32,187	....	....	....	....	74,224
Wool	....	2	....	21,104	34	....	39	....	39,983
Other products of animals	....	96	221	134,618	22	....	....	....	267,661
Coal	3,449	634	179	489,396	96	685	167	....	3,516,470
Ores	3,400	9,762	1	574,090	....	8,056	636	....	1,418,376
Stone, sand, etc.	....	2,139	885	1,142,947	143	15	31,459	....	2,375,670
Other products of mines	....	10,716	66	2,190,316	150,091	21,519	133	....	3,359,148
Lumber	3,316	39,938	19,667	2,044,702	8,856	2,550	1,767	....	3,990,740
Other products of forests	....	555	3,770	287,982	380	7,410	119	....	1,278,593
Oil	....	426	3,369	139,168	81	152	1,869	....	395,793
Iron—pig and bloom	....	223	373	44,291	27	....	6	....	78,962
Iron and steel rails	....	....	256	138,296	1,005	8,841	....	....	240,630
Other castings and machinery	....	3,997	....	322,201	6,142	615	308	....	644,195
Bar and other sheet metal	....	....	....	93,368	101	124	....	....	204,524
Cement, brick and lime	....	10,793	69	810,965	1,701	351	510	....	1,695,289
Agricultural implements	....	....	50	14,214	....	....	....	....	68,416
Wagons, tools, etc.	....	....	54	21,794	....	....	42	....	73,177
Wines, liquors and beers	....	1,517	859	275,827	123	474	....	....	469,088
Furniture and household goods	....	127	87	54,807	....	64	123	....	174,762
Merchandise	2,073	9,791	1,733	1,390,682	1,436	3,782	3,322	....	2,599,292
Other commodities	1,574	2,699	190	450,504	6,768	3,479	163	....	656,412
Sugar	....	165	191	183,551	....	85	15	....	329,279
Naval stores	....	....	....	348	2	....	....	....	947
Other manufactures	....	512	515	461,586	827	906	121	....	1,067,750
Total	13,930	106,849	36,575	14,131,750	182,277	61,058	43,212	7,319	32,697,063

DECISIONS.

Before the Railroad Commissioners of the State of California.

Bridgford-Cunningham Company, a Corporation, } No. 101.
vs.
McCloud River Railroad Company, a Corporation.

Submitted June 9, 1908. *Decided July 14, 1908.*

1. Commission is not governed by strict rules observed by courts of law, as to the introduction and admissibility of evidence, its object being to arrive at the facts and in so doing it follows the practice adopted by the Interstate Commerce Commission.
2. Rate of $3.50 per ton charged by the McCloud River Railroad Company, for hauling lumber from Complainant's mill to Sisson—held under circumstances of this case to be unreasonable and excessive, and a rate of $2.75 per ton held to be a reasonable rate for such service.

E. A. Bridgford, for Complainant.
F. D. Madison, of Pillsbury, Madison & Sutro, and
Chas. L. Brown, for Defendant.

REPORT OF COMMISSION.

Loveland, *Commissioner:*

Complainant contends that the rate charged by defendant, viz., $3.50 per ton for hauling lumber a distance of 34 miles is unreasonable, and support such contention by testimony covering the following points:

(*a*) Value of defendant's investment upon which reasonable returns should be expected.

(*b*) Comparison of rates of other roads for alleged similar service, under alleged similar conditions.

(*c*) That defendant or its predecessor had formerly, to wit, in 1905, entered into an agreement with complainant to haul lumber from complainant's mill to Sisson where defendant's road connects with the Southern Pacific for $2.00 per ton, which contract was cancelled by the complainant at the solicitation of the defendant upon its representation that it desired to effect a joint rate agreement with the Southern Pacific Railroad Company which it represented it could not do while this contract was in existence, said cancellation being only consented to by complainant upon the specific assurance of defendant that it would "treat complainant right."

Defendant alleges that the rate of $3.50 per ton is a fair and reasonable one, and support its allegation by testimony and argument going to show—

(*a*) That at said rate of $3.50 per ton, the earnings of the road have not been sufficient to pay operating expenses, fixed charges, and a fair income upon the investment.

(*b*) That the road is constructed through a sparsely settled country from which little business could be expected.

(*c*) That the cost of constructing and operating said road was and is very heavy by reason of it running over mountain ranges, where heavy grades were encountered, and for the further reason that it is far distant from any producing coal fields, in consequence of which it is compelled to haul fuel long distances to supply its engines.

(*d*) That it is compelled to shut down and cease operations by reason of heavy snows in the winter, and that during such periods it enjoys no revenue from its road.

(*e*) Comparison of tariffs of other roads for alleged similar service under alleged similar conditions.

In announcing its decision in the above entitled case, the Commission reiterates its statement made during the hearing, that it was not governed by the strict rules observed by courts of law as to the introduction of testimony and the admissibility of evidence, its object being to arrive at the facts, and in so doing it has followed the practice adopted by the Interstate Commerce Commission. In consequence of this, the hearing was permitted to cover a much wider scope than it otherwise would, and while all of the testimony was interesting, and most of it salient and material, it will only be necessary to refer to that which pertains directly to the grounds upon which the Commission has decided the case, namely, the reasonableness of the rate complained of.

THE TESTIMONY.

Testimony of Complainant as to Investment.

As to the value of defendant's investment represented by the cost of construction and equipment, on which defendant contends it is entitled to fair and reasonable returns above expenses and fixed charges, there is a wide difference in the showing made by the parties to this action. Mr. Wisdom testified that the road east of McCloud could probably be constructed at a cost of six or seven thousand dollars per mile.

Mr. Wilder, recalled by defendant, testified that the difference in the cost per mile of the road west of McCloud, compared with that east of the same point, was about four thousand dollars per mile.

At the time the report of the McCloud River Railroad Company was filed with the Commission, in 1905, the main line extended east from McCloud nineteen miles and west from same point eighteen miles, making nineteen miles at seven thousand dollars per mile (at the outside figure given by Mr. Wisdom) and eighteen miles at eleven thousand dollars per mile (taking Mr. Wisdom's outside estimate, plus the difference testified to by Mr. Wilder), or

Nineteen miles at $7,000.00	$133,000.00
Eighteen miles at $11,000.00	198,000.00
As cost of main line	$331,000.00
Add to this cost of equipment	309,928.03
And it would appear that	$640,928.03

was cost of main line and equipment.

This, complainant contends, was approximately the amount of defendant's investment in 1905, as against the figures contained in the report—$1,097,825.34. No direct testimony in rebuttal was offered as to this estimate, defendant seeming satisfied to rely upon statements contained in report.

The report filed with the Commission for 1907, shows mileage of 69 6-10 miles, or practically 34 miles more than that shown in the report for 1905. The cost of construction in 1907 is given as $2,119,604.64, or $1,021,779.30 more than in 1905. From this it would at first appear that the 34 miles built between 1905 and 1907 cost the difference between the cost of construction reported for those years, or $1,021,779.30; but we find in the report for 1907 a charge against construction account of $840,000.00 for right of way. This would only leave $181,779.30 as the cost of building the practically 34 miles built between 1905 and 1907, although the 36 miles built previous to 1905 are reported to have cost $1,097,825.34.

Complainant also shows that the right of way for which $840,000.00 is charged to cost of construction, is a strip of land 200 feet wide, from which the timber has been cut, or in other words, approximately $690.00 per acre for mountain land divested of timber, and to pay the $840,000.00 for right of way it increased its capital stock from $360,000.00 to $1,200,000.00, thus increasing cost of construction by $840,000.00 not shown in former reports.

Former contract at $2.00 per ton.

This contract, the existence of which was denied in general terms by defendant in its answer, was shown by testimony to have been entered into by the Scott and Van Arsdale Lumber Company (which company was succeeded by the McCloud River Lumber Company) and complainant, which testimony was not disputed by defendant; nor did defendant deny the circumstances under which the cancellation of said contract was procured by Mr. Queal, president of the McCloud River Railroad Company and also president of the McCloud River Lumber Company, which, according to testimony of complainant, was upon the specific promise of defendant that rates should not be raised.

Testimony of defendant as to investment.

As to the investment represented by cost of constructing road, right of way, and equipment, defendant seemed satisfied to practically rest upon the report of the McCloud River Railroad Company filed with the Commission, no witnesses being produced to testify either as to cost of construction or value of right of way, although testimony was offered by complainant going to show that the figures given in the report, both as to the cost of construction and value of right of way, were much too high.

In cross-examining Mr. Osmer, however, defendant shows that in addition to the $66,000.00 realized on first capitalization, the investment represented over a million dollars, which the McCloud River Lumber Company had advanced to the defendant company for construction and equipment, and that it was for that that the stock and bonds, shown by the report to the Railroad Commission, were issued.

Sparsely settled country.

The testimony as to the tonnage of the road shows that while the road runs through a sparsely settled country, it is nevertheless a country from which a large volume of business is received by the road.

Cost of construction and distance from coal fields.

The only evidence submitted as to cost of construction other than the figures given in the reports and cross-examination of Mr. Osmer, already referred to, was offered by complainant, and has already been analyzed.

It is interesting in this connection to note the comparative cost of construction of the defendant road and that of the Nevada, California and Oregon, the tariffs of which have been compared in evidence with those of defendant. Nevada, California and Oregon, 143 miles, cost, according to report, $2,655,638.55. McCloud River Railroad Company, 69 6-10 miles, cost $2,119,604.64.

Defendant's plea that its road is far distant from producing coal fields must be considered in connection with testimony, undisputed, that no coal is used as fuel and that it is paying $5.00 per cord to the McCloud River Lumber Company for fuelwood, which complainant offers to furnish at $2.50 per cord, which circumstance supports the contention of complainant that the railroad is run in the interest of the lumber company rather than to pay dividends on the stock of the road, the stock of the railroad being owned and controlled by the lumber company, as admitted by Mr. Madison, counsel for defendant.

Operation in winter.

This claim set forth in answer of defendant was not sustained by the evidence. Mr. Osmer, the auditor of the road, testifying that while the work of running the road was "retarded to a certain extent," the average time when it was entirely stopped would not be three days during the winter.

Return of empty cars.

It was shown by the evidence that but little eastbound freight was available for the road, and the fact that empties had to be hauled from Sisson to mills of complainant and defendant was given due consideration by the Commission in arriving at a decision.

Tariffs of other roads were introduced by both complainant and defendant in comparison with defendant's rates, which received careful study and attention at the hands of the Commission. Such comparisons are at best difficult of analysis and often misleading, as conditions are never the same; and in arriving at a decision the Commission has relied more upon other testimony herein referred to than upon the comparisons of tariffs offered.

The evidence showing the former existence of a contract between the predecessors of defendant and complainant to haul its lumber at $2.00 per ton, and testimony (undisputed) as to the manner in which its cancellation was procured has especially been considered important; but the Commission has also had in mind that the expense of operating is greater on all railroads than it was at the time the contract was entered into.

Other evidence submitted.

Thus far we have endeavored to analyze the evidence offered at the hearing in support of the allegations contained in the complaint and answer. Careful consideration also has been given to the matters not set forth in the complaint or answer, but appearing from testimony introduced at the hearing, such as tonnage, the relation of McCloud River Railroad Company to McCloud River Lumber Company, the comparative price charged by the road for hauling logs for McCloud River Lumber Company and lumber for complainant, and the published tariffs on cattle, Bartle to Sisson.

Tonnage.

The question of tonnage is especially interesting, and must be considered in connection with defendant's investment in order to intelligently pass upon the reasonableness of the rate complained of. The tonnage of the roads, the tariffs of which were put in evidence in comparison with defendant's rates, is also important, and has received careful consideration, although most of those referred to by defendant are located in other states; hence Commission has no reports on them.

Of the business of those in California referred to by the parties to this action, the following comparisons are interesting and pertinent to this hearing

Nevada, California and Oregon, cited by complainant—mileage, 143; tonnage, 43,550; price per ton per mile, .03821; gross earnings, $267,305.58; operating expenses, $119,197.72. Dividend declared in August, 1907, or 4 per cent on $750,000.00 preferred stock from earnings of 1906.

Butte County road, cited by both complainant and defendant—mileage, 31.56; tonage, 117,993; price per ton per mile, .06174; gross earnings, $260,654.11; operating expenses, $116,400.11. Dividend, 150 per cent, or, after paying same rental as paid in 1906, which report states they expect to pay, the dividend on rental investment would be over 100 per cent.

McCloud River Railroad Company, defendant—Mileage, main line, 49.60; logging spur, 20; total, 69.60 miles; tonnage, 357,317; price per ton per mile, .0892; gross earnings, $536,945.07; operating expenses, $311,391.55; paid interest, $11,218.40; taxes, $2,202.66; permanent improvement, $26,562.26; other deductions, $98,808.70, including depreciation $30,027.81 and $68,780.89 for temporary logging track. No dividend, but surplus from operation for year ending June 30, 1907, $26,761.50.

Relation of McCloud River Lumber Company to defendant.

It has already been noted that the lumber company owned the stock of the railroad company. It is also shown in evidence that for several years the lumber company operated the railroad as an adjunct to its lumber business, and complainant claims that from that relation, and during that time, arose the indebtedness, or much of it, to cancel which stock and bonds were issued, as before referred to, while no credit was given for service performed by the railroad, as it had no separate existence. In support of this, it calls attention to the evidence that no interest was charged by the lumber company for such advances, and no charge was made for right of way until 1907, and that the expense of building at least 20 miles of spur or logging track, and of taking it up when through with it, was charged to construction and included in the report to the Commission of the cost of construction.

Comparison of rates charged complainant and the McCloud River Lumber Company.

In view of the contention of complainant and defendant as to the reasonableness of rate complained of, a comparison of the rates charged by defendant complainant and to the McCloud River Lumber Company is interesting.

Tariff on logs compared with that on lumber.

The testimony shows that logs were hauled at the rate of 50 cents per ton for distances from 5 to 25 miles, or an average of 17½ miles. Taking the average, this would be a little less than 3 cents per ton per mile as compared with a little over 10 cents per ton per mile for hauling lumber.

Defendant claims that this rate on logs was a published rate open to all shippers, but the testimony on this point shows that all hauling of logs is done for the McCloud River Lumber Company, which company has a contract with complainant to haul its logs; and that as the cut of complainant's mill is only 10 per cent of the cut of the McCloud River Lumber Company, a low rate on hauling logs results principally to the benefit of that company.

Rate on cattle.

See also rate on cattle—Bartle to Sisson, 37 miles, $20.00 per car of twenty tons, or $1.00 per ton.

Reports of defendant road, filed with the Commission, have received careful consideration and analysis.

Arguments of counsel were heard with interest, and have been again carefully considered. Statements filed with the Commission by agreement between counsel after arguments have received due attention, and the Commission desires to compliment counsel upon the thorough and able manner in which this case was presented.

DECISION.

No difference of opinion has arisen between the members of the Commission as to their decision, and it is unanimously decided that the rate of $3.50 per ton charged by defendant for hauling lumber from complainant's mill to Sisson is excessive and more than is justified under the circumstances and conditions; that $2.75 per ton is a fair and reasonable rate for such service, and acting under the authority conferred upon the Board of Railroad Commissioners by the Constitution of the State of California, said Board of Railroad Commissioners hereby make the rate on lumber from Algomah to Sisson, Shasta County, California, $2.75 per ton, and orders the defendant in this action to publish and observe said rate and not to charge or collect rates in excess of $2.75 per ton for such service.

A. C. IRWIN,
H. D. LOVELAND,
THEODORE SUMMERLAND.

Attest:
W. D. WAGNER, Secretary.

Before the Board of Railroad Commissioners of the State of California.

IN THE MATTER OF ALLEGED DISCRIMINATIONS BY THE SOUTHERN PACIFIC COMPANY BETWEEN SHIPPERS OF THE STATE OF CALIFORNIA IN FREIGHT RATES AND TRANSPORTATION FACILITIES. } No. 102.

Submitted August 15, 1908. *Decided January 12, 1909.*

1. Section 21 of Article XII of the Constitution of California is a constitutional declaration and prohibition against discrimination in charges or facilities for transportation by railroad or other transportation companies, but no provision is made by the Constitution for penalties in respect to such discrimination, it being provided in Section 24 of the same article that the Legislature shall pass all laws necessary for the enforcement of the provisions of such article. Penalties are prescribed by Section 22 of Article XII of the Constitution, limited to those cases where transportation companies have failed in their duty to move traffic in conformity with such rates as may be established by the Railroad Commission, or have charged rates in excess thereof.
2. At the common law, as decided by the Supreme Court of this State, the duty of the transportation company in the matter of rates was to make a reasonable rate to the shipper, and on this being done, the carrier was free to make a lower rate to another shipper, or carry his goods free.

3. It was not claimed, nor is it found, that any of the rates of the Southern Pacific Company examined at the hearing were unreasonable, and therefore the carrier is not subject to penalties in respect thereto, under the Constitution or at common law; for it does not appear that any of the rates comprehended in this investigation have been established within the meaning of Section 22, Article XII of the Constitution, prior to January, 1908, and as said rates were not legally established, it can not be said that the Southern Pacific Company has failed or refused to conform to established rates, or has charged rates in excess thereof. But the act of the Legislature of April 1, 1878, in respect to unjust discrimination, and attaching penalties therefor, is still in force, and presents the question whether the rates inquired into are in breach of its provisions.
4. It is found that there was discrimination in rates of the Southern Pacific Company under investigation:

   First—In the matter of the lower rate given to the Illinois Pacific Glass Works than to the Pacific Coast Glass Works.

   Second—In the matter of the lower rate given to Simon Newman than to his competitors on shipments of merchandise from San Francisco to the town of Newman.

   Third—In the matter of store-door delivery or drayage allowance given to the Walsh-Col Company of San Jose as against the rate charged its competitor, the Keystone Company.

   Fourth—In the matter of the lower rate given to the Illinois Pacific Glass Works and to the Pacific Coast Glass Works than to the Henry Cowell Lime Company.

   Fifth—In the matter of the lower rate given to the Loma Prieta Lumber Company than to Healy & Tibbitts.

   Sixth—In the matter of the lower rate given to the Salinas Valley Lumber Company than to John L. Howard.

   The first, second, and third are unquestionably cases of unjust discrimination; fourth, fifth, and sixth are cases of discrimination, but which can not be properly classed as unjust, as there was no competition between the parties.
5. Other rates mentioned in the investigation were not claimed to be discriminatory by counsel for the Board and Traffic Association, or are found not to be such by reason of no other shipper or shippers entitled to the same rate and denied it, appearing in the testimony.
6. Secret rates, even when not discriminatory by reason of there being no competitive shipper or shippers, are condemned as tending to create monopoly, stifle competition, and limit markets.
7. It is found that since the passage of the Hepburn Act on June 29, 1906, by Congress, amending the Interstate Commerce Law, the Southern Pacific Company has brought its State tariffs into line with the interstate tariffs, by publishing all State rates, and no complaint was made on the hearing, and it is not found that any of the State rates now published and charged by the Southern Pacific Company discriminate unjustly between shippers. But, while such is the present practice of the company, it is not a legal duty that the State rate should be published, and the Commission believes that this duty should be enforced by law.

U. S. Webb, Attorney General, } for the State.
Raymond Benjamin, Deputy Attorney General, }
O. K. Cushing, for California Traffic Association.
Peter F. Dunne, for Defendant.

Report of Commission.

By the Commission:

On the 14th day of January, 1908, a resolution was passed by this commission reciting a hearing had before one of the Interstate Commerce Commissioners in San Francisco on October 2d, 3d, and 4th, 1907, calling attention to a certified copy of the testimony taken before the Commission, and in the possession of the Board, and referring the matter and the papers to the Attorney General for advice as to the manner in which this Board should proceed. As a result, and on January 16, 1908, it was resolved that this Board "hold an investigation as to alleged discriminations in freight rates and transportation facilities between interstate shippers upon the part of the Southern Pacific Company," and February 12, 1908, was fixed as the date of the hearing. A similar resolution was adopted in respect to the Atchison, Topeka and Santa Fe Railway Company; also in respect to the San Pedro, Los Angeles and Salt Lake Railway Company.

It was further resolved on the same day:

> "That this Commission request that the said railroads (the Southern Pacific Company, the Atchison, Topeka and Santa Fe Railway Company, and the San Pedro, Los Angeles and Salt Lake Railroad Company) permit inspection of their books and records by the secretary of this Board and a representative from the Attorney General's office, and this Board hereby authorizes such inspection by said parties. This inspection to deal with the books and records covering freight rates and claims for rebates or overcharges."

It was stated by the Attorney General at the hearing that the books and records of the Southern Pacific Company were freely open to inspection, as called for in this resolution.

The inquiry before us, like the inquiry already spoken of before the Interstate Commerce Commission, was based on a table of rates, shown by a memorandum, sometimes spoken of at the hearing as the "Special Commodity Rate Sheet." This memorandum contained a list of shippers and of the rates made to them on special commodities. The examination into these special commodity rates occupied twelve days and takes up five large volumes of testimony.

At the hearing the examination was conducted for the Attorney General's office by Attorney General U. S. Webb and First Deputy Attorney General Raymond Benjamin. Mr. O. K. Cushing conducted the examination on the part of the Traffic Association, representing interested shippers. The Southern Pacific Company was represented by Mr. P. F. Dunne. The appearance of the Traffic Association by Mr. Cushing was in response to the invitation of this Commission to shippers and parties in interest generally to assist the Commission by the presentation of any evidence they might have which bore upon the matters under investigation.

In the argument made to the Commission after all the evidence had been put in on the part of the Attorney General, Section 21 of Article XII of the Constitution of the State was read as follows:

> "No discrimination in charges or facilities for transportation shall be made by any railroad or other transportation company between places or persons, or in facilities for the transportation of the same classes of freight or passengers within this State, or coming from or going to any other State."

In the same argument, Section 22 of Article XII was read from as follows:

> "Said Commissioners shall have the power, and it shall be their duty, to establish rates of charges for the transportation of passengers and freight by railroad or other transportation companies, and publish the same from time to time, with such changes as they may make."

This language was also read from the same section, in the argument by the Attorney General:

> "Any railroad corporation or transportation company which shall fail or refuse to conform to such rates as shall be established by such Commissioners, or shall charge rates in excess thereof, or shall fail to keep their accounts in accordance with the system prescribed by the Commission, shall be fined not exceeding $20,000 for each offense, and every officer, agent, or employee of any such corporation or company, who shall demand or receive rates in excess thereof, or shall in any manner violate the provisions of this section, shall be fined not exceeding $5,000 or be imprisoned in the county jail not exceeding one year."

In the preparation for this investigation the Assistant Attorney General had carefully examined the records of the Board of Railroad Commissioners to ascertain if the constitutional mandate quoted above, that they should

> "Establish rates of charges for the transportation of passengers and freight by railroad or other transportation companies, and publish the same from time to time with such changes as they may make."

had been properly complied with. He found that prior to January, 1908, it had not, except in some few isolated cases, and after stating that fact in his argument, added:

> "It now follows therefore, gentlemen, that with the exception of such rates as the Commission has established, the penalty cited in the constitutional provision does not apply."

It can not therefore be said in this decision that the Southern Pacific Company has failed to move traffic in conformity with established rates or has charged rates in excess thereof, because during the time comprehended in this investigation there were no established rates, and the penalties mentioned in Section 22, Article XII of the Constitution, can not apply.

No claim is made that any of the rates under investigation were unreasonable. In the opening argument the Assistant Attorney General states:

> "The only question is whether or not there has been discrimination practiced between persons, or, rather, shippers shipping commodities of the same character between the same points."

Section 21 of Article XII of the Constitution, dealing with discrimination, as quoted above, declares that there shall be no discrimination in charges or facilities for transportation; it does not provide a penalty, that being provided for in Section 22 of Article XII and which can not be applied to this case for the reason mentioned above. Mr. Cushing, attorney for the Traffic Association, in his argument agreed with the Deputy Attorney General in language as follows:

> "The Deputy Attorney General has pointed out to you that in the condition of the record and in view of the past history of the subject of railroad rates in this State, the question of the imposition of any fine against a railroad company under the constitutional provisions practically drops out of the case, and in that I concur with him. I do not see how a fine could be imposed under circumstances that have been developed here."

It seems to be well settled by the decisions that there was nothing in the common law to prevent a carrier charging a higher rate to one shipper and a lower rate to another, so long as the carrier did not charge anybody more than a reasonable rate. See decision of the Supreme Court of California, reported in 94th California, page 479, *Cowden* vs. *Pacific Steamship Company*. The decision says:

> "At common law a common carrier of goods is not under any obligation to treat all customers equally. He is bound to accept and carry for all upon being paid a reasonable compensation. But the fact that he charges less for one than for another is only evidence to show that a particular charge is unreasonable, nothing more. There is nothing in the common law to hinder a carrier from carrying for favored individuals at an unreasonably low rate, or even gratis."

While there was no penalty for discrimination under the common law, and while under the circumstances the penalty provided by the Constitution can not be applied, the question of a penalty in instances of discrimination comes into the case in another way. The act of April 1, 1878, of this State, defining unjust discrimination and fixing penalties therefor, is still in force, as evidenced by decisions of the Supreme Court cited by the Attorney General found in the case of *Dwyer* vs. *The County of Placer*, reported in the 90th California, page 276, and reaffirmed in the case of *Giesieke* vs. *The County of San Joaquin*, reported in the 109th California, page 489.

Section 2 of Chapter II of that act provides that a railroad company shall be found guilty of unjust discrimination

> "When it shall, directly or indirectly, willfully charge, demand, or receive from any person or persons any less sum for passage or freight than from another person or persons (except as in this act herein provided) at the same time, between the same places, and in the same direction, for the like class of passage, or for the like quantity of goods of the same class."

Section 5 of the same act and chapter provides the penalty as follows:

> "If any such railroad company shall be guilty of unjust discrimination, as defined in Section 2 of this chapter, it shall forfeit and pay the sum of $1,000 for each offense."

By Section 2 of the same chapter the fines and forfeitures and penalties for violation of the act shall be recovered by action in the name of the people of the State, upon complaint of the person aggrieved, the action to be brought by the District Attorney of the county in which the violation occurred, and the money recovered on account of such fines, penalties, and forfeitures, shall be paid into the State treasury for the benefit of the public school fund.

It was said in the argument for the Southern Pacific Company that the word "willfully," when used in a penal statute, means the doing of a thing, or omitting to do it, with knowledge and a determination with a bad intent to do it or to omit doing it, and a case was cited from the Supreme Court of the United States, entitled *Felton* vs. *United States*, 96 United States, 699, to the above effect, and using, in connection with the word "willfully," by way of description, the words "any purpose to evade or disobey the mandates of the law." But the Attorney General quoted to us the seventh section of the Penal Code, thus:

> "The word 'willfully,' when applied to the intent with which an act is done or omitted, implies simply a purpose or willingness to commit the act, or to make the omission referred to. It does not require any intent to violate law, or to injure another, or to acquire any advantage."

While this is the significance attached to the word "willfully" in the Penal Code, the Attorney General argues to us that the same significance should go with the use of the word in the act of 1878. This seems reasonable.

The Attorney General also read to us from a case in California entitled *People* vs. *Sheldon*, in 68th California at page 37, as follows:

> "There was no error in instructing the jury that an act is willfully done when done with deliberation, and not through surprise or confusion, or bona fide mistake."

We think we ought to read the word "willfully" in the act of 1878, as it is used in the Penal Code and by the California court, although we are not unmindful that the Interstate Commerce Commission has differed in judgment with the courts, and the courts have disagreed between themselves, as to what was or was not an unjust discrimination in rates.

The Special Commodity Rate Sheet that was the basis of the investigation before the Interstate Commerce Commission in October, 1907, and also the basis of this investigation, contained something over one hundred items of rates that were used up to the time when the Southern Pacific Company, after the passage of the Hepburn Act in 1906, published its State rates at the time it published its interstate rates. In this investigation about ten per cent of these items were referred to by counsel for the Board and Traffic Association, but not all of these were claimed to be discriminatory. The Attorney General in his opening argument uses the following language:

> "There are a lot of rates, if the Commission please, that were shown in this investigation, that were unquestionably lawful rates. I am now speaking advisedly of the so-called inside rates, and the only criticism of the Southern Pacific that can be indulged in with respect to these particular rates is that they did not publish them. We can not say that they were discriminatory against any one else, because we have not available the proof that others were obliged to ship at the published tariff, and it may be possible that there were no others who might ship at the published tariff between the points over which such rates were extended."

Now as to the particular rates on the Special Commodity Rate Sheet which were the subject of investigation. The first one is on dried fruit to the California Fruit Canners' Association, between intermediate points in California (except San Francisco), half tariff.

This rate was meant to apply on dried fruit from the field to the packing house, to be processed there. The commercial movement of the finished product began at the packing house, not at the field, and upon the commercial movement the full rate was charged. The evidence before us is that the California Fruit Canners' Association was to name to the railroad company, the places between which, field to packing house, the dried fruit would move for processing, and then the half-tariff rate would apply to that movement, and the California Fruit Canners' Association would be on a parity with other packers of dried fruit in the San Joaquin Valley. The testimony developes the fact that the California Fruit Canners' Association, first, never specified the points between which this half-tariff rate should apply, and second, they never moved any dried fruit at all from the field to the packing house until 1906, after all the rates had been published by the carrier.

With reference to the special rate given to the Droge Fruit Company and Chaddock & Company of 65 cents per ton from Malaga and Fowler to Fresno on dried fruit moving from field to packing house in sweat boxes and sacks to be processed and gotten ready for commercial movement to market points. This rate was made in competition with team-haul, and as shown by the testimony was given to all shippers from these points. The testimony also shows that the producers generally knew of this rate and received the benefit of it, the price to them being made on that basis.

Mention was made in the argument of the fruit rate to the Concord Fruit Company from Hemme, Concord or Danville to Suisun, where it was prepared for the commercial movement. Instead of the printed class rate on this movement to Suisun, the fruit company was charged the Concord to San Francisco rate. But it turned out that the rate, Concord to San Francisco, simply put the fruit company on the basis of paying half the class rate to Suisun, and no discrimination was claimed in the application of this rate.

Two witnesses, from the Chico fruit district, testified that they paid full rates on their dried fruit in that part of the State, from the field into the packing house. Most of their business, it appeared, was done by the teams, very little by rail, and one of the witnesses, Mr. Reynolds, said that he had applied to the railroad company for a lower rate than the printed rail rate, because he could do better by team-haul, and the company met the team-haul competition and gave him the lower rate, but the record does not show that the other shipper, Mr. Warren, made contemporaneous shipments from the same point, proof of which would be necessary to establish discrimination. It appears that the volume and density of the dried fruit traffic in the raisin belt, in the San Joaquin Valley, in the movement of the unfinished product for processing and preparation for market, is overwhelmingly large in comparison with the traffic on the fruit handled in the Chico district, which is not raisins, but different commodities, peaches, pears, apples, and some plums and apricots. No competitive interest of the Chico district was discriminated against by the half rate applied in the raisin belt, for the commodities in question, the raisins of Fresno, for example, were not in competition with the peaches, pears, and apples of the Chico district, and the traffic in the two places was of different kinds.

This is justified by the case before the Interstate Commerce Commission, reported in the eighth volume of Interstate Commerce Reports, page 551, entitled *Pennsylvania*

Millers' State Association vs. *Philadelphia and Reading Railway Company*, in which Section 2 of the Interstate Commerce Act, the one which deals with unjust discrimination, is interpreted. In this case a greater demurrage or free time was allowed on certain commodities than the other traffic at such points, and the Commission said this was not discrimination under the law, because the commodities were different and did not compete one with the other. The Commission used this language:

> "Section 2 prohibits unjust discrimination in the transportation of a like kind of traffic, and does not apply where the traffic is of different kinds or classses not competitive with each other."

Crude wine moving from one winery to another to be blended or fortified, and wine grapes shipped to the winery to be crushed, were mentioned as having been moved at special commodity rates, but no one was denied these rates and no discrimination was claimed in the argument.

As applicable to the last two items mentioned, namely the dried fruit and the wine grape, the language of the Circuit Court in the case of the *United States* vs. *Chicago Northwestern Railway*, 127 Federal, 785, may be cited:

> "The Interstate Commerce Act is not aimed at putting down just discrimination in the transportation of persons or property. This has always been held legal in this country and in England, and, is indeed in great measure, the life and soul of the business, both to the railroad companies and the public. By its means new industries are built up and old ones sustained, to the advantage alike of the public and the transportation companies. Nobody is injured by it, but on the contrary, everybody is benefited, because the public in this way is best served. It is only unfair and unjust discrimination that the statute as well as the common law is aimed at. If two persons or corporations *are engaged in the same business* and their situation is substantially alike, any discrimination in rates would be prohibited as invidious and unjust."

With reference to the sand rate from Lake Majella to San Francisco, which was gone into very fully in the testimony and in the arguments of counsel; so far as shown by the testimony there were three different shippers shipping sand from Lake Majella to San Francisco. The published carload rate was $2.65 per ton; but the sand could be shipped by boat and the railroad made a lower rate to meet the water competition. To the Henry Cowell Lime Company it gave a rate of $2.00 per ton; to the other two shippers, namely, the Pacific Coast Glass Works and the Illinois Pacific Glass Works, it gave a rate of $1.65 per ton. This is discrimination, but lacking in some of the elements of unjust discrimination, in that the parties were not in competition. The evidence showed, that in the case of the glass works, as in the case of the dried fruit packers and the wine makers, it was a matter of moving crude material, not commercially, but to the factory, to be there turned into the commercial product, on which the carrier would get a second haul and more revenue in transporting it in the finished form from the factory to the market. The sand of the glass works went into their factories at San Francisco to be used in the manufacture of bottles and other glassware, and on the out-haul of these finished products from factories to the market, the carrier received a further revenue. The sand of the Cowell Company did not move to a factory, but was itself commercial freight in the first instance, and went directly to the San Francisco market, where it was distributed commercially for use in sprinkling the floors of restaurants, saloons, and like public places. In the one case the commodity was finished and commercial, not yielding any further haul, while in the other, it was unfinished, and after being finished into a commercial product gave the railroad company a second haul, and between the commodities thus handled respectively by the Cowell Company and the glass works, there was no competition of interest.

In the case cited by the Attorney General called the *Party Rate Case*, volume 145, United States Supreme Court, 263, the court in speaking of the matter of undue preference to parties, used this language:

> "You must bring them into competition in order to give them an interest to complain."

There was no competition between the Henry Cowell Lime Company and the glass companies. Another decision in a case closely analagous to this is that of *Hoover* vs. *The Pennsylvania Railroad*, reported in Volume 36 of the American State Reports, page 49, decided by the Supreme Court of Pennsylvania. There, a lower rate on coal was given to the manufacturers of nails, the coal being used in the factories, than to the dealers in coal at the same place, who sold it for domestic consumption. In the one case, the coal went into the making of the finished product, nails, on which the carrier got another haul. In the other case the coal was used in the kitchen stoves. There was no competition of interests between the local coal dealers and the nail manufacturers. The business of the one did not conflict with the business of the other. The coal rates in that case were very much like the sand rates in this case. The Supreme Court of Pennsylvania said:

> "The plaintiffs were dealers in coal merely, while the nail company was a manufacturer of fabrics, and itself consumed the coal it received. They were therefore not competitiors in the same business, and a lower rate to the manufacturer would not, under the contract, affect the business of the plaintiffs injuriously."

The court says further:

> "The business of the plaintiffs paid but one freight to the defendant, while the business of the nail company paid not only that freight, to wit, for hauling the coal to the nail works, but also in addition to that, another and entirely independent freight to the defendant on all products manufactured by the nail company. This was a most important and vital difference in the conditions and circumstances of the two shipments. The authorities are very clear and strong that where an additional freight is obtained by means of the lower charge, the discrimination is justified both at common law and under the statutes."

Also in the case of the *Interstate Commerce Commission* vs. *The Baltimore and Ohio Railroad Company*, reported in Federal 43, page 37, the judges of the Circuit Court said:

> "When thus considered it is perfectly manifest that Congress did not intend to impose upon common carriers subject to the provisions of the act, any rule or duty of absolute equality of rates in their charges for transportion service. Subject to the requirements of Section 1 that all charges made for any service rendered in the transportation of passengers or property shall be reasonable and just, the language of Section 2 clearly recognizes and implies that there may be discriminations which are not unjust and not prohibited."

This decision was affirmed by the Supreme Court.

So, too, in the case of the *C. N. O. and T. P. Railway* vs. *Interstate Commerce Commission*, 162 United States, page 184, the court confirms the same doctrine in the following language:

> "Subject to the two leading prohibitions that their charges shall not be unjust or unreasonable and that they shall not unjustly discriminate so as to give undue preference or disadvantage to persons or traffic similarly circumstanced, the act to regulate commerce leaves the common carriers as they were at common law, free to make special contracts looking to the increase of their business, to classify their traffic, to adjust and apportion their rates so as to meet the necessities of commerce, and generally to manage their important interests upon the same principles which are regarded as sound and adopted in other trades and pursuits."

After examining the decisions cited and in affirming the decision of the Circuit Court in the case of the *Interstate Commerce Commission* vs. *Baltimore and Ohio Railroad Company*, the Supreme Court said:

> "In short, the substance of all these decisions is that railway companies are only bound to give the same terms to all persons alike under the same conditions and circumstances, and that any fact which produces an inequality of conditions and a change of circumstances justifies an inequality of charge."

See also Hutchinson on "Carriers," a leading American authority, page 353:

> "Mere inequality in charges does not therefore of itself amount to unjust discrimination. It only becomes such when a discrimination is made in rates charged to different shippers *under like circumstances and conditions.*
>
> "So a mere reduction from the established rate is not necessarily an unjust discrimination, but it becomes such when it is either intended or has a natural tendency to injure another shipper in his business and destroy his trade by giving to the favored shipper a *practical monopoly of the business.*"

The principle that carriers are justified in making a lower rate on merchandise which after some change in form will give them a second or further haul, has been referred to, but perhaps not fully recognized, as the decision refers more particularly to circumstances of carriage, by the Interstate Commerce Commission in the case of *Cattle Raisers' Association* vs. *M. K. and T. R. Company*, reported in Interstate Commerce Commission report, Volume II, page 312, Mr. Commissioner Prouty says:

> "It may also be noted at this point that rates for transportation of range cattle are often lower than corresponding rates for the transportation of beef

> cattle. These stock cattle from Texas to the northern ranges are younger and in poorer condition than beef cattle. The single animal weighs much less and the car-loading is much less. After these cattle have matured upon the northern ranges they load perhaps 25,000 pounds to the car, while the loading to those ranges will not exceed 20,000 pounds per car. The value of the animal is also much less and the *transportation is itself in the nature of a second haul.*
>
> "If the steer is fattened in Texas for the Chicago market it is transported perhaps 1,000 miles in all, while if it is matured in the north the railroad haul would exceed 2,000 miles. For these and other reasons the rate on stock cattle generally is and in our opinion should be lower than that of beef cattle—"

Since Cowell on the one hand and the manufacturers of glass on the other were respectively shipping sand for the purpose of two separate businesses, different and in no way competitive, it is clear that no injury to or monopoly of a particular business could arise between them from the application of a different basis of rates to their several shipments.

If, however, the glass companies had competed with the Cowell Company in the sale of sand to saloons, restaurants, etc., or if the Cowell Company had used the sand to manufacture glass or had even sold it to glass manufacturers, the lower rate to the glass companies would have been unjustly discriminatory.

In view of these decisions, and in view of the authorities quoted, and construction of the term "discrimination" by State and Federal courts, we believe, that a reasonable construction of the Constitution and of the statute of 1878 of California, would be that there may be discrimination which is unjust and also discrimination which under the statute is not to be classed as unjust discrimination; and without therefore laying down any general principle, as has been done by the Supreme Court of Pennsylvania, that carriers may fairly charge a lower rate when the merchandise shipped is put to such use as will give them a second haul on products which the first shipment enters into the manufacture of, but believing that under the laws of this State, each case of such discrimination must be judged by the circumstances surrounding it, we find, that while there was discrimination in the rate charged the Henry Cowell Lime Company as against the rate charged the glass companies, such discriminations worked no injury to the lime company, as there was no competition between them.

No case, so far as we have been able to ascertain, has ever been adjudicated by the courts of our State covering this point, but we assume that should such be presented, the decisions herein quoted would receive respectful consideration, especially those emanating from the Supreme Court of the United States.

But this is not all the rates on sand from Lake Majella to San Francisco, as developed by the testimony. For a time the rate to the two glass companies was the same—$1.65 per ton; but the Illinois Pacific Glass Works got control of a body of sand at Marysville, and went to the railroad company with the proposition that they could get that sand to their San Francisco factory by river boat at $1.25 per ton, which they would do if the railroad company would not give them that rate by rail from Lake Majella to San Francisco. This the railroad company did, and sought to justify it by boat competition from Marysville. In support of this the attorney for the railroad company, cites what is commonly known as the Import Rate Case, 162 United States, 197, in support of the position taken on these various rates. In our opinion, the Import Rate Case does not bear any resemblance to the facts before us in the sand case. The Import Rate Case involved a division of a through rate from Liverpool to San Francisco between the water and rail carrier, as a result of which division the rail carrier received less for the same service from New Orleans to San Francisco on boots and cutlery that were shipped from Liverpool to San Francisco via New Orleans, than it did on boots and cutlery that originated in New Orleans and were shipped thence to San Francisco over the same rail route. In the Import Rate Case, the boots and cutlery of New Orleans *did not* originate in Liverpool and *did not* have the same avenues of transportation open to them. The differing rate was justified upon the basis of the competition for such shipments *that existed at Liverpool,* the point of origin. In our case, the different shipments of sand originated at the *same point* and all such shipments had open to them the same routes of transportation without difference. Reversing the Import Rate Case, no good reason could be advanced, we should say, why a rate from San Francisco to New Orleans should govern the making of a rate from San Francisco to Liverpool via New Orleans. If the sand case before us involved the fact that the railroad was hauling sand from Marysville via Lake Majella to San Francisco, and that that portion of the rate earned between Lake Majella and San Francisco was less than the rate on sand shipments originating in Lake Majella and shipped to San Francisco, then the Import Rate Case might apply.

A case was cited to us which seems to be particularly in point as to the different rates given to the glass companies, viz: *Wright* vs. *The United States,* 167 United States, page 512. In this case two wholesale dealers in beer located in Pittsburg were shipping beer from Cincinnati. One of them, Mr. Bruening, had his warehouse on the tracks of the Panhandle Railroad. The other, Mr. Wolf, did not. The Baltimore and Ohio Railroad, a competitor of the Panhandle, in order to take Mr. Bruening's buisness from the Panhandle, allowed him the cost of draying his beer from the Baltimore and Ohio depot to his warehouse. At the same time the Baltimore and Ohio was hauling beer from the same source in Cincinnati for Mr. Wolf, performing exactly the same service as it did for Mr. Bruening, but, as Mr. Wolf's warehouse was not on the Panhandle or any other railroad's tracks, the Baltimore and Ohio charged him the full tariff. In this case the Supreme Court said in part:

> "Now, it is contended by the defendant that it was necessary for the Baltimore and Ohio Company to offer this inducement to Mr. Bruening in order to get his business and not necessary to make the like offer to Mr. Wolf, because he would have to go to the expense of carting, by whichever road he transported; that therefore the traffic was not 'under substantially similar circumstances and conditions' within the terms of Section 2. We are unable to concur in this view. Whatever the Baltimore and Ohio Company might lawfully do to draw business from a competing line, whatever inducements it might offer to the customers of that competing line to induce them to change their carrier, is not a question involved in this case. The wrong prohibited by the section is a discrimination between shippers. It was designed to compel every carrier to give equal rights to all shippers over its own road, and to forbid any device to enforce higher charges against one than another. Counsel insist that the purpose of the section was not to prohibit a carrier from rendering more service to one shipper than to another for the same charge, but only that for the same service the charge should be equal, and that the effect of this arrangement was simply the rendering to Mr. Bruening of a little greater service for the 15 cents than it did to Mr. Wolf. They say that the section contains no prohibition of extra service or extra privileges to one shipper over that rendered to another. They ask whether, if one shipper has a siding connection with the road of a carrier, it can not run the cars containing such shipper's freight onto that siding, and thus to his warehouse, at the same rate that it runs cars to its own depot, and there delivers goods to other shippers who are not so fortunate in the matter of sidings. But the service performed in transporting from Cincinnati to the depot at Pittsburg was precisely alike for each. The one shipper paid 15 cents a hundred; the other in fact but 11½ cents. It is true he formally paid 15 cents, but he received a rebate of 3½ cents; and regard must always be had to the substance, and not to the form. Indeed the section itself forbids the carrier 'directly or indirectly by any special rate, rebate, drawback, or other device,' to charge, demand, collect, or receive from any person or persons a greater or less compensation," etc.
>
> "It was the purpose of the section to enforce equality between shippers, and it prohibits any rebate or other device by which two shippers, shipping over the same line, the same distance, under the same circumstances of carriage, are compelled to pay different prices therefor.
>
> "It may be that the phrase 'under substantially similar circumstances and conditions,' found in Section 4 of the act, and where the matter of the long and short haul is considered, may have a broader meaning or a wider reach than the same phrase found in Section 2. It will be time enough to determine that question when it is presented. For this case it is enough to hold that the phrase as found in Section 2 refers to the matter of carriage, and does not include competition."

In our judgment the lower rate given to the Illinois Pacific Glass Works as against that given to the Pacific Coast Glass Works, is clearly a case of unjust discrimination.

Here, both shippers used the sand for the same purpose, and in the language of the Party Rate Case,

> "We have brought them into competition,"

which gives them a right to complain.

The special commodity rate of 9.1 per cent off tariff given to the California Pine Box and Lumber Company on box shooks, was made the subject of searching investigation, but uncontradicted testimony showed that it was made in competition with water and that all users of box shooks got the benefit of it. No discrimination was claimed by the Attorney General or Mr. Cushing.

Referring to the lower rate made on lumber to the Loma Prieta Lumber Company than to Healy & Tibbitts, and the lower rate given to the Salinas Valley Lumber Company than to John L. Howard where the service was identical; here, again are cases that must be considered discrimination, but such discrimination as worked no injury to the shipper paying the higher rate. Healy & Tibbitts were not in competition with the Loma Prieta Lumber Company, nor was John L. Howard in competition with the Salinas Valley Lumber Company, hence the reasoning applied to the sand rate as between the Henry Cowell Lime Company and the glass companies applies here.

Reference was made in the argument to a rate on lumber quoted to Miller & Lux to a point on the San Joaquin River named Volta, lower than was made to the Yancey Lumber Company to the same point. But the testimony showed no shipments were made, consequently there was no discrimination.

With reference to the special commodity rates on grain made to the Newman Company from several points on the San Joaquin River to San Francisco bay points. This rate was given to Newman because he had warehouses on the river, could have the grain delivered to those warehouses and ship by boat to bay points. But this water competition was open to all shippers and it only remained to establish the fact that there was another shipper or shippers from and to the same points at the same time, who were denied this rate to make it unjust discrimination. The direct examination of Mr. Volmer, Mr. Barnard, and Mr. Ferguson seemed to establish this; but under cross-examination they either testified that while they received shipments from that section, Mr. Volmer and Mr. Barnard bought the grain delivered at bay points, and Mr. Ferguson could not recall positively that he shipped from the points comprehended in the special rate extended to Newman.

In the case of the *United States* vs. *Hanley*, 71st Federal Report, page 673, the court said:

> "A rebate or variation of the usual rate in force is not alone sufficient; it must be supplemented by another member of the comparison, namely, the existence of another shipper or shippers who entitled to like treatment have been denied it,—"

While we can not therefore find that unjust discrimination is proven in the granting of the special rate to Newman, we do, however, condemn the giving of special, secret rates in all cases, and in cases of this kind especially, as it tends to confine and limit the market available to the farmers to one buyer, whereas free and unrestricted competition among buyers would be to their advantage.

A condition analagous to that in which the testimony shows Newman to have been placed, existed for many years at certain points in the Middle West, where many large grain elevators were located. Special rates to these concentration points were made to shippers owning elevators, which gave to the elevator operators control of the grain districts contiguous to such points and benefited the railroads in the matter of less expense in train handling and loading.

Newman had warehouses along the line of the railroad instead of elevators, and being the only one granted the special rate to his warehouse points had an advantage that resulted in at least partially assisting him to exclude all other buyers. In quoting prices to neighboring sellers, the market price being fixed at tide water, his advantage and resultant profit are apparent, as all others quoting in competition with him were obliged to quote upon the basis of the same market price, but different freight rate.

In a recent decision of the Interstate Commerce Commission it condemned the payment of elevator allowances in the Middle West, as explained above, and ordered the railroads to desist from that practice. Commercial bodies of St. Joseph, Missouri; Atchison, Kansas; Kansas City, Missouri; Omaha, Nebraska, and the Wabash Railroad Company, no one of which was a party to the original proceedings, filed petitions asking that the case be reopened and that they be allowed to intervene and that the matter be further investigated. The petitions were denied upon the ground that the Commission had investigated every phase of the question and that no possible good could come from further discussion. In denying the petition, Mr. Commissioner Prouty uses the following language:

> "The cardinal consideration in reaching our conclusion was a belief that in no way could discrimination or preference be prevented except by the complete prohibition of these payments and privileges. The principle of our decision applies everywhere. We expect that the decision will be universally accepted by carriers."

As to the rates given to Newman on shipments of merchandise from San Francisco to the town of Newman, as against the rates given to his competitors, we believe there is no question but that they were unjustly discriminatory and wholly unjustifiable under the circumstances. Here, "the other member of the comparison, the other shipper entitled to like treatment who did not receive it," appears. The carrier seeks to justify this on the ground of water competition in *cargo lots*. It is a well established principle that water competition must not only be possible, but actual or potential to justify the lower rates. So, too, cargo shipments by water must not only be possible, but actual or potential. In this instance it was not shown that Newman ever did ship in "cargo lots." His shipments were substantially the same as those of his competitors—Levy and Dobrzensky, and the rate to each should have been the same.

Furthermore, the use of the term "shipment in cargo lots" is misleading in this connection. Assuming that Newman was able to ship by water in "cargo lots," still, when these "cargo lots" left the boat for the rail, or were shipped by rail in preference to shipment by water they were broken up into *carload lots* and took carload lot rates, which in turn should have been extended to all shippers of like commodity who shipped in carload lots.

Outside of these considerations, however, the question of "cargo rates" seems to have been decided by the Interstate Commerce Commission in the case of *Payne Bros. vs. The Lehigh Valley, Philadelphia and Reading and other Railroads*, reported in Volume 7 of the Interstate Commerce Reports, page 218, where it was held

> "That the principle involved under lower rates for 'cargo' or 'train-load' quantities than for carload shipments, whether for export or domestic use, violates the rule of equality and tends to defeat its just and wholesome purpose."

In the matter of the half rate given to the Pacific Hardware and Steel Company and to Baker & Hamilton on goods interchanged by those houses with the branch houses which they had established in Los Angeles to help fill out the stock of the branch house where it would run short, such rates being made in competition with water carriers, the question of discrimination is eliminated, from the fact that other houses, like Holbrook, Merrill & Stetson and W. W. Montague & Company, similarly situated, testified that they had no use for this rate and did not consider themselves discriminated against. Or in the language of the Supreme Court of the United States in the case of the *United States* vs. *Hanley*, 71st Federal Report, page 673, quoted above:

> "A rebate or variation of the usual rate in force is not alone sufficient; it must be supplemented by another member of the comparison, namely, the existence of another shipper or shippers who entitled to like treatment have been denied it."

Mr. Watkins for W. W. Montague & Company and Mr. Voy of Holbrook, Merrill & Stetson did not testify that they been denied the rate, but that they did not need it.

With reference to the rate of $1.00 per ton on merchandise from San Francisco to San Jose and the store-door delivery or drayage allowance of 25 cents given to Walsh-Col Company, we consider this unjust discrimination as against the rate made to the Keystone Company, which did not include the store-door delivery.

The foregoing review covers the rates that were specified in the full and instructive arguments made as to rates comprehended in this investigation. We have gone over the voluminous evidence in the case with care, and in the light of that evidence we find that there was discrimination in rates of the Southern Pacific Company examined at this investigation as follows:

First—In the matter of the sand rates as between the two glass companies.

Second—In the matter of the lower rate given Simon Newman than to his competitors on merchandise from San Francisco to the town of Newman.

Third—In the matter of the store-door delivery given to Walsh-Col Company as against the rate charged the Keystone Company.

Fourth—In the matter of the lower rate given to the Illinois Pacific Glass Works and to the Pacific Coast Glass Works than to the Henry Cowell Lime Company.

Fifth—In the matter of the lower rate given to the Loma Prieta Lumber Company than to Healy & Tibbitts.

Sixth—In the matter of the lower rate given to the Salinas Valley Lumber Company than to John L. Howard.

The first, second, and third are unquestionably cases of unjust discrimination; fourth, fifth, and sixth are cases of discrimination, but which can not be properly classed as unjust, as there was no competition between the parties.

As to the other rates mentioned in the investigation, we find that as to some of them no discrimination was claimed by the Attorney General or by Mr. Cushing: as to others we believe that the decisions which we have quoted justify our opinion that no charge of unjust discrimination was sustained.

We further find, that the rates now made by the carriers and properly established by the Commission, are all public, the publication of which, however, by the carriers is their voluntary act, as the laws of California do not require carriers to publish their tariffs.

While we approve the free and voluntary acts of carriers in publishing their tariffs, we believe the law should be amended, making it their legal duty to publish their rates on State business, as they are required to publish them on interstate business.

Under the circumstances of rates not having been properly established, no order can be made by the Commission; the punishment for such cases of discrimination as have been found, resting with the aggreived shipper under the statute of 1878, as quoted on page 8 of this decision.

Signed: A. C. IRWIN,
H. D. LOVELAND,
THEODORE SUMMERLAND.

[SEAL.]

Attest:
W. D. WAGNER, Secretary.

Before the Board of Railroad Commissioners of the State of California.

IN THE MATTER OF ALLEGED DISCRIMINATIONS BY THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY, BETWEEN SHIPPERS OF THE STATE OF CALIFORNIA IN FREIGHT RATES AND TRANSPORTATION FACILITIES. } No. 103.

Submitted December 26, 1908. *Decided January 12, 1909.*

1. Section 21 of Article XII of the Constitution of California is a constitutional declaration and prohibition against discrimination in charges or facilities for transportation by railroad or other transportation companies, but no provision is made by the Constitution for penalties in respect to such discrimination, it being provided in Section 24 of the same article that the Legislature shall pass all laws necessary for the enforcement of the provisions of such article. Penalties are prescribed by Section 22 of Article XII of the Constitution, limited to those cases where transportation companies have failed in their duty to move traffic in conformity with such rates as may be established by the Railroad Commission, or have charged rates in excess thereof.
2. At the common law, as decided by the Supreme Court of this State, the duty of the transportation company in the matter of rates was to make a reasonable rate to the shipper, and on this being done, the carrier was free to make a lower rate to another shipper, or carry his goods free.
3. No claim was made that the rates comprehended in this investigation were unreasonable, and it is admitted by the State that no rates mentioned herein, except the rate on oil, was legally fixed and established in the manner provided by law. Hence the defendant carrier is not subject to penalties under the Constitution or at common law in respect to those rates which were not properly fixed and established. But it is found that the act of the Legislature of April 1, 1878, defining discrimination and attaching penalties therefor, is still in force and applicable to cases of unjust discrimination found herein in respect to rates other than oil rates.
4. It is found that there was unjust discrimination in the rates of the Atchison, Topeka and Santa Fe Railway Company with respect to rates under investigation as follows:

   First—The rate of $3.50 per ton on sugar given to J. R. Newberry & Company on shipments—San Francisco to Los Angeles, as against the rate of $4.05 per ton extended to Haas, Baruch & Company.

   Second—The rate of $3.50 per ton given to the United Wholesale Grocery Company between same points on same commodity as against the rate of $4.05 given Haas, Baruch & Company.

   Third—The rate of $3.40 per ton between same points on same commodity applied to shipments of Bowles Bros., as against the rates given Haas, Baruch & Company, United Wholesale Grocery Company, and J. R. Newberry & Company.

   Fourth—The rate of 20 and 27½ cents per hundredweight given to J. R. Newberry & Company on shipments of sugar—San Francisco to Riverside, as against the rate of 37½ cents per hundredweight given to the United Wholesale Grocery Company.

   Fifth—The rate of 17½ cents per hundredweight given to T. J. Barkley on shipments of coffee—San Francisco to Los Angeles, as against the rate given to M. Graveyet and J. A. Folger & Company of 30 cents per hundredweight, and to Stall & Company, 27½ cents per hundredweight.

   Sixth—The rate of 27½ cents per hundredweight on coffee—San Francisco to Los Angeles, given to Stall & Company, as against the rate of 30 cents per hundredweight given to M. Graveyet and J. A. Folger & Company.

   Other rates comprehended in group (1) are found not discriminatory or discriminatory, but not unjustly so. Some of the rates mentioned in group (2) were undoubtedly discriminatory, but upon the evidence before it the Commission does not find them unjustly discriminatory. Other rates mentioned in the investigation are not claimed discriminatory by counsel for the State.
5. Rates on oil found to have been legally fixed and established by the Railroad Commission and the Atchison, Topeka and Santa Fe Railway Company found to have failed to conform to said rates. It is adjudged and decreed that said Atchison Company be fined in the sum of five thousand (5,000) dollars.
6. It is found as was found with respect to the Southern Pacific Company that since the passage of the Hepburn Act on June 29, 1906, the Atchison Company has brought its tariffs into line with the Interstate rule as to publication, and no complaint was made at the hearing, nor is it found that any of the rates now published and charged by the Atchison Company discriminate unjustly between shippers.

   The Commission approves of the voluntary act of the company in publishing its State rates, but believes that such should be made a legal duty.

U. S. Webb, Attorney General,
Raymond Benjamin, Deputy Attorney General, } for the State.
E. W. Camp, for Atchison, Topeka and Santa Fe Railway Company.

REPORT OF COMMISSION.

By the Commission.

This investigation was held pursuant to a resolution passed by this Commission on January 16, 1908, said resolution being to the effect that this Board "hold an investigation as to alleged discriminations in freight rates and transportation facilities between interstate shippers upon the part of the Atchison, Topeka and Santa Fe Railway Company," and April 6, 1908, was fixed as the date of the hearing. A similar resolution was adopted in respect to the Southern Pacific Company; also in respect to the San Pedro, Los Angeles and Salt Lake Railroad Company.

A resolution was also passed by this Commission:

> "That this Commission request that the said railroads (Southern Pacific Company, the Atchison, Topeka and Santa Fe Railway Company, and the San Pedro, Los Angeles and Salt Lake Railroad Company) permit inspection of their books and records by the Secretary of this Board and a representative from the Attorney General's office, and this Board hereby authorizes such inspection by said parties. This inspection to deal with the books and records covering freight rates and claims for rebates or overcharges."

The inquiry before us was based on a table of rates sometimes spoken of at the hearing as the "Special Commodity Rate Sheet." This memorandum contained a list of shippers and of the rates made to them on special commodities.

At the hearing Attorney General U. S. Webb and Deputy Attorney General Raymond Benjamin conducted the investigation for the State. The Atchison, Topeka and Santa Fe Railway Company was represented by Mr. E. W. Camp. As in the case of the investigation with respect to the Southern Pacific Company, an invitation had been extended to commercial organizations, and to shippers generally, to participate in the investigation, but none appeared.

As the investigation of the Southern Pacific Company had been held previous to that of the Atchison, Topeka and Santa Fe, and as the circumstances surrounding the two cases were similar to a considerable extent, both as to the law and the facts, and as the case of the Southern Pacific Company had been exhaustively argued by counsel therein, it was stipulated by counsel appearing before the Commission in the present inquiry that this case be submitted upon briefs, and "that the argument heretofore made in behalf of the State in the hearing of a similar investigation with respect to the Southern Pacific Company be considered as a part of the argument of the State in those matters applicable to the present inquiry."

In the argument of the case with respect to the Southern Pacific Company, counsel for the State read from the Constitution of the State of California as follows: Section 21, Article XII—

> "No discrimination in charges or facilities for transportation shall be made by any railroad or other transportation company between places or persons, or in facilities for the transportation of the same classes of freight or passengers within this State, or coming from or going to any other State."
>
> "Said Commissioners shall have the power, and it shall be their duty, to establish rates of charges for the transportation of passengers and freight by railroad or other transportation companies, and publish the same from time to time, with such changes as they may make."
>
> "Any railroad corporation or transportation company which shall fail or refuse to conform to such rates as shall be established by such Commissioners, or shall charge rates in excess thereof, or shall fail to keep their accounts in accordance with the system prescribed by the Commission, shall be fined not exceeding $20,000 for each offense, and every officer, agent, or employee of any such corporation or company who shall demand or receive rates in excess thereof, or shall in any manner violate the provisions of this section, shall be fined not exceeding $5,000 or be imprisoned in the county jail not exceeding one year."

In the preparation for this investigation the Assistant Attorney General had carefully examined the records of the Board of Railroad Commissioners to ascertain if the constitutional mandate quoted above that they should

> "Establish rates of charges for the transportation of passengers and freight by railroad or other transportation companies, and publish the same from time to time, with such changes as they may make"

had been properly complied with. He found that prior to January, 1908, it had not, except in isolated cases, and stated that fact in his argument.

In the case with respect to the Southern Pacific Company, Mr. O. K. Cushing, representing the California Traffic Association, agreed with counsel for the State on this proposition. As before stated, the arguments of counsel in that case was by stipulation made a part of the argument in this investigation.

It was found in the case with respect to the Southern Pacific Company that

> "At the common law, as decided by the Supreme Court of this State, the duty of the transportation company in the matter of rates, was to make a reasonable rate to the shipper, and on this being done, the carrier was free to make a lower rate to another shipper, or carry his goods free."

But it was also found that the act of the Legislature of April 1, 1878, in respect to unjust discrimination and attaching penalties therefor, is still in force, as evidenced by the decisions of the Supreme Court in the case of *Dwyer* vs. *The County of Placer*, 90th California, page 276, and the case of *Giesicke* vs. *The County of San Joaquin*, 109 California, page 489. Section 2 of Chapter II of that act provides that a railroad company shall be deemed guilty of unjust discrimination .

> "When it shall directly or indirectly, willfully charge, demand, or receive from any person or persons any less sum for passage or freight than from any other person or persons (except as in this act herein provided) at the same time, between the same places, and in the same direction, for the like class of passage, or for the like quantity of goods of the same class."

Section 5 of the same act and chapter provides the penalty as follows:

> "If any such railroad company shall be guilty of unjust discrimination, as defined in Section 2 of this chapter, it shall forfeit and pay the sum of $1,000 for each offense."

By Section 2 of the same chapter, the fines and forfeitures and penalties for violation of the act shall be recovered by action in the name of the people of the State, upon complaint of the person aggrieved, the action to be brought by the District Attorney of the county in which the violation occurred, and the money recovered on account of such fines, penalties, and forfeitures, shall be paid into the state treasury for the benefit of the public school fund.

It does not appear in the record that any of the rates comprehended in this investigation were unreasonable, hence as stated by counsel for the State in the investigation with respect to the Southern Pacific Company,

> "The only question is whether or not there has been discrimination practiced between persons, or rather shippers shipping commodities of the same character between the same points."

Section 21 of Article XII of the Constitution dealing with discrimination, as quoted above, declared that there shall be no discrimination in charges or facilities for transportation, but it does not provide a penalty; the penalty provided for in Section 22 being limited to cases where transportation companies have failed to conform to rates established by the Commission or have charged rates in excess thereof. Section 24 provides that the Legislature shall pass all laws necessary to the enforcement of the provisions of Article XII, Section 21.

With the exception, therefore, of shipments moving under such rates as it shall be found have been heretofore properly established by this Commission, the penalty provided by Section 22, Article XII of the Constitution, can not apply to cases of discrimination found herein.

We do not consider it necessary to refer to all of the rates mentioned in this investigation, and in justification of this we quote from the brief of the Attorney General as follows:

> "For some unknown reason, although an invitation was extended to the shippers of the State to attend and participate in the hearing before this Commission, but little evidence was obtainable as to shippers who had been compelled to pay full tariff upon their consignments. In justice to the defendant corporation, it may be that this condition of affairs was occasioned by the fact that no shipper was compelled to pay the full published tariff as against many of the special rates which are exhibited by the schedules, and upon the theory, which in this instance may be true, and which we are not in a position to say is not true, that all persons are presumed innocent until proven guilty, we are compelled to acquit the defendant corporation of actual discrimination, as far as the evidence goes, with respect to a large number of the special rates which are exhibited in the schedule."

We shall, therefore, first consider those instances which counsel for the State claim are cases of discrimination under the act of April 1, 1878:

Rates on sugar moving from San Francisco, California, to Los Angeles, California, the published tariff being $5.55 per ton:

Haas, Baruch & Co. were given a rate of	$4 05 per ton
The United Wholesale Grocery Co. were given a rate of	3 50 per ton
J. R. Newberry & Co. were given a rate of	3 50 per ton
Bowles Bros. were given a rate of	3 40 per ton

On shipments of sugar from San Francisco, California, to Riverside, California, the published tariff being 45 cents per cwt., the following varying rates were made:

To The United Wholesale Grocery Co.	37½ cents per cwt.
To J. R. Newberry	37½ cents per cwt.
To J. R. Newberry	27½ cents per cwt.
To J. R. Newberry	20 cents per cwt.

On shipments of coffee from San Francisco to Los Angeles, the published tariff being 37½ cents per cwt.:

T. J. Barkley & Co. were given a rate of	17½ cents per cwt.
M. Graveyet	30 cents per cwt.
J. A. Folger & Co.	30 cents per cwt.
Stall & Co.	27½ cents per cwt.

On shipments of paper between the same points, the following varying rates were given, under a published tariff of 27½ cents per cwt.:

To the Pioneer Roll Paper Co.	17½ cents per cwt.
To Zellerbach & Co.	17½ cents per cwt.
California Paper and Board Mill Co.	20 cents per cwt.

Hides and pelts were shipped at the following rates, the published rate being 27½ cents per cwt.—San Francisco to Los Angeles:

Los Angeles Soap Co.	22½ cents per cwt.
Kauffman, Davidson & Co.	17½ cents per cwt.

On wire—San Francisco to Los Angeles:

American Steel and Wire Co.	$4 00 per ton
Otis Elevator Co.	5 00 per ton

On machinery—San Francisco to Los Angeles:

American Steel and Wire Co.	$4 00 per ton
M. L. Wingston	5 00 per ton

It appears also in the testimony, and is referred to by counsel for the State in their brief, that a special rate of 10 per cent off tariff was extended to certain shippers between Los Angeles and San Diego and other points, which counsel for the State characterize as discrimination, as against the rate extended to other shippers not on the favored list.

Lastly, counsel for the State call attention to a refund which the testimony shows was paid by the Atchison, Topeka and Santa Fe Railway Company to the Associated Oil Company to the amount of $30,750.75, and quotes from the rceords of this Commission and of the United States Circuit Court to show that after proceedings before the Commission, and also before said court, the rate of 37.8 cents per barrel on oil betweeen Bakersfield and San Francisco was on April 17, 1902, regularly fixed and established by the Commission and agreed to by the defendant carriers; that it was, in fact, a compromise rate and that the Atchison Company can not plead ignorance of the establishment of this agreed rate, as the San Joaquin Railroad Company, now a part of the Atchison Company, was a party defendant in the proceedings before the court and Commission, which resulted in said agreed rate.

Counsel for the Atchison Company arranges these instances of what counsel for the State allege to be discriminatory rates into three groups:

First—Those involving a movement of freight between San Francisco and Los Angeles.

Second—The Jobbers' List, providing for movement of freight between Los Angeles and San Diego; and

Third—The refund on oil shipments made to the Associated Oil Company, and seeks to justify his claim that they do not constitute discrimination as follows:

The different rates on sugar, coffee, paper, hides and pelts, wire and machinery between San Francisco and Los Angeles he claimed are justified by water competition. Inasmuch as the rate by water from San Francisco to ports in Southern California affects the rate from San Francisco to Riverside, we assume that he intended that the instances of shipments to Riverside should be included in the first group, although no mention is made in his brief of San Francisco to Riverside rates. His contention is that if the boats of a regullar steamship line are leaving San Francisco for Los Angeles on a certain day, and carrying freight at a certain price per ton, the railroad is justified in meeting that competition; that if on the day following or the day after or any time thereafter an independent or competing steamship company is dispatching its boats and carrying freight at a less rate, the railroad is also justified in meeting that rate, or rather in each instance making any rate to take the business from a water competitor regardless of the rate contemporaneously, or practically contemporaneously, made in competition with another water competitor.

No authorities are quoted in support of this contention. The members of this Commission would have welcomed citations of decisions of courts or other commissions by counsel in support of his position.

It appears to the Commission that the principal point upon which its decision must rest in determining the discriminatory or non-discriminatory character of the rates comprehended in Group (1) is, what constitutes "contemporaneous shipments?" Attention was called to the importance of this in the opening brief of counsel for the State, and counsel for the defendant carrier was invited to show that the rates alleged to be discriminatory were not applied to contemporaneous shipments. No such attempt was made by counsel for the Atchison Company, and the only justification before the Commission for the varying rates is the statement of counsel, which amounts to setting forth the necessity for making the rates to get the business. Counsel for the State cite the case of *United States* vs. *Tozer*, 39 Federal, page 369, where it was held that shipment made two days apart of the same commodity between the same places were contemporaneous. In view of that decision, and in the absence of citations by defendant's counsel or of any attempt to show that the shipments under consideration were not contemporaneous, as that, if true, could easily have been established, the Commission finds with reference to the first group, or rates between San Francisco and Los Angeles and San Francisco and Riverside, that some of them were unjustly discriminatory and others were discriminatory only as follows:

Unjustly Discriminatory:

First—The rate of $3.50 per ton on sugar given to J. R. Newberry Company on shipments San Francisco to Los Angeles as against the rate of $4.05 per ton extended to Haas, Baruch & Company.

Second—The rate of $3.50 per ton given to the United Wholesale Grocery Company between same points on same commodity as against the rate of $4.05 given to Haas, Baruch & Company.

Third—The rate of $3.40 per ton between same points on same commodity applied to shipments of Bowles Bros. as against the rates given to Haas, Baruch & Company, United Wholesale Grocery Company, and J. R. Newberry & Company.

Fourth—The rate of 20 and 27½ cents per hundredweight given to J. R. Newberry on shipments of sugar San Francisco to Riverside as against the rate of 37½ cents per hundredweight given to the United Wholesale Grocery Company.

Fifth—The rate of 17½ cents per hundredweight given to T. J. Barkley on shipments of coffee San Francisco to Los Angeles as against the rate given to M. Graveyet and J. A. Folger of 30 cents per hundredweight, and to Stall & Company of 27½ cents per hundredweight.

Sixth—Rate of 27½ cents per hundredweight on coffee San Francisco to Los Angeles given to Stall & Company as against rate of 30 cents per hundredweight given to M. Graveyet and J. A. Folger.

Sugar and coffee are necessaries of life, the sale and shipment of which are daily occurrence. The Commission, therefore, feels justified in finding that the shipments of these commodities were contemporaneous, and that any rate made by the railroad to meet water competition should have been extended to all. Instead of this, the defendant carrier met the rate that different shippers could get by different steamship lines, and in the case of J. R. Newberry, the United Wholesale Grocery Company, and Bowles Bros., made different rates where all were shipping by same steamship line from and to same points.

We recognize that rail carriers have the right within the law to meet water competition and to make such rates as will take a share of the business to their rails, but under our interpretation of the law of this State, rates made to meet water rates should be alike to contemporaneous shippers from and to same points and in similar quantities. All of the shipments of sugar referred to in group (1) were admittedly carload shipments, and no question was raised in the testimony or in the brief of counsel for the Atchison Company that there was any substantial difference in the shipments of coffee.

Discrimination only:

As to other shipments mentioned herein upon which varying rates were given to different shippers, namely, paper, hides, and pelts, wire and machinery, counsel for the State assume that as counsel for the defendant did not respond to their invitation to show that they were *not* contemporaneous, the Commission should consider it established that they *were* such.

We can not subscribe to that opinion which in our judgment would be a reversal of the well-known maxim of law, that "innocence is supposed until guilt is proven." These articles are not necessaries of life, nor are they shipped as frequently as sugar and coffee. The shipments may have been contemporaneous, but there is no evidence in support of that, and the fact that in the case of the *United States* vs. *Tozer*, cited above, the court held that shipments made within two days of each other were contemporaneous, presupposes that shipments made much further apart than that would not be contemporaneous. In view of the character of the merchandise comprehended in these shipments and the absence of testimony to show that they were made at substantially the same time, the Commission finds that while there was no discrimination in these rates, so far as the Commission knows, it may have been such discrimination as is justified by water competition.

As to the rates comprehended in group (2), namely, 10 per cent off tariff to certain shippers on shipments between Los Angeles and San Diego and vice versa.

Some of these rates were unquestionably discriminatory; that is, different rates were applied to the shipments of different shippers between Los Angeles and San Diego. Mr. Helping, who for some time had charge of the "Special Jobbers' List," while in the employ of the Atchison Company, testified that not all of the jobbers making shipments between these points and to intermediate points to which the special list applied received the special rates. From the list of shippers who received the special rates, which was furnished by the Atchison Company at the request of counsel for the State, it also appears that the rate was given to some shippers at a later date than to others, and in some instances was made retroactive, showing that such shipments had been made at a higher rate than had been applied to the shipments of those on the special list. This was discrimination. But was it such discrimination as should be called unjust discrimination?

This Commission has held in the case with respect to the Southern Pacific that under its interpretation of the Constitution and statutes of California there may be discrimination which is unjust, and also discrimination lacking in those elements, possessing which it should be classed as unjust.

In the case of the *United States* vs. *Hanley*, 71st Federal Report, page 673, the Court uses the following language:

> "A rebate or variation of the usual rate in force is not alone sufficient. It must be supplemented by another member of the comparison, namely, the existence of another shipper or shippers who, entitled to like treatment, have been denied it."

It appears from the testimony before the Commission that the Atchison Company was willing to extend this special rate to all who desired it, and even sent its solicitors to offer the rate to shippers, and in no case does it appear that the rate was denied to any one.

Neither does the testimony show that there was competition between the parties enjoying this special rate and those who did not. In what is known as the *Party Rate Case*, 145 United States Supreme Court Reports, the Court in speaking of undue preference between parties, says:

> "You must bring them into competition in order to give them an interest to complain."

Under all of the circumstances, while as before stated there was doubtless discrimination in the application of this special rate, and while had the dates of the shipments been established to show that they were contemporaneous, and had the character of the shipment shown that they were competitive, we should not have hestitated to declare them unjustly discriminatory; we do not feel that we are justified in assuming these things in the absence of evidence.

The circumstances surrounding the application of the special jobbers' rate were different from those connected with the sugar and coffee rates mentioned in group (1), which were found unjustly discriminatory, in that the same rate was extended to all who wanted the special jobbers' rate, while different rates were given to shippers asking for rates on sugar and coffee.

With reference to group (3), or the refund of $30,750.75 to the Associated Oil Company on shipments of oil from Bakersfield to San Francisco, Stockton, etc., counsel for the State claim that the rate on oil from Bakersfield to San Francisco is one rate that was properly fixed, established, and published by the Railroad Commission. The history of this rate and its establishment is as follows, as shown by the records of the Commission.

The matter of rates on crude oil and petroleum having been previously called to the attention of the Board of Railroad Commissioners at its regular meeting on March 12, 1901, the Board adopted a resolution citing the Southern Pacific Company, the Atchison, Topeka and Santa Fe Company, and its branches and leased lines, to appear on or before April 10, 1901, and show cause why said rates and charges should not be reduced. At the request of Hon. Frank H. Short, representing interested producers and shippers, said citation was on April 10th at the regular meeting of the Board "recalled and set aside," and thereafter a complaint was regularly filed with the Board, and after receiving both oral and documentary evidence from complainants and defendants, all parties being at all times duly represented at each and every hearing, and the case regularly submitted, the Commission adjudged and decreed that the rate of 42 cents per barrel on crude petroleum theretofore charged by defendant carriers from the Kern County oil district should be reduced to 37.8 cents per barrel, and 37.8 cents per barrel should be "fixed, determined, and established as the maximum rate" for such service. This finding and decree of the Board, together with the schedule of rates adopted December 2, 1901, for transportation of crude petroleum was, to wit, on April 17, 1902, repealed, and all orders and schedules and parts of orders and schedules in conflict with the schedule adopted April 17, 1902, were also repealed; said schedule adopted April 17, 1902, and regularly established by the Board, being as follows:

EXTRACT FROM RECORDS OF COMMISSION.

> "Schedule of rates adopted by the Board of Railroad Commissioners of the State of California April 17, 1902, fixing rates to be charged for the transportation of crude petroleum oil in the State of California, to wit:
>
> For shipment in carload lots:
>
> Rate: Per barrel of 42 gallons from Bakersfield and Coalinga to San Francisco and all intermediate points, and all points of consignment north of Bakersfield in this State, where the rate charged has hitherto been 42 cents per barrel—37.8 cents.
>
> Rate: For transportation over the switch or spur track into the Kern River oil district (extending from main lines of railroad operated by Southern Pacific Company and the Atchison, Topeka and Santa Fe Railway Company.)
>
> Per barrel of 42 gallons shipped from Oil City on said spur track, or intermediate points to saidmain line, when destined beyond Bakersfield, 2⅔ cents. Car loaded to capacity—minimum charge per car, $4.00.
>
> Per barrel of 42 gallons shipped from any point on said spur track more distant from said main line than said Oil City, when destined beyond Bakersfield, 4 cents. Car loaded to capacity—mimimum charge per car, $6.00.
>
> The schedule and order of rates adopted December 2, 1901, and all orders and schedules and parts of orders and schedules in conflict with this schedule and order are hereby repealed.
>
> A letter was read from Hon. Frank H. Short, counsel of record in this case, that the above schedule had been approved by Mr. W. A. Bissel and T. J. Norton, representing the Atchison, Topeka and Santa Fe Railway Company."

The carriers accepted this rate and amended their tariffs to correspond to said rate.

The Commission, therefore, holds that said rate was duly and regularly fixed and established under the authority vested in the Commission by the Constitution of this State.

Having decided that the rate 37.8 cents per barrel on oil from Bakersfield to San Francisco was regularly and properly established by the Commission, the question as to whether the Atchison Company conformed to said rate becomes pertinent. Counsel for the company seeks first to justify the refund to the Associated Oil Company on the ground that the rate of 25 cents per barrel on oil from Bakersfield to San Francisco bay points was given in consideration of the company receiving a price of 22 cents per barrel on fuel oil for engine consumption, and, second, to justify his contention that the refund to the Associated Oil Company by which a rate of 25 cents per barrel was applied to its shipments as against the rate of 37.8 cents paid by other shippers did not constitute discrimination, for the reason that the authority conferred upon the Railroad Commission by the Constitution to fix and establish rates means that the rates fixed and established by the Commission are the maximum rates and that the charging of a less rate is not non-conformity.

It is necessary to consider but one of these pleas, as, if it is held that charging a rate less than that fixed and established by the Commission is conforming to the Commission's rate, the necessity for the first is not apparent, while if on the contrary it is held that "conform" means to charge the exact rate fixed by the Commission, such barter or trade as is expressed in the first plea would be illegal. See *New York, New Haven and Hartford Railway* vs. *Interstate Commerce Commission*, 200 United States Report, page 361.

Citations of authorities in support of the second contention would have been welcomed by the Commission, but none were given. In our judgment the framers of the Constitution intended to clothe the Commission or its predecessor with authority to establish the actual rate and not the maximum rate. The laws of 1876 and 1878 gave the Commission the authority to fix the maximum rate. That this was unsatisfactory is evidenced by the amendment to the Constitution by which authority was given to "fix the rate." Hence the definition of the words "establish" and "conform" as used in the Constitution is important, as, if to "establish" means to fix the exact rate and to "conform" means to charge only that exact rate fixed and established by the Commission, no more nor less, then the charging of a less rate to a favored shipper constitutes discrimination and non-conformity. We quote from Section 22, Article XII of the Constitution, under which section the Supreme Court of California has recognized the authority of the Commission to act:

> "Said Commissioners shall have the power, and it shall be their duty, to establish rates of charges for the transportation of passengers and freight by railroad or other transportation companies, and publish the same from time to time, with such changes as they may make; to examine the books, records, and papers of all railroad and other transportation companies, and

> for this purpose they shall have power to issue subpœnas and all other necessary process; to hear and determine complaints against railroad and other transportation companies, to send for persons and papers, to administer oaths, take testimony, and punish for contempt of their orders and processes in the same manner and to the same extent as courts of record, and enforce their decisions and correct abuses through the medium of courts. Said Commissioners shall prescribe a uniform system of accounts to be kept by all such corporations and companies. Any railroad corporation or transportation company which shall fail or refuse to conform to such rates as shall be established by such Commissioners, or shall charge rates in excess thereof, or shall fail to keep their accounts in accordance with the system prescribed by the Commission, shall be fined not exceeding twenty thousand dollars for each offense; and every officer, agent, or other employee of any such corporation or company who shall demand or receive rates in excess thereof, or who shall in any manner violate the provisions of this section, shall be fined not exceeding five thousand dollars, or be imprisoned in the county jail not exceeding one year. In all controversies, civil or criminal, the rates of fares and freights established by said Commission shall be deemed conclusively just and reasonable, and in any action against such corporation or company for damages sustained by charging excessive rates, the plaintiff, in addition to the actual damage, may, in the discretion of the judge or jury, recover exemplary damages."

We believe and hold that "establish" means to fix the exact rate and that "conform" means to charge that exact rate, no more no less, and justify our opinion by citing the following cases:

"ESTABLISH."

> "To establish is 'to make stable and firm, to fix or settle unalterably.'" *Appeal of Ambler* (Pa.), 2 Walker, 287.
>
> "'Establish,' as used in Constitution of 1869, Article V, Section 19, providing that the Legislature shall establish new counties, should be construed to mean the same as the word 'create.'" *State* vs. *Cook*, 14 S. W. 996.
>
> "The words 'establish' and 'prescribe' are often used to express the same thing, and Webster classes them as synonymous, hence a decision under an act using one word is authority in the construction of an act using the other." *Ex parte Lothrop*, 118 U. S. 113.
>
> "The word 'establish' means to make, erect, or found permanently." *McDonald* vs. *International and G. Ry. Co.*, 60 Tex. 590.
>
> "The ordinary meaning of the word 'establish' is to settle certainly, to fix permanently, what is before uncertain, doubtful, or disputed." *Smith* vs. *Forrest*, 49 N. H. 230; *Egan* vs. *Finney*, 72 Pac. 133.

"CONFORM."

Fort Worth and Denver Railway vs. *Masterson*, 66 Southwest, page 833: In this decision the Supreme Court of Texas says.

> "The word 'conform' was used in the sense of 'comply with,' 'adopt,'" and adds, "We can not conceive how the Commission could fix the line so as to conform to a line established by the 'United States Department of Agriculture' except by adopting the latter line."

People vs. *Seale*, 52 California, page 72:
In this case the Supreme Court held that keeping the polls open at a special election, between the hours of one and six, was not "in conformity with the general election law," which requires the polls to be open "at one hour after sunrise on the morning of the election and to be kept open until sunset." The analogy between this and the case under consideration seems clear. Less than the time prescribed by law was not conforming to that time.

Directors of Fallbrook Irrigation District vs. *Henrique B. Abila*, 106 California, page 369:
Here it was held that an election to vote bonds for an irrigation district, which election the law provides, must as nearly as practicable conform to the provisions of the act governing the election of officers; keeping the polls open from sunrise to five o'clock P. M. was not conforming to the requirement that they be kept "open from one hour after sunrise until sunset."

After careful research we have been able to find but one decision where "conformity" did did not mean "identical with," and that is the case of *De Leonis* vs. *Etchepare*, 120 California, page 407, in which case it seems to the Commission that the court was endeavoring to give expression to a well known principle of law, and harmonize conflicting sections of the Code, for which purpose a liberal construction was given to the word "conform."

That the Atchison Company refunded to the Associated Oil Company the difference between 37.8 cents per barrel and 25 cents per barrel on shipments of oil from the Bakersfield and Kern River oil districts to San Francisco and other bay points is admitted by the testimony of Mr. Chambers, assistant general freight traffic manager of the company.

That other shippers were shipping the same commodity from and to the same points at the established rate of 37.8 cents per barrel during the time the 25 cent per barrel rate was applied to the shipments of the Associated Oil Company was also testified to by Mr. Chambers, the evidence being that the Union Oil Company and the May Company made such shipments, and that approximately 29,000 barrels were shipped by parties other than the Associated Oil Company at established rates during the time the latter company was receiving the less than established rate.

The only question left, therefore, for the Commission to decide is as to the authority vested in the Commission by Section 22, Article XII of the Constitution, to penalize or fine the Atchison Company for failure to conform to the rate established by the Commission, by charging less to a favored shipper.

The Commission holds that it has that power and authority. In so doing it is not unmindful of the restrictions placed upon it directly or by the decision in the case of *Edson* vs. *The Southern Pacific Company*, 133 California, and by implication or dictum in the same case reported in 144 California.

In the former case the learned Chief Justice, while denying to the Railroad Commission the authority to hear and determine cases arising under Section 20, Article XII of the Constitution, expressly recognizes the authority of the Commission "as a court of last resort" in cases arising under Section 22 of the same article of the Constitution.

In the latter case, 144 California, some of the language of the opinion would seem to decide that rates established by the Commission can only be the maximum rates, and that transportation companies are privileged to charge any rate within the maximum so established. We quote from the decision:

> "We do not understand that the Railroad Commissioners do more than to prescribe the maximum charge allowable. Within that maximum a corporation may establish its own rates, but whether it charges the maximum or less, it must have some established rate of fare,———"

If it shall be decided that this is the law, that the Railroad Commission can only establish maximum rates and the carriers can charge anything less than that maximum that they see fit to favored shippers and not to all shippers alike, then there is no law in California to punish discrimination except the old and wholly inadequate act of 1878. But, in the case just quoted, the question as to whether the Commission could establish the exact rate or the maximum rate was not before the court, and was mentioned incidentally or as dictum only, and therefore hardly seems to be decisive authority in that particular.

The Commission believes that the intent of the framers of this provision of the Constitution was to empower the Commission to make the exact rate to be charged, which rate could not be deviated from by the carriers, by charging more or less, unless the reduction was to all shippers of like commodities under similar circumstances and condition. If this was not the intent, the word "conform" seems to convey no intent whatever to the practical mind, and if the matter of the construction of this word as thus used in the Constitution is brought to the Supreme Court, as it should be in the interest of all concerned to secure a settled construction of this provision, the Commission believes that the court will upon reflection agree with its construction.

It may not be out of place to say that at the time and before the Constitution was adopted, the complaints against transportation companies was not that they charged too little, but that some of their charges were regarded as extortionate. It seems to us that it was clearly the intent of the framers of the Constitution to prevent discrimination; to give all shippers of like commodities under similar circumstances and conditions the same rate. In this way only can we understand Section 21 of the Constitution, which provides that "no discrimination shall be made." If the Railroad Commission can only fix the maximum rate, and transportation companies can charge anything less that they see fit to favored shippers, then we find it difficult to conceive how Section 21 can be complied with.

Therefore, it is hereby adjudged and decreed by the Commission that the Atchison, Topeka and Santa Fe Railway Company did fail to conform to the rate of 37.8 cents per barrel on shipments of oil from Bakersfield to San Francisco and other bay points, regularly established by said Board, and that for said failure to conform to said established rate, it is the order of this Commission that the Atchison, Topeka and Santa Fe Railway Company be, and it hereby is, fined the sum of five thousand (5,000) dollars, said fine to be paid to the State of California within the time specified by law, and if not so paid to be recovered in the manner prescribed by law.

As was held in the case with respect to the Southern Pacific, no order of the Commission is necessary with reference to cases of unjust discrimination found herein in rates which had not been legally established by the Commission, as action to punish the defendant carrier in such cases must be initiated by the aggrieved shipper under the act of 1878.

A. C. IRWIN,
H. D. LOVELAND,
THEODORE SUMMERLAND.

Attest:
W. D. WAGNER, Secretary.

Before the Board of Railroad Commissioners of the State of California.

IN THE MATTER OF ALLEGED DISCRIMINATIONS BY THE SAN PEDRO, LOS ANGELES AND SALT LAKE RAILROAD COMPANY BETWEEN SHIPPERS OF THE STATE OF CALIFORNIA IN FREIGHT RATES AND TRANSPORTATION FACILITIES. } No. 104.

Submitted August 18, 1908. *Decided January 12, 1909.*

The findings in the case with respect to the Southern Pacific Company and the Atchison, Topeka and Santa Fe Railway Company that contemporaneous shipments of like commodity between same points and under substantially similar circumstances and conditions must usually be shown to establish unjust discrimination, is reaffirmed in this case and, no unjust discrimination having been proven or claimed by counsel for the State, the case is ordered dismissed.

U. S. Webb, Attorney General, }
Raymond Benjamin, Deputy Attorney General, } for the State.

S. A. Halstead and }
W. R. Kelly, } for the San Pedro, Los Angeles and Salt Lake Railroad.

REPORT OF COMMISSION.

By the Commission.

This investigation was held pursuant to a resolution passed by this Commission on January 16, 1908, and April 9, 1908, was fixed as the date of the hearing.

By resolution of the Commission, its secretary and a representative of the Attorney General's office were authorized to examine the books and records of said San Pedro, Los Angeles and Salt Lake Railroad Company, such inspection to deal with records covering freight rates and claims for rebates or overcharges.

At and before the hearing an invitation was extended to commercial organizations and to all parties interested to attend and participate in the investigation, but such invitation was not accepted by any one.

An exhaustive and searching examination of various officers of the road was conducted by counsel for the State, but no cases of actual unjust discrimination within the period comprehended by this investigation were disclosed.

The Commission has held in the case with respect to the Southern Pacific Company, numbered one hundred and two in the records of the Commission, and also in the case with respect to the Atchison, Topeka and Santa Fe Railway Company, numbered one hundred and three, as it finds in the present inquiry, that under the Commission's interpretation of the Constitution and statutes of California, there may be discrimination in the application of rates by transportation companies that are unjust and also such as should not be classed as unjust. In the investigation referred to, namely, that of the Southern Pacific Company, and also in that of the Atchison Company, decisions of the Interstate Commerce Commission and of the United States Circuit and Supreme Courts, as well as the Supreme Courts of other states, were cited in support of the position assumed by the Commission, and reference is hereby made to cases and opinions so cited.

Under those decisions, and as held by this Commission, in order to prove that rates are unjustly discriminatory, contemporaneous shipments of like commodity under similar circumstances and condition and competition between shippers must be shown.

In the present investigation the existence or former existence of a contract between the Los Angeles Terminal Railway, afterward absorbed by the defendant carrier, and the Union Oil Company, by the terms of which a rate of five cents per barrel on oil was applied to shipments of oil by the Union Oil Company from Bixby to San Pedro, as against a class rate of eight cents per hundredweight, or about twenty-five cents per barrel, was shown.

Had there been another shipper or shippers moving oil in substantially similar quantities by the class rate, or at any rate higher than that given to the Union Oil Company, at the same time and between the same points, then the rate applied to shipments of the Union Oil Company would have been unjustly discriminatory; but the testimony shows that there was no movement of oil between the points mentioned, at any rate, except the shipments of the Union Oil Company. That the point where such shipments originated was, as testified by Mr. Gillett, traffic manager of the defendant road, a non-competitive point. We can readily conceive how a very low commodity rate from a given point to market might constitute unjust discrimination as against a rate from another point to same market, if the competitive circumstances under which the rate was made were similar, but no such conditions were developed by the testimony with respect to this rate. Other movements of oil between different points under contract with the Union Oil Company at rates less than published tariff, handled by the refund voucher method, were disclosed by the testimony, but in no case was there a contemporaneous competitive movement shown.

Considerable attention was given to the examination and analysis of rates applied to switching to industrial tracks and to other roads, but unjust discrimination was not claimed by counsel for the State with reference to these rates.

By agreement between counsel appearing in the case, it was u mitted without argument.

As was found in the investigation with respect to the Southern cific Company and Atchison Company, it is found that the San Pedro, Los Ange nd Salt Lake Railroad Company published its State as well as Interstate rates af the passage of the Hepburn Act, and although not required to do so by law, has filed ame with this Commission.

No claim that any of defend at carrier's rates comprehended in this investigation unreasonable was made, and as no unjust discrimination was shown, the case ered dismissed.

Signed: A. C. IRWIN,
H. D. LOVELAND,
THEODORE SUMMERLAND.

Attest:
W. D. WAGNER, Secretary.

ELECTRIC RAILROADS, TELEGRAPH AND TELEPHONE COMPANIES.

Though none of them come within the jurisdiction of the Railroad Commission, we have for the purpose of statistics, endeavored to compile a list of the electric railroad, telegraph and telephone companies in this State, and to obtain certain statistics regarding them.

We first addressed a communication to each of the county assessors, asking for a list of the companies doing business in their respective counties. Most of the assessors promptly complied with our request, but several of them failed to give us any information whatsoever.

The companies whose names we thus obtained were asked for certain statistics, and those companies enumerated below promptly gave the desired information.

Four of the largest electric railroad companies doing business in this State failed to furnish any statistics, but we hope soon to have a complete list on file.

ELECTRIC AND CABLE CAR COMPANIES.

NAME OF COMPANY.	Principal Place of Business.	Incorporated Under What Laws.	Capital Stock Authorized.	Number Miles Single Track	Number Miles Second Track	Number Electric Cars	Number Cable Cars	Number Passengers Carried During Year.
Bakersfield and Ventura Railroad Company	Oxnard	Colorado	$500,000	20.	5.	*64	†1	700
Bakersfield and Kern Electric Railway Company	Bakersfield	California	150,000	7.5	.....	7	...	995,738
Bay Point and Clayton Railroad	San Francisco	California	150,000	10.	.....	...	...	....
Coronado Railroad Company	San Diego	California	500,000	25.1	.....	4	...	774,581
California Midland Railroad	San Francisco	California	3,000,000	1.6	.....	...	...	....
California Street Cable Railroad	San Francisco	California	1,000,000	11.5	.....	...	37	6,773,771
Central California Traction Company	San Francisco	California	....	29.2	1.	16	...	300,000
Fresno Traction Company	Fresno	California	5,000,000	9.	2.46	17	...	2,791,858
Geary Street Park and Ocean Railroad	San Francisco	California	1,000,000	3.84	3.84	...	30	3,329,120
Humboldt Transit Company	San Francisco	California	1,000,000	12.	1.	16	...	1,714,234
Hetch Hetchy and Yosemite Valley Railway	Tuolumne	California	1,000,000	35.	.....	...	...	....
Los Angeles Pacific Company	Sherman	California	21,000,000	179.48	.....	170	...	....
Monterey-Pacific Grove Railway	San Francisco	California	600,000	6.6	.....	12	...	874,765
Nevada County Traction Company	San Francisco	California	100,000	5.5	.....	4	...	643,861
Oakland Traction Company	Oakland	California	17,925,000	98.32	67.78	236	...	52,551,617
Presidio and Ferries Railroad	San Francisco	California	1,000,000	7.63	.....	20	...	....
Petaluma and Santa Rosa Railway	San Francisco	California	1,000,000	31.6	.....	13	...	620,219
Riverside and Arlington	Riverside	California	200,000	12.55	1.5	10	...	....
San Jose and Santa Clara Company	San Jose	California	5,000,000	35.	.....	24	...	3,768,319
Santa Barbara Consolidated Railroad Company	Santa Barbara	New Jersey	250,000	7.5	.....	10	...	1,292,230
Sacramento Electric, Gas and Railway Company	San Francisco	California	....	8.52	20.41	33	...	8,711,986
San Diego Electric Railway Company	San Diego	California	5,000,000	25.45	10.1	51	...	8,049,656
San Francisco, Vallejo and Napa Valley	Napa	California	1,500,000	35.	.....	15	...	63,000
San Bernardino Valley Traction Company	Los Angeles	California	1,500,000	39.75	2.75	20	...	1,906,745
South Park and Eastside Railway	San Diego	California	100,000	3.3	.25	4	...	377,206
San Francisco, Oakland and San Jose Consolidated	Oakland	California	7,750,000	11.2	11.2	57	...	8,396,660
San Jose Railway Company	San Francisco	Nevada	500,000	15.5	2.	18	...	2,526,074
San Jose, Los Gatos and Interurban	San Jose	California	2,000,000	39.09	.....	24	...	1,315,320
Santa Clara Interurban	Palo Alto	California	5,000,000	2.64	.....	5	...	146,132
Union Traction Company	San Francisco	California	750,000	10.	2.	20	...	1,803,644
Vallejo, Benicia and Napa Valley	Napa	California	500,000	35.	.....	15	...	395,312
Visalia Electric Railroad Company	Exeter	California	1,000,000	24.	.....	6	...	....
Total (32 companies)	....	....	$85,975,000	798.37	131.29	891	68	110,122,748

* Freight. † Gas.

TELEPHONE COMPANIES.

NAME OF COMPANY.	Principal Place of Business.	Incorporated Under What Laws.	Capital Stock Authorized.	Miles of Wire in California.	Number of Telephones in Use in California.
Alhambra Home Telephone and Telegraph Co.	Alhambra, Cal.	California	$50,000	700	450
Bridgeport Telephone and Telegraph Co.	Bridgeport, Cal.	Not incorporated	....	80	25
Bodie and Hawthorne Telephone and Telegraph Co.	Bodie, Cal.	California	3,500	7	2
California and Oregon Telephone Company	Susanville, Cal.	California	50,000	400	25
Coachella Valley Home Telephone and Telegraph Co.	Thermal, Cal.	California	25,000	65	90
Consolidated Utilities Company	Compton, Cal.	California	100,000	350	525
Colusa County Telephone Company	Williams, Cal.	California	100,000	5,000	725
Downey Home Telephone and Telegraph Co.	Downey	California	50,000	....	300
Del Norte County Telephone Company	Crescent City	....	....	50	60
Home Telephone and Telegraph Co. of Chino	Chino, Cal.	California	10,000	45	200
Home Telephone and Telegraph Company	Los Angeles, Cal.	California	6,000,000	75,000	29,509
Northwestern Telephone and Telegraph Co.	Santa Rosa, Cal.	California	20,000	50	182
Nevada Consolidated Telephone and Telegraph Co.	Carson City, Nev.	Nevada	250,000	21	5
New Freeport Telephone and Telegraph Co.	Courtland, Cal.	California	50,000	700	200
Oxnard Home Telephone Company	Oxnard, Cal.	California	50,000	75	475
Rio Vista Telephone and Telegraph Company	Rio Vista, Cal.	California	20,000	60	84
San Francisco Home Telephone Company	San Francisco, Cal.	California	10,000,000	....	....
Santa Barbara Home Telephone and Telegraph Co.	Santa Barbara, Cal.	California	300,000	....	4,200
Sorrento and Carmel Valley Telephone Company	Sorrento	....	....	15	10
Siskiyou Telephone Company	Fort Jones, Cal.	California	10,000	150	60
Sierra Madre Telephone and Telegraph Company	Sierra Madre, Cal.	California	50,000	250	200
San Fernando Valley Home Telephone Company	Glendale, Cal.	California	50,000	....	300
Southwestern Home Telephone Company	Redlands, Cal.	California	1,000,000	....	2,250
San Luis Rey Coöperative Telephone	Oceanside, Cal.	California	....	48	20
Smeltzer Home Telephone and Telegraph Co.	Smeltzer, Cal.	California	10,000	401	229
The Pacific Telephone and Telegraph Company	San Francisco, Cal.	California	50,000,000	10,846	195,190
The Clear Lake Telephone and Telegraph Co.	Santa Rosa, Cal.	California	50,000	100	218
U. S. Long-Distance Telephone and Telegraph Co.	Los Angeles, Cal.	California	3,000,000	....	....
Volcano Telephone and Telegraph Company	Volcano, Cal.	Not incorporated	....	300	100
Williams Telephone Company	Cassel, Cal.	....	....	275	207
Whittier Home Telephone and Telegraph Co.	Whittier, Cal.	California	100,000	....	975
Total (31 companies)	....	....	$71,348,500	94,988	236,816

TELEGRAPH COMPANIES.

NAME OF COMPANY.	Principal Place of Business.	Incorporated Under What Laws.	Capital Stock Authorized.	Miles of Wire in California.	Number of Offices in California.
Angels Telegraph Company	Angels Camp, Cal.	....	$1,000	19	3
Chinese-Jamestown and Sonora Telegraph Co.	Chinese Camp, Cal.	California	1,200	12	2
Postal Telegraph Cable Company	San Francisco, Cal.	California	100,000	8,388	119
South Pacific Coast Railway Company	San Francisco, Cal.	California	6,000,000	129	16
Sierra Telegraph Company	Jamestown, Cal.	California	35,000	76	8
The Western Union Telegraph Company	San Francisco, Cal.	New York	100,000,000	21,697	672
Total (6 companies)	....	....	$106,137,200	30,321	820

TWENTY-SECOND ANNUAL REPORT

OF THE

INDUSTRIAL HOME OF MECHANICAL TRADES FOR THE ADULT BLIND

OF THE

STATE OF CALIFORNIA

1906-7

SACRAMENTO
W. W. SHANNON, : : : : : SUPERINTENDENT STATE PRINTING
1907.

BOARD OF DIRECTORS.

JOHN P. IRISH, *President,*	Oakland
GEORGE E. RANDOLPH, *Vice-President,*	Oakland
SOL. KAHN,	Oakland
H. C. CAPWELL,	Oakland
J. W. SCOTT,	Oakland

OFFICERS OF THE HOME.

JOSEPH SANDERS,	Superintendent
H. N. ROWELL,	Physician
GEORGE S. MEREDITH,	Secretary

SUPERINTENDENT'S ANNUAL REPORT

FOR THE YEAR ENDING JUNE 30, 1907.

Oakland, Cal., June 30, 1907.

To the Honorable the Board of Directors of the Industrial Home for the Adult Blind.

Gentlemen: In accordance with the provision of Section 4, subdivision eleventh, of the Act governing the Home, I herewith submit to you my report of the affairs and conditions of the Home for the year ending June 30, 1907.

The year just ending is the twenty-second of the Home's existence and the eighth in which it has been under the control and management of your present Superintendent since his reinstatement by your body in 1899.

Annexed hereto are presented the several statistical tables of the affairs of the Home required to be set forth in this report.

Officers of the Home.

Superintendent	Joseph Sanders	$2,100 00
Secretary	George S. Meredith	600 00
Physician	H. N. Rowell, M.D.	1,200 00

Employes of the Home, and their Rate of Compensation per Month.

Clerk of the Home	T. A. Williston	$65 00
Matron	Mrs. A. Sanders	35 00
Assistant Matron	Miss O. B. Smith	30 00
In Charge of Women	Mrs. C. B. Goodrich	30 00
Watchman	W. Schafer	40 00
First Cook	J. Ayers	60 00
Second Cook	S. Vallera	35 00
Janitor and Nurse	A. H. Wulzen	33 00
Janitor	G. Abenathy	25 00
Waitress	Miss Porter	22 50
Waitress	Miss McCann	22 50
Waitress	Miss Bonneau	22 50
Waitress	Miss Schriener	22 50
Laborer	Gus Spieth	25 00
Driver of Wagon	J. Ryan	25 00
Reader	W. Pillsbury	7 50
Total		$500 50
Gardener	W. Gustafson, when employed, per day	3 00

Inmates Employed by the Month.

Shop Assistant	D. Weider	$35 00
Shop Assistant	W. Plowman	27 50
Laborer	C. Dean	10 00
Total		$72 50

Employes of the Shop, and their Rate of Compensation per Month.

Shop Assistant	H. Marshall	$25 00
Shop Assistant	Ed. Timmell	20 00
Teacher in Girls' Shop	Miss Schakelsford	22 50
Total		$67 50

Names of Inmates Present during the Year ending June 30, 1907.

Name.	Date of Admission.	Age when Admitted.	Native of.
1. D. Aherns	June 15, 1890	68	Germany
2. Maggie Aitkens	Oct. 1, 1887	28	Michigan
3. Luke Andrews*	May 25, 1895	37	California
4. Geo. Allman	Aug. 25, 1902	52	Massachusetts
5. S. Brown	Aug. 17, 1901	42	Connecticut
6. P. M. Behan	Mar. 23, 1898	34	Ireland
7. Chas. Bauhofer†	Jan. 23, 1905	21	Switzerland
8. J. E. Buskirk	May 6, 1905	44	Indiana
9. J. Barrett	Jan. 20, 1905	25	Ireland
10. Thos. Carr	June 9, 1905	50	Ireland
11. A. Bellisle	Jan. 2, 1888	42	Canada
12. Miss Brissell	Mar. 30, 1888	38	New York
13. Wm. Brooks†	June 5, 1899	21	California
14. E. N. Beckwith	Sept. 2, 1903	49	Pennsylvania
15. W. Crossfield†	Aug. 9, 1901	22	California
16. J. L. Chamblin	Nov. 25, 1899	73	Kentucky
17. Isabel Cinega	Feb. 9, 1890	29	California
18. Margaret Clifford	Oct. 25, 1898	25	California
19. John Coffee	Dec. 1, 1890	20	California
20. Kate Carroll	Jan. 4, 1901	47	Ireland
21. Geo. Davis†	Dec. 11, 1899	23	England
22. John Didier	April 17, 1898	38	Illinois
23. G. Dudley*	Nov. 30, 1885	33	California
24. Oscar Darnell	Dec. 17, 1902	20	Oregon
25. Alex. Derrick	June 24, 1907	24	Arizona
26. Viola Doudell	Mar. 16, 1903	37	Virginia
27. James Eaton‡	Aug. 31, 1903	26	Scotland
28. B. Fales	Sept. 20, 1893	50	Michigan
29. Sarah Fryberg	Jan. 25, 1904	27	Germany
30. Wm. Flannigan	Dec. 9, 1896	35	New York
31. Alice E. Fields	Jan. 12, 1895	25	Maine
32. Fred Folsom†	Oct. 30, 1894	25	Indiana
33. Samuel D. Grant	April 4, 1906	19	California
34. W. E. Gill*	April 13, 1901	28	Missouri
35. Frank Gonzels	July 14, 1906	18	California
36. Manuel Gomez	Dec. 6, 1906	32	Cape Verde Islands
37. John Giblin	May 22, 1907	52	California
38. T. C. Graney	Nov. 14, 1904	20	California
39. J. H. Gafferney	Jan. 9, 1886	32	California
40. Lizzie Hannah	Sept. 7, 1887	41	England
41. P. Hoban	Sept. 25, 1893	44	Ireland
42. Henry Hodges	May 23, 1896	49	England
43. Benj. Holmes*	April 25, 1894	32	Illinois
44. Pauline Howe	Feb. 2, 1889	29	California
45. Chester A. Ingalls	May 22, 1907	20	California
46. T. Jones†	Oct. 29, 1903	32	Kansas
47. T. M. Jensen‡	Mar. 23, 1902	35	Denmark
48. C. E. Juckett	Dec. 14, 1904	25	Iowa
49. Wm. Johnston	Feb. 16, 1899	49	North Carolina
50. J. W. Judson	Nov. 10, 1902	22	Tennessee
51. Frank King	June 13, 1890	17	Massachusetts

Names of Inmates Present during the Year ending June 30, 1907.—*Continued.*

Name.	Date of Admission.	Age when Admitted.	Native of.
52. D. Kraskey	June 16, 1890	18	Minnesota
53. M. Kouper	Sept. 16, 1890	38	Germany
54. H. Lutz	Jan. 24, 1902	46	Germany
55. A. LaMott	Dec. 23, 1899	53	New York
56. James Lipp*	Jan. 7, 1895	20	California
57. Eliza O. Logan	Oct. 7, 1891	22	California
58. E. Lundbeck	Feb. 18, 1898	37	Sweden
59. J. McDonald	July 12, 1905	37	Ireland
60. Ellen P. Morgan	May 1, 1906	29	Utah
61. Clara Long	May 1, 1906	41	Illinois
62. C. Martin	Sept. 3, 1903	44	Norway
63. Rose McComb*	April 24, 1902	37	Utah
64. C. S. Morgan	Dec. 5, 1904	41	California
65. A. McGuinness	Aug. 9, 1895	51	England
66. M. Marmalejo	Mar. 9, 1899	24	California
67. Emma Mast*	Sept. 22, 1887	24	California
68. W. E. Mast*	June 16, 1891	21	California
69. P. Miller‡	Feb. 1, 1886	44	Iowa
70. Eliza J. Matlock	Dec. 16, 1899	35	Virginia
71. L. Moulzen	Dec. 3, 1894	49	Germany
72. John Moore	Aug. 27, 1885	29	California
73. Dorinda Mullaney	Nov. 11, 1889	27	New York
74. Bryan Nelson	May 12, 1888	48	New York
75. John Nolan	May 18, 1902	48	Ireland
76. N. P. Neilson	July 28, 1903	31	Sweden
77. J. I. Nall	Nov. 5, 1903	21	Illinois
78. J. Pasco	Dec. 29, 1905	48	England
79. J. Paulsen	Aug. 22, 1904	45	Sweden
80. W. T. Rose*	July 9, 1904	40	California
81. L. Orth	Sept. 2, 1895	37	California
82. B. Oakland	April 15, 1903	55	Sweden
83. Eliza Parker	April 30, 1893	46	California
84. W. Peterson†	Jan. 14, 1895	21	Missouri
85. W. Plowman	June 1, 1899	46	Kansas
86. T. Powers	Oct. 10, 1885	40	Ireland
87. C. L. Reynolds†	Aug. 31, 1905	49	Maryland
88. G. H. Rushton	Oct. 3, 1906	32	Michigan
89. W. A. Rennick	Mar. 30, 1907	29	California
90. G. Richville	April 27, 1896	19	Mississippi
91. J. Riley	June 19, 1890	47	Ireland
92. A. D. Stagg	June 24, 1907	42	Illinois
93. F. M. Smith	June 3, 1905	55	Illinois
94. J. H. Sheenen	Mar. 6, 1906	50	Ireland
95. H. Salmon	April 21, 1890	21	California
96. J. Sexton	Aug. 27, 1885	42	Ireland
97. W. Shakeley	Aug. 29, 1893	44	Pennsylvania
98. Mary Slattery	Aug. 27, 1892	48	Ireland
99. W. Staggs	Nov. 1, 1888	23	California
100. R. Sublett	May 12, 1887	35	California
101. V. Swortellis	Dec. 27, 1887	51	Russia
102. Wm. Turner	Feb. 26, 1907	27	California
103. D. Thussman	Mar. 30, 1907	49	California
104. J. Thompson‡	May 13, 1895	66	Scotland
105. J. M. Thompson	May 25, 1900	48	Tennessee
106. E. B. Taylor	June 9, 1892	45	Maine
107. P. Tipps	Oct. 11, 1894	48	Holland
108. Goda T. Wells	Aug. 15, 1906	49	California
109. F. Weiland	Oct. 19, 1905	63	Germany
110. J. Wickers	Feb. 9, 1901	54	Germany
111. H. Ward	June 29, 1895	54	Illinois
112. Viola Whipple	Sept. 11, 1895	22	Minnesota
113. D. Weider	Nov. 1, 1901	36	Iowa
114. H. H. Wisner	Aug. 22, 1904	45	Kansas

*Inmates on leave of absence, 9. †Left the Home during the year, 8. ‡Died during the year, 4. Inmates admitted during the year, 8. Inmates on the roll June 30, 1906, 111. Inmates on the roll June 30, 1907, 107. Refugees (not admitted), 9. Total on the roll, 116.

Inventory of Raw Material on Hand June 30, 1907.

Broomcorn, 54 tons, at $100 per ton	$5,400 00
Rattan, 2,175 pounds, at 10 cents per pound	217 50
Broom locks, 504 gross, at 30 cents per gross	151 20
Broom handles, straight taper, 1,000, at $22.50 per 1,000	22 50
Broom handles, maple carpet, 4,200, at $25 per 1,000	105 00
Broom bands, 12,000, at $13 per 1,000	156 00
Twine, gray, 426 pounds, at 20 cents per pound	85 20
Twine, green and red, 675 pounds, at 33 cents per pound	222 75
Twine, pink and orange, 645 pounds at 35 cents per pound	225 75
Twine, Brush, 28 pounds, at 47 cents per pound	13 16
Plush caps, 40 gross, at 20 cents per gross	8 00
Bluestone, 20 pounds, at 12 cents per pound	2 40
Wire, galvanized, 1,040 pounds at 6 cents per pound	62 40
Wire, tinned, 986 pounds, at 6 cents per pound	59 16
Nails, 175 pounds, at 4 cents per pound	7 00
Broom dye, 2½ pounds, at $1 per pound	2 50
Toy handles, 4,060, at $16 per 1,000	64 96
Brush rods, 1,000, at $13 per 1,000	13 00
28,000 feet chair cane, at 50 cents per 1,000 feet	14 00
Burlap, 450 yards, at 5½ cents per yard	24 75
Ticking, 40 yards, at 15 cents per yard	6 00
Hammock rings, 10 pairs, at 5 cents per pair	50
Coir, 1 bale, at $15 per bale	15 00
Velvet, 5 yards, at 24 cents per yard	1 20
Total	$6,910 93

Inventory of Manufactured Stock on Hand June 30, 1907.

Brooms, 50 10-12 dozen, at $2.50 per dozen	$127 10
Whisks, 12 dozen, at $10 per gross	10 00
Hammocks, toy, 13½ dozen, at $4.50 per dozen	60 75
Hammocks, fringe, 2, at $3.50	7 00
Hammocks, plain, 2, at $3	6 00
Hammocks, small, 6, at $2	12 00
Broom bags, 300, at 5 cents	15 00
Total	$237 85

Brooms Manufactured, Sold, and Delivered.

Brooms on hand July 1, 1906	1,318
Brooms manufactured, July 1, 1906, to June 30, 1907	107,998
Total	109,316
Brooms sold and delivered during the year ending June 30, 1907	108,706
Brooms on hand June 30, 1907	610
Whisks on hand July 1, 1906	160
Whisks manufactured, July 1, 1906, to June 30, 1907	22,143
Total	22,303
Whisks sold and delivered during the year ending June 30, 1907	22,159
Whisks on hand June 30, 1907	144

Manufacturing Statement for the Year ending June 30, 1907.

Brooms manufactured	107,998
Whisks manufactured	22,143
Chairs re-seated	1,623
Mattresses manufactured	77
Pillows manufactured	109
Broom bags manufactured	5,525
Hammocks manufactured	29
Toy hammocks manufactured	240
Mattress ticks manufactured	83
Broom bands manufactured	18,487

Summary of Expenditures for the Year ending June 30, 1907.

Month.	Provisions.	Furniture.	Wages.	Wages of Inmates	Drugs.	Building and Improvements.	Washing.	Raw Material.	Miscellaneous.
1906.									
July	$656 55	$41 68	$916 25	$488 70	$31 50	$1,538 65	$135 00	$362 17	$65 49
August	808 92	97 44	917 15	565 90	26 40	25 59	135 00	300 00	48 24
September	838 24	119 65	923 35	461 50	29 15	370 51	135 00	752 96	129 58
October	974 48	41 10	915 50	607 45	27 85	139 68	153 75	6,808 70	110 96
November	845 06	196 55	912 05	466 85	27 50	115 92	175 00	2,193 20	67 49
December	963 75	22 35	921 90	480 07	23 85	13 50	175 00	942 11	43 93
1907.									
January	1,030 16	30 53	913 78	559 25	22 90	56 85	175 00	1,536 28	315 93
February	868 58	84 01	915 65	524 05	32 25	17 03	175 00	216 00	143 01
March	1.022 15	117 95	922 20	497 75	29 90	78 15	175 00	1,672 49	27 84
April	873 52	4 75	904 40	565 20	28 90	250 29	1 75	1,458 87	163 66
May	1,003 63	9 05	912 02	541 25	30 55	89 14	2 10	210 36	101 21
June	964 51	277 60	925 67	521 05	27 55	17 30	....	507 21	90 27
Totals	10,849 55	1,042 66	10,999 92	6,279 02	338 30	2,712 61	1,437 60	16,960 35	1,307 61

Receipts and Collections for the Year ending June 30, 1907.

1906—July	$1,818 65
August	2,260 06
September	1,954 89
October	2,054 01
November	2,134 93
December	3,053 38
1907—January	2,628 01
February	2,219 15
March	1,953 76
April	3,056 30
May	2,202 02
June	1,806 62
Total	$27,141 78

Expenditures for the Year ending June 30, 1907.

1906—July	$4,235 99
August	2,924 64
September	3,759 94
October	9,779 47
November	4,999 62
December	3,586 46
1907—January	4,640 68
February	2,975 58
March	4,543 43
April	4,251 34
May	2,899 31
June	3,331 16
Total	$51,927 62

The current expense for the year, after deducting the following items:

Furniture	$1,042 66
Building and improvements	2,712 61
Raw material	16,960 35
Wages of inmates	6,279 02

amounts to $24,932.98. The average number of persons residing at the Home during the year was 130. The yearly cost per capita was, therefore, $191.02; the weekly cost per capita was $3.67. The cost of provisions alone was $10,849.55. The cost per capita for provisions was, therefore, $83.45 per year; cost per week, $1.60; per day, 23 cents.

Value of Stock, Raw Material, Etc., on Hand June 30, 1907.

Raw material	$6,910 93
Value of manufactured stock	237 85
Bills receivable	3,038 80
Amount in the Adult Blind Fund	7,202 01
Total	$17,389 59

The above sum of $17,389.59 represents the assets of the shops on June 30, 1907, which is an increase of $360.61 since June 30, 1906. This proves that our manufacturing industries are in a most healthy condition. Our trade continues good, and our output is on the increase. This is shown by the fact that we manufactured over 8,000 brooms more during the year 1906-07 than we did during the year 1905-06. This condition of affairs must be very gratifying to your honorable body, also to the Governor of the State, as well as to the friends and patrons of the Institution. It is particularly gratifying to myself, as it goes to show that an institution for the blind, carefully administered, can do much to alleviate the sufferings of those who, through misfortune, are forced to depend upon the fostering care of a paternal State government. It further goes to prove that the old theory, which would relegate the blind mechanic to a condition of helpless dependence, is erroneous, as it conclusively shows that the blind artisan can be lifted from a condition of helpless inactivity into a realm of useful and profitable activity.

The cost per capita for the year 1906-07 was 23 cents per day, which is 3 cents per day greater than for the year 1905-06. This I regret, but at the same time we are fortunate that it was not greater, considering the increased cost of provisions, etc. I trust that with great care, and the practice of the most rigid economy, we will be able to keep within our appropriation for the next two fiscal years. This administration never has had a deficit, and I trust that it never will have one.

This report proves most conclusively that the last administration was in error when they made the statement, after closing the shops, "They never would again be opened, and run successfully, because they had tried and failed."

It is true that I am handicapped by reason of the increasing age and feebleness of many of our most skilled mechanics, who entered the Institution many years ago; and also by the incapacity of the refugees, whom I was forced to admit after the San Francisco disaster, and who are all well advanced in years, and for that reason it is utterly impossible to make them skilled workmen. We have also with us a class of old and feeble blind men and women, who should not be employed, as they are a detriment, and lower the percentage of profits, which should go to swell our Adult Blind Fund. I consider, however, that, in their case, the question of profits should not be considered. I keep them employed, which causes them to believe that they are adding to the usefulness and success of the Home, which thought makes them cheerful and happy, and brightens their lives, which at best is dark and dreary. And as it carries out the purpose of the Organic Act, I am satisfied with the results. I trust that when the new dormitory is built, we will be in a position to admit the younger blind, which will, I have no doubt, add to the capacity of the shops, and give us the material to replace the old and feeble blind mechanic, when finally he is forced to cease from his labors and take his well-earned rest.

The inmates, with few exceptions, have tried their best to make the shops a success, and their conduct has done much to maintain the high standard of the Institution. The result of their efforts is shown in this report.

Thanks to the efforts of the Board of Directors, and to the generosity of the Hon. George C. Pardee, we now have a first-class broom shop, which cost $25,000, and which is not only an ornament to these grounds and a credit to the State, but will add to the comfort of the blind mechanic who heretofore was compelled to work in a firetrap of a structure, which was hot in summer and cold and damp in winter. A warm, comfortable shop, heated with steam, will add to their happiness and assure them steady employment throughout the year.

I trust that before the year comes to a close I will be in a position to report the completion of our new dormitory, thanks to the unselfish thought of our Governor, the Hon. J. N. Gillett, to whom we owe a debt of gratitude, for allowing us $50,000 to construct the same.

I can not find words too strong to express my appreciation of the faithful and efficient services of our Physician, Dr. H. N. Rowell, and I also wish to thank him for the very able manner in which he performs his duties, and for his affable and courteous bearing toward all, and also for his willingness to answer all demands made upon his time, either day or night.

In conclusion, I desire to thank deeply your honorable body for the honor conferred upon me and for the good will and assistance you have rendered in the execution of my charge and its duties. It has been, and shall be, my continual endeavor to carry out faithfully the responsibilities devolving upon me and to execute the worthy aims of yourselves.

Respectfully submitted.

JOSEPH SANDERS, Superintendent.

TWENTY-THIRD ANNUAL REPORT

OF THE

INDUSTRIAL HOME OF MECHANICAL TRADES FOR THE ADULT BLIND

OF THE

STATE OF CALIFORNIA

1907-8

SACRAMENTO:
W. W. SHANNON, : : : : : SUPERINTENDENT STATE PRINTING.
1908.

BOARD OF DIRECTORS.

JOHN P. IRISH, *President,*	Oakland
GEORGE E. RANDOLPH, *Vice-President,*	Oakland
SOL. KAHN,	Oakland
H. C. CAPWELL,	Oakland
J. W. SCOTT,	Oakland

OFFICERS OF THE HOME.

JOSEPH SANDERS,	Superintendent
H. N. ROWELL,	Physician
GEORGE S. MEREDITH,	Secretary

INDUSTRIAL HOME FOR THE ADULT BLIND.

SUPERINTENDENT'S ANNUAL REPORT FOR THE YEAR ENDING JUNE 30, 1908.

OAKLAND, CAL., June 30, 1908.

To the Honorable Board of Directors of the Industrial Home for the Adult Blind.

GENTLEMEN: In accordance with the provision of Section 4, subdivision eleventh, of the Act governing the Home, I herewith submit to you my report of the affairs and conditions of the Home for the year ending June 30, 1908.

The year just ending is the twenty-third of the Home's existence, and the ninth in which it has been under the control and management of your present Superintendent since his reinstatement by your body in 1899.

Annexed hereto are presented the several statistical tables of the affairs of the Home required to be set forth in this report.

Officers of the Home.

Superintendent	Joseph Sanders	$2,100 00
Secretary	Geo. S. Meredith	600 00
Physician	H. N. Rowell, M. D.	1,200 00

Employees of the Home, and Their Rate of Compensation per Month.

Clerk of the Home	T. A. Williston	$70 00
Matron	Mrs. A. Sanders	35 00
Assistant Matron	Miss O. B. Smith	30 00
In Charge of Women	Mrs. C. B. Goodrich	30 00
Watchman	W. B. Cook	40 00
First Cook	S. Vallera	60 00
Second Cook	P. Pietro	35 00
Janitor and Nurse	A. H. Wulzen	33 00
Janitor	Chas. Olsen	25 00
Waitress	Mrs. M. Jarrett	22 50
Waitress	Miss Williamson	22 50
Waitress	Mrs. A. Rogers	22 50
Waitress	Miss Bonneau	22 50
Laborer	A. H. Heywood	25 00
Laborer	Thos. Wright	25 00
Driver of Wagon	Wm. Applegreen	25 00
Reader	W. Pillsbury	7 50
Total		$530 50
Gardener	W. Gustafson, when employed, per day	3 00

Inmates Employed by the Month.

		Salary.
Shop Assistant	D. Weider	$35 00
Shop Assistant	W. Plowman	27 50
Laborer	W. H. Hummerston	5 00
Dishwasher	Miss Carroll	5 00
Total		$72 50

Employees of the Shop, and Their Rate of Compensation per Month.

		Per Month.
Shop Assistant	Ed. Timmell	$25 00
Shop Assistant	L. W. Kallen	25 00
Teacher in Girls' Shop	Miss Weaver	22 50
Total		$72 50

Names of Inmates Present During the Year ending June 30, 1908.

	Name.	Date of Admission.	Age when Admitted.	Native of.
1.	D. Aherns	June 15, 1890	68	Germany
2.	Maggie Aitkens	Oct. 1, 1887	28	Michigan
3.	Geo. Allman	Aug. 25, 1902	52	Massachusetts
4.	S. Brown	Aug. 17, 1901	42	Connecticut
5.	P. M. Behan	Mar. 23, 1898	34	Ireland
6.	J. E. Buskirk	May 6, 1905	44	Indiana
7.	J. Barrett	Jan. 20, 1905	25	Ireland
8.	Thomas Carr	June 9, 1905	50	Ireland
9.	A. Bellisle	Jan. 2, 1888	42	Canada
10.	Miss Brissell	Mar. 30, 1888	38	New York
11.	Luke Andrews*	May 25, 1895	37	California
12.	E. N. Beckwith†	Sept. 2, 1903	49	Pennsylvania
13.	J. L. Chamblin‡	Nov. 25, 1899	73	Kentucky
14.	Isabel Cinega	Feb. 9, 1890	29	California
15.	Margaret Clifford	Oct. 25, 1898	25	California
16.	J. Coffey	Dec. 1, 1890	20	California
17.	E. Coleman	Aug. 13, 1907	37	Wisconsin
18.	Amelia Coffey	Dec. 4, 1907	20	California
19.	Kate Carroll	Jan. 4, 1901	47	Ireland
20.	J. Didier	April 17, 1898	38	Illinois
21.	E. DeWitt	Oct. 22, 1907	32	Colorado
22.	G. Dudley*	Nov. 30, 1885	33	California
23.	O. Darnell	Dec. 17, 1902	20	Oregon
24.	A. Derrick*	June 24, 1907	24	Arizona
25.	Viola Doudell	Mar. 16, 1903	37	Virginia
26.	B. Fales	Sept. 20, 1893	50	Michigan
27.	Sarah Fryberg	Jan. 25, 1904	27	Germany
28.	W. Flannigan	Dec. 9, 1896	35	New York
29.	Alice E. Fields	Jan. 12, 1895	25	Maine
30.	T. George	Aug. 1, 1907	37	Michigan
31.	S. D. Grant	April 4, 1906	19	California
32.	W. E. Gill*	April 13, 1901	28	Missouri
33.	Frank Gonzels	July 14, 1906	18	California
34.	Manuel Gomez*	Dec. 6, 1906	32	Cape Verde Islands
35.	J. Giblin	May 22, 1907	52	California
36.	T. C. Graney	Nov. 14, 1904	20	California
37.	J. H. Gafferney	Jan. 9, 1886	32	California
38.	F. W. Hummerston	Sept. 7, 1907	63	England
39.	Lizzie Hannah	Sept. 7, 1887	41	England
40.	P. Hoban	Sept. 25, 1893	44	Ireland
41.	H. Hodges	May 23, 1896	49	England
42.	B. Holmes*	April 25, 1894	32	Illinois
43.	Pauline Howe	Feb. 2, 1889	29	California
44.	C. A. Ingalls	May 22, 1907	20	California
45.	C. E. Juckett*	Dec. 14, 1904	25	Iowa
46.	Wm. Johnston	Feb. 16, 1899	49	North Carolina
47.	J. W. Judson	Nov. 10, 1890	22	Tennessee
48.	F. King	June 13, 1890	17	Massachusetts
49.	D. Kraskey	June 16, 1890	18	Minnesota
50.	M. Kouper	Sept. 16, 1900	38	Germany
51.	H. Lutz	Jan. 24, 1902	46	Germany
52.	A. La Mott	Dec. 23, 1895	53	New York
53.	J. Lipp*	Jan. 7, 1895	20	California
54.	Eliza O. Logan	Oct. 7, 1891	22	California
55.	E. Lundbeck	Feb. 18, 1898	37	Sweden
56.	J. McDonald	July 12, 1905	37	Ireland
57.	Ellen P. Morgan	May 1, 1906	29	Utah

Names of Inmates Present during the Year Ending June 30, 1908—*Continued.*

Name.	Date of Admission.	Age when Admitted	Native of.
58. Clara Long*	May 1, 1906	41	Illinois
59. C. Martin	Sept. 3, 1903	44	Norway
60. Rose McComb*	April 24, 1902	37	Utah
61. C. S. Morgan	Dec. 5, 1904	41	California
62. A. McGuinness†	Aug. 9, 1895	51	England
63. M. Marmalejo	Mar. 9, 1899	24	California
64. Emma Mast*	Sept. 22, 1887	21	California
65. W. E. Mast*	June 16, 1891	21	California
66. Eliza J. Matlock	Dec. 16, 1899	35	Virginia
67. L. Moulzen	Dec. 3, 1894	49	Germany
68. J. Moore	Aug. 27, 1885	29	California
69. Dorinda Mullaney	Nov. 11, 1889	27	New York
70. B. Nelson‡	May 12, 1888	48	New York
71. J. Nolan	May 18, 1902	48	Ireland
72. N. P. Neilson	July 28, 1903	31	Sweden
73. J. I. Nall	Nov. 5, 1903	21	Illinois
74. J. Pasco	Dec. 29, 1905	48	England
75. J. Paulsen	Aug. 22, 1904	45	Sweden
76. Claudie Piggott	Jan. 30, 1908	54	California
77. W. T. Rose*	July 9, 1904	40	California
78. L. Orth	Sept. 2, 1895	37	California
79. B. Oakland	April 15, 1903	55	Sweden
80. Eliza Parker	April 30, 1893	46	California
81. W. Plowman	June 1, 1899	46	Kansas
82. T. Powers	Oct. 10, 1885	40	Ireland
83. G. H. Rushton	Oct. 3, 1906	32	Michigan
84. W. A. Renneck	Mar. 30, 1907	29	California
85. G. Richville	April 27, 1896	19	Mississippi
86. J. Riley	June 10, 1890	47	Ireland
87. A. D. Stagg	June 24, 1907	47	Illinois
88. F. M. Smith	June 3, 1905	55	Illinois
89. J. H. Sheenen	Mar. 6, 1906	50	Ireland
90. H. Salmon	April 21, 1890	21	California
91. J. Sexton	Aug. 27, 1885	42	Ireland
92. W. Shakeley	Aug. 29, 1893	44	Pennsylvania
93. Mary Slattery	Aug. 27, 1892	48	Ireland
94. W. Staggs	Nov. 1, 1888	23	California
95. R. Sublett	May 12, 1887	35	California
96. V. Swortellis	Dec. 27, 1887	51	Russia
97. Bessie Sherman‡	April 29, 1904	31	New Jersey
98. W. Turner	Feb. 20, 1907	27	California
99. Lulu Trimble	May 28, 1908	40	Kentucky
100. D. Thussman	Mar. 30, 1907	49	California
101. J. M. Thompson	May 25, 1900	48	Tennessee
102. E. B. Taylor	June 9, 1892	45	Maine
103. P. Tipps†	Oct. 11, 1894	48	Holland
104. Goda T. Wells	Aug. 15, 1906	49	California
105. F. Weiland	Oct. 19, 1905	63	Germany
106. J. Wickers	Feb. 9, 1901	54	Germany
107. H. Ward	June 29, 1895	54	Illinois
108. Viola Whipple	Sept. 11, 1895	22	Minnesota
109. D. Weider	Nov. 1, 1901	36	Iowa
110. H. H. Wisner	Aug. 22, 1904	45	Kansas

*Inmates on leave of absence, 13. †Left the Home during the year, 3. ‡Died during the year, 3. Inmates admitted during the year, 7. Inmates on the roll June 30, 1907, 107. Total on the roll June 30, 1908, 108. Refugees from the San Francisco calamity (not admitted), 8. Total on the roll, 116.

Inventory of Raw Material on Hand June 30, 1908.

Eastern broomcorn, 28 tons, at $150 per ton	$4,200 00
California broomcorn, 22 tons, at $90 per ton	1,980 00
Rattan, 720 pounds, at 5½ cents per pound	39 60
Broom bands, 20,400, at $13 per 1,000	265 20
Broom dye, 12 pounds, at $1 per pound	12 00
Broom twine, orange, 440 pounds, at 37 cents per pound	162 80
Broom twine, green, 415 pounds, at 35 cents per pound	145 25
Broom twine, pink, 180 pounds, at 49½ cents per pound	89 10
Broom twine, B. C. No. 36, 108 pounds, at 20 cents per pound	21 60
Broom twine, B. C. No. 18, 190 pounds, at 22½ cents per pound	42 75
Broom twine, red, 265 pounds, at 35 cents per pound	92 75
Broom nails, 300 pounds, at 5 cents per pound	15 00
Broom velvet, 200 yards, at 25 cents per yard	50 00
Broom staples, 40 pounds, at 10 cents per pound	4 00
Tacks, 1 dozen packages, at 35 cents per package	35
Broom locks, 528 gross, at 35 cents per gross	184 80
Toy broom handles, 2,500, at $15 per 1,000	37 50
Whisk rods, 1,000, at $15 per 1,000	15 00
Dextrine, 24 pounds, at 12 cents per pound	2 88
Gum arabic, 6 pounds, at 45 cents per pound	2 70
Broom wire, No. 19, 800 pounds, at 6 cents per pound	48 00
Broom wire, No. 20, 2,000 pounds, at 6 cents per pound	120 00
Broom wire, No. 22, 600 pounds, at 6 cents per pound	36 00
Broom wire, galvanized, No. 18, 800 pounds, at 6 cents per pound	48 00
Broom handles, maple parlor, 20,000, at $28 per 1,000	560 00
Broom handles, maple warehouse, 1,200, at $30 per 1,000	36 00
Broom handles, polished maple, 900, at $50 per 1,000	45 00
Broom handles, maple misses, 1,000, at $30	30 00
Whisk caps, plush, 100 gross, at 20 cents per gross	20 00
Chair cane, 105,000 feet, at 50 cents per 1,000 feet	52 50
Coir, 1 bale, at $15 per bale	15 00
Ticking, 175 yards, at 17 cents per yard	30 63
Burlap, 50 yards, at 7½ cents per yard	3 75
Total	$8,408 16

Inventory of Manufactured Stock on Hand June 30, 1908.

Brooms, 252 11-12 dozen, at $2 per dozen	$505 90
Whisks, 118 7-12 dozen, at 90 cents per dozen	106 73
Toy hammock, 3 dozen, at $4.50 per dozen	13 50
Small hammocks, 2, at $2 each	4 00
Large hammocks, fringe, 2, at $3.50 each	7 00
Large hammocks, plain, 2, at $3 each	6 00
Mops, 6 dozen, at $7	42 00
Total	$685 13

Brooms Manufactured, Sold, and Delivered.

Brooms on hand July 1, 1907	610
Brooms manufactured July 1, 1907, to June 30, 1908	80,463
Total	81,073
Brooms sold and delivered during the year ending June 30, 1908	78,038
Brooms on hand June 30, 1908	3,035
Whisks on hand July 1, 1907	144
Whisks manufactured July 1, 1907, to June 30, 1908	17,074
Total	17,218
Whisks sold and delivered during the year ending June 30, 1908	15,805
Whisks on hand June 30, 1908	1,413

Manufacturing Statement for the Year ending June 30, 1908.

Brooms manufactured	80,463
Whisks manufactured	17,074
Chairs re-seated	1,892
Mattresses manufactured	153
Pillows manufactured	165
Broom bags manufactured	2,734
Hammocks manufactured	7

Summary of Expenditures for the Year ending June 30, 1908.

Month.	Provisions.	Furniture.	Wages.	Wages of Inmates.	Drugs.	Build'g and Improvements.	Washing.	Raw Material.	Miscellaneous.
1907.									
July	$966 55	$232 00	$935 95	$536 90	$39 05	$392 98	....	$797 99	$74 20
Aug.	1,044 92	54 77	932 58	563 00	29 65	728 75	$120 45	285 63	195 70
Sept.	761 05	18 40	938 40	349 45	24 50	74 05	57 70	1,436 59	557 55
Oct.	1,014 81	55 00	925 98	583 50	21 80	101 32	77 50	2,668 29	145 22
Nov.	1,140 36	36 01	942 10	519 15	38 00	638 78	165 00	3,480 13	121 96
Dec.	1,024 76	43 71	939 55	417 23	31 00	24 50	165 00	2,497 83	92 40
1908.									
Jan.	948 29	24 10	916 15	562 05	25 95	73 33	165 00	1,759 41	37 33
Feb.	1,056 87	24 80	921 00	401 75	27 35	1,026 90	167 05	1,649 74	52 86
Mar.	1,018 74	6 05	921 00	452 85	26 35	70 75	165 00	407 52	137 96
April	915 58	78 20	946 00	428 23	25 60	88 83	165 00	1,756 67	82 37
May	952 14	22 25	921 00	410 90	34 30	41 55	166 05	115 58	26 90
June	982 36	73 65	1,016 10	331 65	16 35	52 60	165 00	203 39	81 78
Totals	11,826 43	668 94	11,255 81	5,556 66	339 90	3,314 34	1,578 75	17,058 77	1,606 23

Receipts and Collections for the Year ending June 30, 1908.

1907—July	$1,928 30
August	2,097 04
September	1,568 78
October	1,359 16
November	2,065 04
December	1,875 51
1908—January	3,421 59
February	2,039 64
March	2,047 22
April	1,487 03
May	1,300 49
June	1,582 41
Total	$22,772 21

Expenditure for the Year ending June 30, 1908.

1907—July	$3,975 62
August	3,955 45
September	4,417 69
October	5,593 42
November	7,081 49
December	5,235 98
1908—January	4,511 61
February	5,328 32
March	3,206 22
April	4,486 48
May	2,690 67
June	2,922 88
Total	$53,405 83

The current expense for the year, after deducting the following items:

Furniture	$668 94
Buildings and improvements	3,314 34
Raw material	17,058 77
Wages of inmates	5,556 66

amounts to $26,807.12. The average number of persons residing at the Home during the year was 133. The yearly cost per capita was, therefore, $201.55; the weekly cost, $3.88. The cost of provisions alone was $11,826.43. The cost per capita for provisions was, therefore, $88.92 per year; cost per week, $1.71; cost per day, 25 cents.

Value of Stock, Raw Material, etc., on Hand June 30, 1908.

Raw material	$8,410 66
Value of stock	685 13
Bills receivable	2,162 70
Amount in Adult Blind Fund	3,667 11
Total	$14,925 60

The above sum of $14,925.60 represents the assets of the shops on June 30, 1908, which is a decrease of $1,463.99 since the 30th of June, 1907. This decrease is caused by the great depression in all lines of business; and also by reason of the fact that I was forced to draw from the Adult Blind Fund sufficient money to build a galvanized iron warehouse, and also to draw from that fund nearly $500 to rebuild our tank house, which was destroyed by fire on the night of July 31, 1907. The fire which destroyed our tank house also burned about five tons of broomcorn, valued at about $450. The great increase in the cost of supplies during the year also forced me to draw from that fund, the regular Support Fund not being large enough to meet the demands made upon it.

The cost per capita for the year 1907-8 was 25 cents per day, which is 2 cents per day greater than the cost for 1906-7. Although the amount is small, I regret that it should be so; however, as I have stated above, the increased cost of supplies during the past year accounts for it. With the greatest economy I trust to be able to keep within the limits of our appropriation. If I can not do so I shall draw against our Adult Blind Fund, as I have done during the present year. This will prevent a deficiency, something that I have never had since the institution has been under my management.

The contract for the new dormitory building will be let on July 14th. When completed, the building will be a great addition to the institution, as it will largely increase the usefulness of the Home, by extending its benefits to many deserving blind men and women who are now on the outside, and who are entitled, under the Act, to enjoy its privileges. Those on the inside look forward with a great deal of pleasure to the completion of the building, as it will, with all its modern improvements, add greatly to their comfort. The blind who are forced to remain on the outside, many depending upon cold charity for their support, also look forward to the completion of our new building, as it means to them the restoration of manhood and womanhood, which honest labor in this institution will restore to them. Their gratitude and happiness must in a measure repay your honorable body for the sacrifice you have made in their interest. The blind can not individually thank you for your unselfish efforts. I, however, take this opportunity of doing it for them.

We have on file a large number of applications from aged and infirm blind people, and the problem that confronts your honorable body is how to provide for them. The appeals from their friends and relatives, who are unable to provide for them, and also the personal appeals from those who have no friends, are constantly being presented to me; but under present conditions I am powerless to alleviate their sufferings or to hold out any hopeful promise for the future. Only one way presents itself to my mind, whereby these deserving blind people can be provided for; and that is, for this board to appeal to the Legislature at its next session for an appropriation to erect a building especially for this class. The additional cost of maintaining this auxiliary to the Home would be but slight, as the same set of officials could govern both I was in hopes that the San Francisco Relief Committee would have done something for this Institution out of their large surplus which would in a slight degree repay us for the cost of maintaining the blind refugees from the San Francisco disaster. Many of these are still with us, but so far the Relief Committee has evinced no inclination to do anything for them, permitting the burden of their support to rest upon the taxpayers of the State.

The blind of the State of California owe a deep debt of gratitude to our Governor, the Hon. J. N. Gillett, and to the Legislature that appropriated the money with which to erect our new dormitory building, which I trust will be dedicated within the next few months, and which will stand as a monument to their generosity and as a witness to the interest that the State of California takes in her blind citizens, who among the defective class, are the most worthy of consideration. In connection with this subject, I would mention that while attending the convention of the blind in Boston last August I was gratified to hear some of the ablest blind leaders declare from the rostrum "that California had done more for the blind than any other state," and that her institution "was the foremost of its kind in the world." The New York Commission speaks of our institution "as the best conducted of its kind in the world."

Although we did not manufacture as many brooms this year as we manufactured during 1906-7, yet we have prospered, and I believe that this report proves most conclusively that the last administration was in error when they made the statement, after closing the shops, "they never would again be opened and run successfully, because they had tried and failed."

As the years roll on we become more and more handicapped by reason of the increasing age and feebleness of many of our most skilled mechanics, who entered the institution many years ago, and also by the incapacity of the refugees, whom I was forced to admit after the San Francisco disaster, and who are all well advanced in years, and for that reason it is utterly impossible to make them skilled workmen. We have also with us an ever increasing class of old and feeble blind men and women who should not be employed, as they are a detriment and lower the percentage of profits which should go to swell the Adult Blind Fund. I consider, however, that in their case the question of profit should not be considered. I keep them employed, which causes them to believe that they are adding to the usefulness and success of the Home, which thought makes them cheerful and happy and brightens their lives, which at best is dark and dreary. And as it carries out the purpose of the Organic Act, I am satisfied with the results.

REPORT OF THE NEW YORK COMMISSION.

The following extract from the "Report of the New York State Commission to Investigate the Condition of the Blind" may prove of interest to your honorable body, therefore I quote it in full:

> What your Commission believes to be one of the most successful homes for blind men and women in the United States is the Industrial Home of Mechanical Trades for the Adult Blind, situated at Oakland, Cal. This institution was established in March, 1885, by the State of California, which appropriated $65,000 for the establishment at its outset. It combines the features of a home, a workshop, and a training shop. There are at the present time 112 inmates in the Home, about ninety of whom are men and the remainder women. The principal industries pursued by the men are the manufacture of brooms, mattresses, and the cane seating of chairs, and by the women, machine sewing and fancy work. Some of the women are paid by the piece, others by the week, and still others by the month. The minimum annual wage earned by any workman last year was $108; the maximum, $420. The Home finds ready sale for all articles manufactured, being unable to supply the demand. All sales are made in competition with private firms. Mr. Sanders, the superintendent, believes broom making to be the best trade for the blind of moderate mental endowments. His experience has been that factories will not employ blind men on account of their blindness. He, therefore, thinks that the best way of helping the adult blind to help themselves is by teaching them trades and by furnishing them with work. He believes the question of housing of blind workers when learning their trades as well as after they have learned them depends upon their environments. Mr. Sanders states that his institution is not self-supporting, but that it costs the State $25,000 per year to maintain it. Training shops have not been self-supporting, and he believes it utterly impossible.
>
> He believes in the large institution for the adult blind because it can be run cheaper. The larger the institution the smaller the per capita rate. Four seeing people are employed in the shop, and six in the home.
>
> It is very evident that this institution has the confidence of the people of the State of California generally, as among the recommendations of the State Board of Charities for the current year is an increase in the appropriation for this institution, in order to extend its benefits to a larger number of people. The Legislature has responded to this recommendation and to the demand of the charitable people of the State by the appropriation of $50,000 for the current year, instead of the usual $25,000. Your Commissioners are of the opinion that the efficient work done in this institution is due in very large measure to the wise management of the superintendent, Mr. Joseph Sanders.

The inmates, with few exceptions, have tried their best to make the shops a success, and their conduct has done much to maintain the high standard of the institution. The result of their efforts is shown in this report.

I can not find words too strong to express my appreciation of the faithful and efficient services of our physician, Dr. H. N. Rowell, and I also wish to thank him for the very able manner in which he performs his duties and for his affable and courteous bearing toward all, and also for his willingness to answer all demands made upon his time, either day or night.

I extend my thanks to the officers of the institution for their faithful and untiring devotion to their duties.

In conclusion, I desire to thank deeply your honorable body for the honor conferred upon me and for the good will and assistance you have rendered in the execution of my charge and its duties. It has been, and shall be, my continual endeavor to carry out faithfully the responsibilities devolving upon me and to execute the worthy aims of yourselves.

Respectfully submitted.

JOSEPH SANDERS,
Superintendent.

REPORT.

To Hon. James N. Gillett, *Governor of California.*

Sir: The Board of Directors of the Industrial Home of Mechanical Trades for the Adult Blind, begs to submit its twenty-third annual report. The statistics and finances of the institution for the fiscal year ending June 30, 1908, will be found in the official report of the Superintendent, submitted herewith as an appendix.

The institution has been long insufficiently provided with buildings. The old shop was used until part of it fell down, and there has been no safe storage for broom corn and other material used in manufacturing operations.

Now, however, the appropriation for a new shop has been used in the erection of a modern shop, fitted with such conveniences as greatly economize manufacturing, and a safe warehouse of corrugated iron has been built for the secure storage of stock.

At the last session of the Legislature the sum of $50,000 was appropriated for the construction of a building for dormitory, refectory, and office purposes, and the same is now under construction upon modern plans drawn by the State's Architect. The favorable conditions in the building trades enable the construction within the appropriation of a much better and more commodious building than would have otherwise been possible. The structure is of reinforced concrete, fireproof, with tile roof and every improvement that modern experience has demonstrated to be necessary in such a building.

The completion of this structure releases the old central building for occupancy as a men's dormitory, and will thereby permit the admission of a large number of blind applicants who have been long on the waiting list.

This old central building was originally erected as a private residence, nearly thirty years ago, and has very much deteriorated. It is hoped that it and the two frame dormitories will soon be replaced by permanent structures, equal in architecture and modern features to the building now under construction. When this is done the institution in the fitness of its accommodations to its noble purpose, will take rank with the other eleemosynary institutions of the State.

It is a pleasure to know that the Blind Home is regarded abroad as the most creditable of its kind in the world, judged by its success and the good it confers upon its helpless beneficiaries. Official commissioners of other states, in the South, Middle West and East, appointed to consider plans for the betterment of the condition of the adult blind, have invariably found in this Home for the blind a model to be followed. In the appendix will be found the flattering statement of such a commission in the State of New York. That commission after a world-wide examination reported the California Home as a model institution.

It is surely gratifying to the pride of a Californian that we have developed such an institution in the interest of the saddest and most forlorn of all the defective classes. Yet when strangers have visited it they have marveled at the humble quarters in which it has been housed, and have wondered that the State has not provided it with an equipment equal to its well earned reputation.

In another respect it is felt to be the duty of the Directors to call the attention of the Legislature to another matter of inequality in the policy of the State toward this institution. The wardens of our State prisons are paid $3.000 per year salary each, as are the superintendents of the State asylums for the insane. The secretary of the State Commission of Lunacy is paid $2,400. The clerk of the Berkeley School for the Deaf, Dumb and Blind is paid $1,800. The Superintendent of the School for the Feeble-Minded is paid $3,000. The Superintendent of the Yountville Soldiers' Home is paid $2,400. The Superintendent of the Blind Home is paid only $2,100. We, therefore, respectfully recommend that his salary be advanced to $3,000. We think that the State owes this to an officer who has so faithfully administered his great trust as to enhance the State's reputation abroad, and has put California in the first place wherever in the civilized world benevolent governments and good men and women are seeking light and ways and means for improving the condition and increasing the happiness of the adult blind.

As the increase in dormitory facilities, and therefore in the number of inmates, will increase the cost of supporting the institution, it is absolutely necessary that the Legislature increase the appropriation for support. Every person who loses sight in adult age must first be taught to walk alone. For this purpose the cement walk in the grounds of the Home is a necessity. This pavement was laid many years ago as a feature of private grounds. It is cracked, broken, unsightly and now unfitted for the use of the blind. It should be relaid in cement or covered with well applied bitumen, and the Legislature should appropriate a sum for that purpose.

The grounds of the institution face Thirty-sixth street on its north line for 600 feet. The property owners on that street desire that it be sidewalked from Grove street to Telegraph avenue. This improvement is prevented by the fact that the State can not be compelled by the city of Oakland to so improve its property. As a matter of proper policy the State should not stand in the way of this improvement to the city as well as to its own property. An appropriation should be made for that purpose.

The Directors, in behalf of the blind beneficiaries of this institution, gratefully acknowledged the interest in them shown by the State government, and especially do they thank you, Sir, for your many acts of intelligent personal and official friendship.

RECAPITULATION.

Imperative Appropriations.

Support	$40,000 00
Salaries	26,000 00
Printing	400 00
Furnishing new building	3,000 00
Grading and lawns	1,000 00
Pumping plant	2,400 00
Cement walks in grounds	2,265 00
	$75,065 00

Desirable Appropriations.

Sidewalk, Thirty-sixth street	$890 00
Iron fence and base	1,600 00
	$2,490 00

JOHN P. IRISH,
President of the Board of Directors.

Subscribed in my presence and sworn to before me, this 28th day of October, 1908.

[SEAL.]

GEO. H. PROBASCO,
Notary Public.

TWENTY-FOURTH ANNUAL REPORT

OF THE

INDUSTRIAL HOME OF MECHANICAL TRADES FOR THE ADULT BLIND

OF THE

STATE OF CALIFORNIA

1908-9

SACRAMENTO:
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING
1909.

BOARD OF DIRECTORS.

JOHN P. IRISH, *President*	Oakland
GEORGE E. RANDOLPH, *Vice-President*	Oakland
SOL. KAHN	Oakland
H. C. CAPWELL	Oakland
J. W. SCOTT	Oakland

OFFICERS OF THE HOME.

JOSEPH SANDERS	Superintendent
H. N. ROWELL	Physician
GEORGE S. MEREDITH	Secretary

INDUSTRIAL HOME FOR THE ADULT BLIND.

SUPERINTENDENT'S ANNUAL REPORT FOR THE YEAR ENDING JUNE 30, 1909.

OAKLAND, CAL., June 30, 1909.

To the Honorable the Board of Directors of the Industrial Home for the Adult Blind.

GENTLEMEN: In accordance with the provision of Section 4, Subdivision 11, of the act governing the Home, I herewith submit to you my report of the affairs and conditions of the Home for the year ending June 30, 1909.

The year just ending is the twenty-fourth of the Home's existence, and the tenth in which it has been under the control and management of your present Superintendent since his reinstatement by your honorable body in 1899.

Annexed hereto are presented the several statistical tables of the affairs of the Home required to be set forth in this report.

Officers of the Home.

Superintendent	Joseph Sanders	Salary	$2,100 00
Secretary	Geo. S. Meredith	Salary	600 00
Physician	H. N. Rowell, M.D.	Salary	1,200 00

Employees of the Home and Their Rate of Compensation per Month.

Clerk of the Home	T. A. Williston	$70 00
Matron	Mrs. A. Sanders	35 00
Assistant Matron	Miss O. B. Smith	30 00
In Charge of Women	Mrs. C. B. Goodrich	30 00
Watchman	H. Ward	40 00
First Cook	S. Valeria	60 00
Second Cook	T. Valeria	35 00
Janitor and Nurse	A. H Wulzen	33 00
Janitor	O. Sarland	25 00
Waitress	Mrs Jarrett	22 50
Waitress	Miss Williamson	22 50
Waitress	Miss Gilbert	22 50
Waitress	Miss Moore	22 50
Laborer	A. H. Haywood	25 00
Carpenter	T. Wright	25 00
Driver of Broom Wagon	R. Lang	25 00
Reader	W. Pillsbury	7 50
Total		$530 50
Gardener	W. Gustafson, when employed, per day	3 00

Inmates Employed by the Month.

Shop Assistant	D. Weider	$35 00
Shop Assistant	W. Plowman	27 50
Laborer	W. H. Hummerston	5 00
Dishwasher	Miss Carroll	5 00
Total		$72 50

Employees of the Shop, and their Rate of Compensation per Month.

Shop Assistant	E. Timmell	$25 00
Shop Assistant	J. Bell	25 00
Teacher in Girls' Shop	Miss Showers	22 50
Total		$72 50

Names of Inmates Present during the Year ending June 30, 1909.

Names.	Date of Admission.	Age when Admitted	Native of—
1. D. Aherns	June 15, 1890	68	Germany
2. Maggie Aitkens	Oct. 1, 1887	28	Michigan
3. Geo. Allman	Aug. 25, 1902	52	Massachusetts
4. J. S. Butterworth	Nov. 6, 1908	62	New Jersey
5. Michael Bryan	April 6, 1909	42	Ireland
6. T. J. Beebe	May 20, 1909	72	Indiana
7. Urisino Bautisti	May 30, 1909	44	Mexico
8. S. Brown	Aug. 17, 1901	42	Connecticut
9. P. M. Behan	Mar. 23, 1898	34	Ireland
10. J. E. Buskirk	May 6, 1905	44	Indiana
11. A. Barrett	Jan. 20, 1905	25	Ireland
12. Thomas Carr	June 9, 1905	50	Ireland
13. A. Bellisle	Jan. 2, 1888	42	Canada
14. Miss Brissell	Mar. 30, 1888	38	New York
15. Luke Andrews*	May 25, 1895	37	California
16. W. Brooks	Feb. 1, 1909	31	California
17. Isabel Cinega	Feb. 9, 1890	29	California
18. Margaret Clifford	Oct. 25, 1898	25	California
19. J. Coffey	Dec. 1, 1890	20	California
20. E. Coleman	Aug. 13, 1907	37	Wisconsin
21. Amelia Coffey	Dec. 4, 1907	20	California
22. Kate Carroll	Jan. 4, 1901	47	Ireland
23. Leon Dominic	Nov. 10, 1908	58	Colombia, S. A.
24. C. Dean	Nov. 10, 1908	40	New Westminster
25. F. Dodge	Feb. 23, 1909	29	California
26. J. Didier	April 17, 1898	38	Illinois
27. E. DeWitt	Oct. 22, 1907	32	Colorado
28. G. Dudley *	Nov. 30, 1885	33	California
29. Oscar Darnell	Dec. 17, 1902	20	Oregon
30. A. Derrick*	June 24, 1907	24	Arizona
31. Viola Doudell	Mar. 16, 1903	37	Virginia
32. W. M. Frame	July 10, 1908	22	Kansas
33. Anna Fenity	Nov. 10, 1908	50	Connecticut
34. A. E. Florence	Nov. 10, 1908	79	Connecticut
35. B. Fales	Sept. 20, 1893	50	Michigan
36. Sarah Fryberg	Jan. 25, 1904	27	Germany
37. W. Flannigan	Dec. 9, 1896	35	New York
38. Alice E. Fields	Jan. 12, 1895	25	Maine
39. T. George	Aug. 1, 1907	37	Michigan
40. S. D. Grant	April 4, 1906	19	California
41. W. E. Gill*	April 13, 1901	28	Missouri
42. Frank Gonzels	July 14, 1906	18	California
43. M. Gomaz*	Dec. 6, 1906	32	Cape Verde Islands
44. J. Giblin	May 22, 1907	52	California
45. T. Graney	Nov. 14, 1904	20	California
46. J. H. Gafferney	Jan. 9, 1886	32	California
47. H. Hansen	Nov. 10, 1908	66	Denmark
48. V. Hackman‡	Nov. 10, 1908	54	Missouri
49. G. Hayes	April 13, 1909	49	Prince Edward Island
50. F. W. Hummerston	Sept. 7, 1907	63	England
51. Lizzie Hannah	Sept. 7, 1887	41	England
52. P. M. Hoban	Sept. 25, 1893	44	Ireland
53. H. Hodges	May 23, 1896	49	England
54. B. Holmes*	April 25, 1894	32	Illinois
55. Pauline Howe	Feb. 2, 1889	29	California
56. C. A. Ingalls*	May 1, 1907	20	California
57. J. S. Johnson‡	Nov. 10, 1908	80	Maryland
58. C. E. Juckett*	Dec. 14, 1904	25	Iowa
59. Wm. Johnston	Feb. 16, 1899	49	North Carolina
60. J. W. Judson	Nov. 10, 1890	22	Tennessee
61. F. King	June 13, 1890	17	Massachusetts
62. D. Kraskey	June 16, 1890	18	Minnesota
63. M. Kouper	Sept. 16, 1900	38	Germany
64. H. Lutz	Jan. 24, 1902	46	Germany
65. G. E. Morss	Nov. 24, 1908	27	California
66. P. McCann	Feb. 29, 1909	39	California

Names of Inmates present during the year ending June 30, 1909.—Continued.

Names.	Date of Admission.	Age when Admitted.	Native of—
67. A. LaMott‡	Dec. 23, 1895	53	New York
68. J. Lipp*	Jan. 7, 1895	20	California
69. Eliza O. Logan*	Oct. 7, 1891	22	California
70. E. Lundeck†	Feb. 18, 1898	37	Denmark
71. J. McDonald	July 12, 1905	37	Ireland
72. Ellen P. Morgan	May 1, 1906	29	Utah
73. Clara Long*	May 1, 1906	41	Illinois
74 C. Martin	Sept. 3, 1903	44	Norway
75. Rose McComb*	April 24, 1902	37	Utah
76. C. S. Morgan	Dec. 5, 1904	41	California
77. M. Marmalejo	Mar. 9, 1899	24	California
78. Emma Mast*	Sept. 22, 1887	21	California
79. W. Mast*	June 16, 1891	21	California
80. Eliza J. Matlock	Dec. 16, 1899	35	Virginia
81. L. Moulzen	Dec. 3, 1894	49	Germany
82. J. Moore	Nov. 11, 1889	29	California
83. Dorinda Mullaney	Nov. 11, 1889	27	New York
84. J. Nolan	May 18, 1902	48	Ireland
85. N. P. Neilson	July 28, 1903	31	Sweden
86. J. I. Nall	Nov. 5, 1903		Illinois
87. L. Orth	Sept. 2, 1895	37	California
88. B. Oakland	April 15, 1903	55	Sweden
89. J. Partridge	Sept. 22, 1908	65	England
90. J. Pasco	Dec. 29, 1905	48	England
91. J. Paulsen	Aug. 22, 1904	45	Sweden
92. Claudie Piggott	Jan. 30, 1908	54	California
93. W. T. Rose*	July 9, 1904	40	California
94. Eliza Parker	April 30, 1893	46	California
95. W. Plowman	June 1, 1899	46	Kansas
96. T. Powers	Oct. 10, 1885	40	Ireland
97. G. H. Rushton†	Oct. 3, 1906	32	Michigan
98. W. A. Renneck	Mar. 20, 1907	29	California
99. G. Richville	April 27, 1896	19	Mississippi
100. J. Riley	June 10, 1890	47	Ireland
101. J. B. Roach	Oct. 9, 1908	63	Massachusetts
102. P. E. Reed*	Sept. 14, 1908	19	Washington
103. A. D. Stagg†	June 24, 1907	47	Illinois
104. F. M. Smith	June 3, 1905	55	Illinois
105. J. H. Sheenen*	Mar. 6, 1906	50	Ireland
106. J. W. Searls	Nov. 10, 1908	58	Ohio
107. A. E. Svensen	Feb. 3, 1908	20	Chili
108. J. M. Strom	May 29, 1909	47	Sweden
109. H. Salmon	April 21, 1890	21	California
110. J. Sexton	Aug. 27, 1885	42	Ireland
111. W. Shakeley	Aug. 29, 1893	44	Pennsylvania
112. Mary Slattery	Aug. 27, 1892	48	Ireland
113 W. Staggs	Nov. 1, 1888	23	California
114. R. Sublett	May 12, 1887	35	California
115. V. Swortellis	Dec. 27, 1887	51	Russia
116. V. Svilicich	Sept. 15, 1908	47	Austria
117. D. Thussman	Mar. 30, 1907	49	California
118. J. M. Thompson	May 25, 1900	48	Tennessee
119. E. B. Taylor	June 9, 1892	45	Maine
120. A. Wirtz	Nov. 10, 1908	52	Germany
121. Goda T. Wells	Aug. 25, 1906	49	California
122. F. Weiland‡	Oct. 19, 1905	63	Germany
123. J. Wickers	Feb. 9, 1901	54	Germany
124. H. Ward*	June 29, 1895	54	Illinois
125. Viola Whipple	June 29, 1895	22	Minnesota
126. D. Weider	Nov. 1, 1901	36	Iowa
127. H. H. Wisner	Aug. 22, 1904	45	Kansas

*Inmates on leave of absence, 18. †Left the Home, 3. ‡Died during the year, 4. Inmates admitted during the year, 25. Inmates on the roll June 30, 1908, 108. Total inmates on the roll June 30, 1909, 126.

Inventory of Raw Material on Hand June 30, 1909.

Broomcorn, eastern, 20 tons, at $160 per ton	$3,200 00
Broomcorn, California, 29 tons, at $100 per ton	2,900 00
Broom handles, maple, 33,500, at $27 per 1,000	904 50
Broom handles, cedar, 18,030, at $23.50 per 1,000	423 70
Broom bands, 20,000, at $12 per 1,000	240 00
Sulphur, 500 pounds, at 3½ cents per pound	17 50
Broom wire, 2,000 pounds, at 5½ cents per pound	110 00
Bale rope, 300 pounds, at 10½ cents per pound	31 50
Broom locks, 100 gross, at 30 cents per gross	30 00
Nails, 200 pounds, at $4.25 per 100 pounds	8 50
Rattan, 650 pounds, at 5 cents per pound	32 50
Broom twine, 1,078 pounds, at 38 cents per pound	409 64
Broom twine, 135 pounds, at 20 cents per pound	27 00
Broom twine, 60 pounds, at 22 cents per pound	13 20
Whisk caps, 60 gross, at 20 cents per gross	12 00
Whisk rods, 200, at $1.10 per 100	2 20
Broom velvet, 150 yards, at 25 cents per yard	37 50
Burlap, 1,800 yards, at 4½ cents per yard	81 00
Ticking, 50 yards, at 17 cents per yard	8 50
Chair cane, 177,000 feet, at 50 cents per 1,000 feet	88 50
Coir, 1 bale, at $15 per bale	15 00
Moss, 450 pounds, at 8 cents per pound	36 00
Feathers, 75 pounds, at 18 cents per pound	13 50
Sundries, estimated	25 00
Total	$8,667 24

Inventory of Manufactured Stock on Hand June 30, 1909.

Brooms, 234 11-12 dozen, at $2 per dozen	$469 84
Whisks, 5 2-12 dozen, at 90 cents per dozen	4 65
Toy hammocks, 1½ dozen, at $4 per dozen	6 00
Small hammocks, 2 at $2 each	4 00
Plain hammocks, 5 at $3 each	15 00
Fringe hammocks, 5 at $3.50 each	17 50
Mops, 4 dozen, at $7 per dozen	28 00
Total	$544 99

Brooms Manufactured, Sold, and Delivered.

Brooms on hand July 1, 1908	3,035
Brooms manufactured July 1, 1908, to June 30, 1909	82,633
Total	85,668
Brooms sold and delivered during the year ending June 30, 1909	82,851
Brooms on hand June 30, 1909	2,817
Whisks on hand July 1, 1908	1,413
Whisks manufactured July 1, 1908, to June 30, 1909	15,364
Total	16,477
Whisks sold and delivered during the year ending June 30, 1909	16,415
Whisks on hand June 30, 1909	62

Manufacturing Statement for the Year ending June 30, 1909.

Brooms manufactured	82,633
Whisks manufactured	15,364
Chairs reseated	1,853
Mattresses manufactured	105
Pillows manufactured	120
Broom bags manufactured	3,122
Hammocks manufactured	4

Summary of Expenditure for the Year ending June 30, 1909.

Month.	Provisions.	Furniture.	Wages.	Wages of Inmates.	Drugs.	Building and Improvements.	Washing.	Raw Material.	Miscellaneous.
1908.									
July	$787 46	$3 25	$1,039 90	$310 00	$21 50	$67 80	$165 00	$734 48	$70 51
August	788 40	4 30	1,144 90	349 35	27 70	54 30	165 00	468 42	39 71
September	1,107 31	85 24	1,056 25	317 95	29 50	54 30	165 00	3,614 99	45 53
October	943 47	60 75	1,026 60	394 55	23 35	63 13	165 00	4,170 06	151 55
November	949 78	....	1,008 50	378 95	27 90	43 59	165 00	927 25	111 48
December	878 82	31 62	1,008 50	412 00	31 20	52 90	165 00	975 10	72 92
1909.									
January	940 36	52 12	1,005 75	427 10	37 10	33 20	165 00	459 89	99 93
February	821 61	24 81	1,002 05	411 30	29 70	39 35	166 00	338 31	52 48
March	1,169 14	46 20	1,008 50	517 60	27 75	73 85	165 00	1,220 51	155 52
April	909 07	9 20	1,030 15	441 95	30 15	88 76	165 00	1,698 48	68 90
May	976 63	50 00	1,008 75	436 70	29 45	52 30	165 00	327 70	61 61
June	912 31	33 50	1,032 45	404 70	30 10	19 50	165 00	284 00	71 43
Totals	$11,184 36	$400 99	$12,372 30	$4,802 15	$345 40	$642 98	$1,981 00	$15,219 19	$1.001 57

Receipts and Collections for the Year Ending June 30, 1909.

1908—July	$1,976 65
August	1,665 94
September	1,141 95
October	1,763 92
November	1,435 84
December	1,719 83
1909—January	2,036 08
February	1,415 10
March	2,336 32
April	1,844 79
May	2,431 86
June	1,658 73
Total	$21,427 01

Expenditure for the Year ending June 30, 1909.

1908–July	$3,199 90
August	3,042 08
September	6,476 07
October	6,998 46
November	3,612 45
December	3,628 06
1909—January	3,220 45
February	2,885 61
March	4,384 07
April	4,441 66
May	3,108 14
June	2,952 99
Total	$47,949 94

The current expense for the year, after deducting the following items:

Furniture	$400 99
Buildings and grounds	642 98
Raw material	15,219 19
Wages of inmates	4,802 15

amounts to $26,884.63. The average number of inmates residing at the Home during the year was 110. The yearly cost per capita was, therefore, $244.40; the weekly cost, $4.70. The cost of provisions alone was $11,184.36. The cost per capita for provisions was, therefore, $106.67 per year; the cost per week was, $1.95; the cost per day was, 27 cents.

The average number of persons residing at the Home during the year (including employees) was 131. The cost per capita was, therefore, $205.23; the weekly cost was, $3.95. The amount expended for provisions alone was $11,184.36. The yearly cost per capita was, therefore, $85.38; the cost per week was, $1.64; the cost per day was, 24 cents. I am satisfied that when we increase the number of inmates, we will materially decrease the cost per year per capita.

Value of Stock, Raw Material, etc., on Hand June 30, 1909.

Raw material	$8,667 24
Value of stock	544 99
Bills receivable	3,016 36
Amount in adult blind fund	4,981 02
Total	$17,209 61

The above sum of $17,209.61 represents the assets of the shops on June 30, 1909. It shows an increase over our assets, on June 30, 1908, of $2,284.01. This, in my judgment, is a showing that we may well be proud of, as it is conclusive proof that our shops are in a strong financial condition, and will compare favorably with any blind shop in the country. This fine showing is largely due to the careful manner in which our raw material is handled; and goes to prove that the rule which I always follow, of saving the little things, in order to accumulate the larger ones, is correct. Another source of loss, of which we are almost entirely free, is our freedom from bad debts. Our books show that we have bills receivable amounting to $3,016.36 on June 30, 1909. The amount due the Home, with few exceptions, is from the large corporations, and is as safe as if the money had been collected.

The contracts for our new building were let on July 14, 1908, nearly one year ago. Owing to unforeseen delays, we have been unable to take possession, as we expected to do, some months ago. For many reasons this delay is to be regretted, the chief of which is the condition of our kitchen which at present we are forced to use. It is greatly in need of repairs; but as I looked forward to an early removal, I have refused to spend money on it, as I consider such an expenditure would be a waste of money, as the improvements would be of no value after we vacated the kitchen, which will be done when we move into our new building.

Another reason for regret at the delay in the completion of our new building is the fact that many inmates could be admitted to the benefits of this Institution who are now forced to remain on the outside. Another reason is, that when finished, our new building will add to the comfort of both the inmates and the employees.

The State Board of Engineering have in charge the improvements which we contemplate, and which were authorized by the last Legislature. I do not know when they will be in a position to begin the work, but I trust that they will begin in the near future. In the matter of these improvements, I consider that great credit is due your honorable body, and especially to Director Scott. During the session of the Legislature last winter, he was most untiring in his efforts, and spent much valuable time and money in behalf of the Institution. With our President, Col. J. P. Irish, he made frequent trips to Sacramento, in order to have our bills approved by the committees who had them in charge. In this connection, I would emphasize the fact, that the blind of California owe to the Hon. J. N. Gillett, our able Governor, a debt of gratitude for the great benefits he has conferred upon them; and I take this opportunity of acting as spokesman for the blind inmates of this Institution, and also as the spokesman of the blind scattered throughout the State, in thanking him for what he has done for them; and also to assure him that we appreciate his efforts in our behalf.

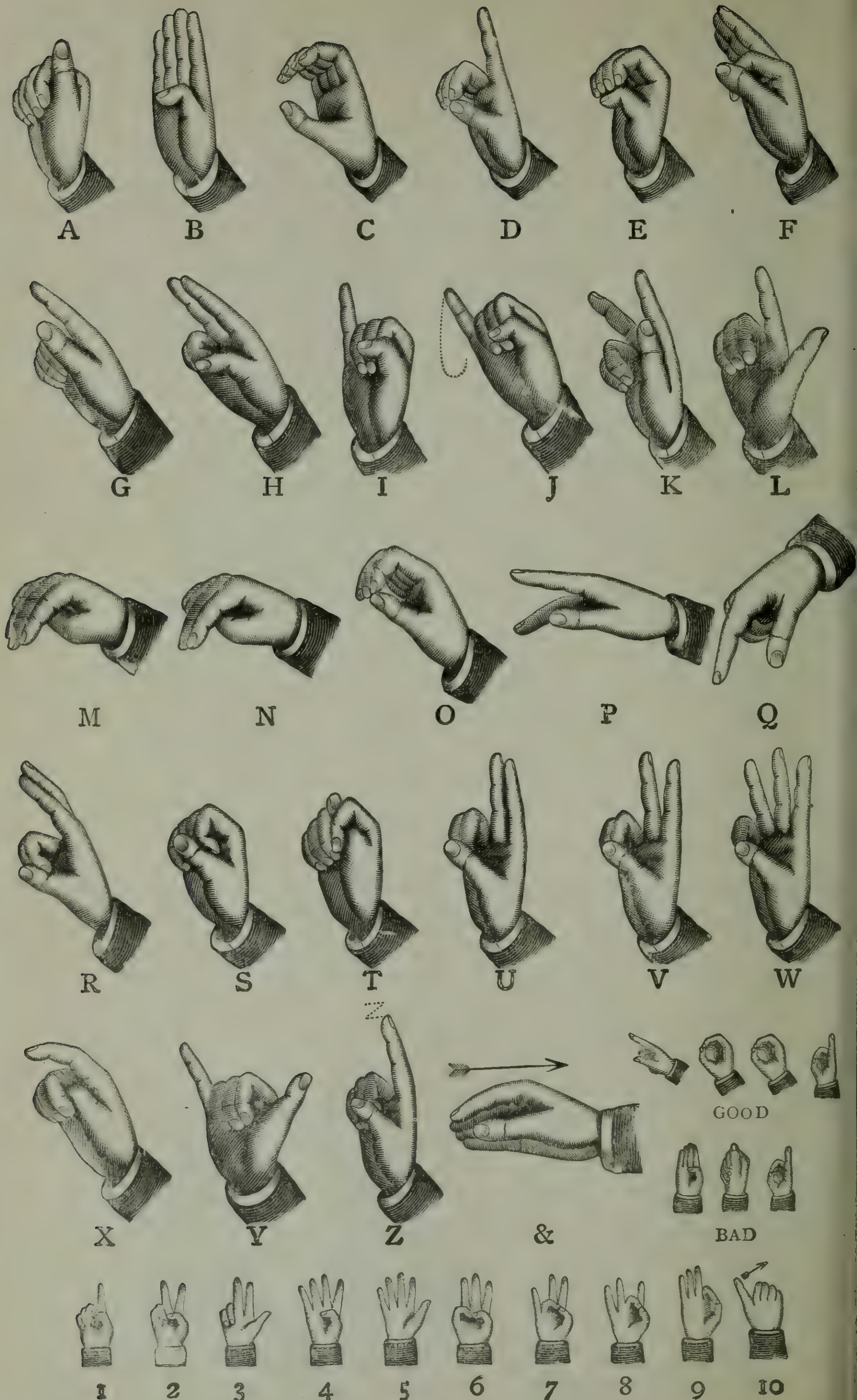
I can not find words too strong to express my appreciation of the faithful and efficient services of our Physician, Dr. H. N. Rowell, and I also wish to thank him for the very able manner in which he performs his duties and for his affable and courteous bearing toward all, and also for his willingness to answer all demands made upon his time, either day or night.

I extend my thanks to the officers and employees of the Institution for their faithful and untiring devotion to their duties.

In conclusion, I desire to thank deeply your honorable body for the honor conferred upon me and for the good will and assistance you have rendered in the execution of my charge and its duties. It has been, and shall be, my continual endeavor to carry out faithfully the responsibilities devolving upon me and to execute the worthy aims of yourselves.

Respectfully submitted.

JOSEPH SANDERS,
Superintendent.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TWENTY-EIGHTH REPORT

OF THE

BOARD OF DIRECTORS AND OFFICERS

OF THE

CALIFORNIA INSTITUTION FOR THE EDUCATION OF THE DEAF AND THE BLIND

FOR THE

TWENTY-FOUR MONTHS ENDING JUNE 30, 1908.

SACRAMENTO:
W. W. SHANNON, : : : SUPERINTENDENT OF STATE PRINTING.
1908.

BOARD OF DIRECTORS.

J. W. RICHARDS, *President*,	Berkeley.
WIGGINTON E. CREED, *Vice-President*,	Berkeley.
W. W. GARTHWAITE,	Oakland.
GEORGE W. REED,	Oakland.
WALTER J. MATHEWS,	Oakland.

W. E. GRIFFITH,	*Treasurer, and Secretary of Board.*

OFFICERS OF THE INSTITUTION.

PRINCIPAL:
W. WILKINSON, M.A., L.H.D.

PRINCIPAL'S ASSISTANT:
WILLIAM A. CALDWELL, M.A.

TEACHERS OF THE DEAF:
WILLIAM A. CALDWELL, M.A.,
CHARLES S. PERRY, M.A.,
THEODORE GRADY, B.L.,
MARY A. DUTCH,
MARIE P. ORR,
FRANK O'DONNELL,
THEO. D'ESTRELLA,
HENRY FRANK,
LAURA NOURSE,
ANITA GOMPERTZ,
JAMES W. HOWSON, M.A.

TEACHERS OF ARTICULATION:
LIZZIE MOFFAT,
AUGUSTA HARMAN.

TEACHERS OF THE BLIND:
RICHARD S. FRENCH, B.L.,
MARY W. EASTMAN,
FLORENCE E. MONTGOMERY, B.L.,
ELMA GOIN.

TEACHERS OF MUSIC:
OTTO FLEISSNER,
BERTHA BUTLER.

TEACHER OF PHYSICAL CULTURE:
ETHEL A. COPLIN.

T. C. McCLEAVE, M.D.,	Physician.
FRANCIS R. MUSSER, M.D.,	Oculist and Aurist.
DOUGLAS KEITH,	Clerk.
ETTA BROWN,	Office Assistant.
GUSSIE E. MAST,	Typewriter.
LESTER W. BARTLETT,	Boys' Supervisor.
RAYMOND HENDERSON,	Assistant Supervisor.

MATRONS:
MARION G. BROWN,
CAROLINE C. ALBERS,
ALICE MUNROE,
SARAH A. KIRK,
HELEN M. CAMMET.

J. C. JENSEN,	Foreman Carpenter Shop.
------------------,	Foreman Printing Office.
FRED HANSEN,	Engineer.
JOHN TREVETHAN,	Electrical Engineer.

INSTITUTION FOR THE DEAF AND THE BLIND, BERKELEY, CALIFORNIA.

REPORT OF THE BOARD OF DIRECTORS.

To His Excellency, JAMES N. GILLETT,
Governor of the State of California.

SIR: The Directors of the California Institution for the Deaf and the Blind herewith respectfully submit their report for the two years ending June 30, 1908, including the reports of the Principal, the Physician of the Institution, financial statements of the Treasurer, and the dissected account of all expenditures, showing the cost of different departments, and a catalogue of the pupils who have been in attendance during the period covered by this report.

It will be seen from the tabulated statement of the Principal that there have been under instruction during the last two years 275 pupils, of whom 184 were deaf and 91 were blind. Segregated by sex, there were 149 boys and 126 girls.

Since the publication of the last report, two changes have been made in the personnel of the Board, Mr. George W. Reed having been appointed to take the place of Mr. A. J. Ralston, whose term had expired, and Mr. Walter J. Mathews in the place of Mr. Frank M. Wilson, whose term also had expired.

The history of the Institution for the period under review has been one of peace and prosperity. No great disaster like the earthquake of 1906 has threatened its buildings with destruction; no epidemic like the peril of 1901 has invaded the household; no death within its walls has occurred to sadden the school life of the children, but good health has prevailed, the pupils have been generally well behaved, and the Directors desire to express their approval and commendation of the faithful service which the officers and teachers have rendered in their several spheres of duty.

The Directors also desire to put on record their deep sense of loss by the death of Mr. Nathan F. Whipple, mentioned in the Principal's report, and to express their appreciation of his conscientious discharge of duty during his twenty years' connection with the Institution.

It will be seen by reference to the Treasurer's report that there has been drawn from the State treasury for the maintenance of the Institution during the last two years the sum of $133,742.25, and the same amount has been expended as the vouchers on file in the Controller's office will show. It is a matter of gratification to the Board to be able to report that the balance to the credit of the Institution on the Controller's books for maintenance of the Institution to the end of the fiscal period June 30, 1909, will in all probability suffice for the needs of the Institution. The Directors feel, however, that it will be necessary to ask the legislature for an increase of $5,000 for the efficient conduct of the Institution for the two years ending June 30, 1911. This increase is asked for because of the continued high prices of articles of consumption, a probable increase of pupils and a desire on the part of the Directors in accordance with the recommendation of the Principal for more teachers in the articulation department. There is every reason to suppose that the population of California is increasing; that the emigration that followed the earthquake in 1906 has been more than compensated for by newcomers, and by the return of many who went away in 1906. With the increase of population, the number of deaf and blind in the State will increase, for the ratio of the deaf and the blind is reduced to almost a mathematical certainty. The Directors, therefore, respectfully request that the increase of appropriation asked for be granted by this legislature, and approved by your Excellency.

The Directors have considered and approved the several recommendations embodied by the Principal in his report. The proposal to segregate the blind from the deaf seems timely and feasible, and the Directors urge the matter upon the legislature as worthy its careful consideration.

The recommendations of the Principal concerning the reconstruction of the plumbing in Moss, Strauss, and Willard halls is in the direction of improved sanitation; the changes in the electrical plant proposed will make for efficiency and economy; the relaying of the water pipe system, and the introduction of a fire extinguishing system is a measure of safety, while the street improvements are called for by a due regard to the city of Berkeley as well as to the valuable property owned and occupied by the State. For these reasons, the Directors approve the necessary appropriations for carrying out the recommendations of the Principal, and earnestly urge the favorable consideration of your Excellency and the members of the legislature.

The invested funds of the Institution have been increased during the last two years by the payment of $2,712 from the estate of the late Mrs. Caroline C. Ver Huell. The money has been invested in bond and mortgage on San Francisco real estate, and has been segregated under the name of the Caroline C. Ver Huell Fund.

The Directors have received notice that by the will of the late Mrs. Elizabeth Ingalls one third of her estate has been bequeathed to this Institution. The whole estate amounts to about $27,000, and if the wish of this benevolent woman is carried into effect, the Institution should receive about $9,000. Measures have been taken to protect the interests of the Institution.

In conclusion, the Directors commend to your Excellency the welfare of this important and beneficent work. It is believed that no department of public education appeals more strongly to the hearts of our people, and that the voiceless and sightless children gathered here for instruction will ever find in you a friend.

Respectfully submitted.

J. W. RICHARDS,
President, Board of Directors.

BERKELEY, December 14, 1908.

REPORT OF THE PRINCIPAL.

To the Board of Directors of the California Institution for the Deaf and the Blind.

GENTLEMEN: I have the honor herewith to submit my biennial report giving in detail the history of the California Institution for the two years ending June 30, 1908, what the receipts and expenditures have been during the same period, together with estimates of appropriation required for the efficient conduct of the Institution for the two years ending June 30, 1911.

The movement of the pupils for the period under review has been as follows:

On the rolls June 30th, 1906—				
Deaf—Boys	73			
Girls	66			
		139		
Blind—Boys	36			
Girls	34			
		70		
			209	
The admissions since same date have been—				
Deaf—Boys	26			
Girls	19			
		45		
Blind—Boys	14			
Girls	7			
		21		
Total admissions, both classes			66	
Total under instruction				275
Graduated and discharged during the same period—				
Deaf—Boys		27		
Girls		17		
			44	
Blind—Boys		17		
Girls		9		
			26	
Total deductions				70
On rolls June 30, 1908				205
Admitted since opening of school			33	
Discharged since opening of school			9	
				24
On rolls at date of report				229

HEALTH.

In any report of a boarding school, the first consideration, for obvious reasons, is the health of its pupils. Frequent outbreaks of disease and slow recoveries would indicate imperfect sanitation somewhere about the premises, or injudicious, meager, perhaps unwholesome diet, and, with a consequent deteriorated physical condition of the pupils, one has no right to expect good work in the class room. It is, therefore, with much satisfaction that I call your attention to the report of the attending physician. It will be noted that during the first year of the period under review we had three outbreaks of chicken-pox, measles, and mumps, all of a mild type and none of them followed by the serious aftermath which sometimes makes these so-called ''children's diseases'' dangerous; but the general health of the pupils and no prolonged case of illness requiring the care of a special nurse has occurred.

And yet we have to record the death at their homes of five pupils during the vacations. Alexander Rose, a little deaf boy, was killed while walking on the railroad track at Sacramento by a locomotive in the summer of 1906; Master Charles McNeil died at Loyalton from membranous croup at his home during the summer vacation of 1907; George Wood died at St. Luke's Hospital, where he had been taken from his home to be operated upon for appendicitis December 31, 1906; Grace Tilton died February 10, 1908, at her home in San Francisco of a brain tumor, a consequence of the meningitis which had caused her blindness when she was six years old; Ethel A. Drummond died at her home December 22, 1906. She was attending school as a day pupil, and living with her mother in Berkeley. Her death was sudden and unexpected, and so far as I know, has never been explained.

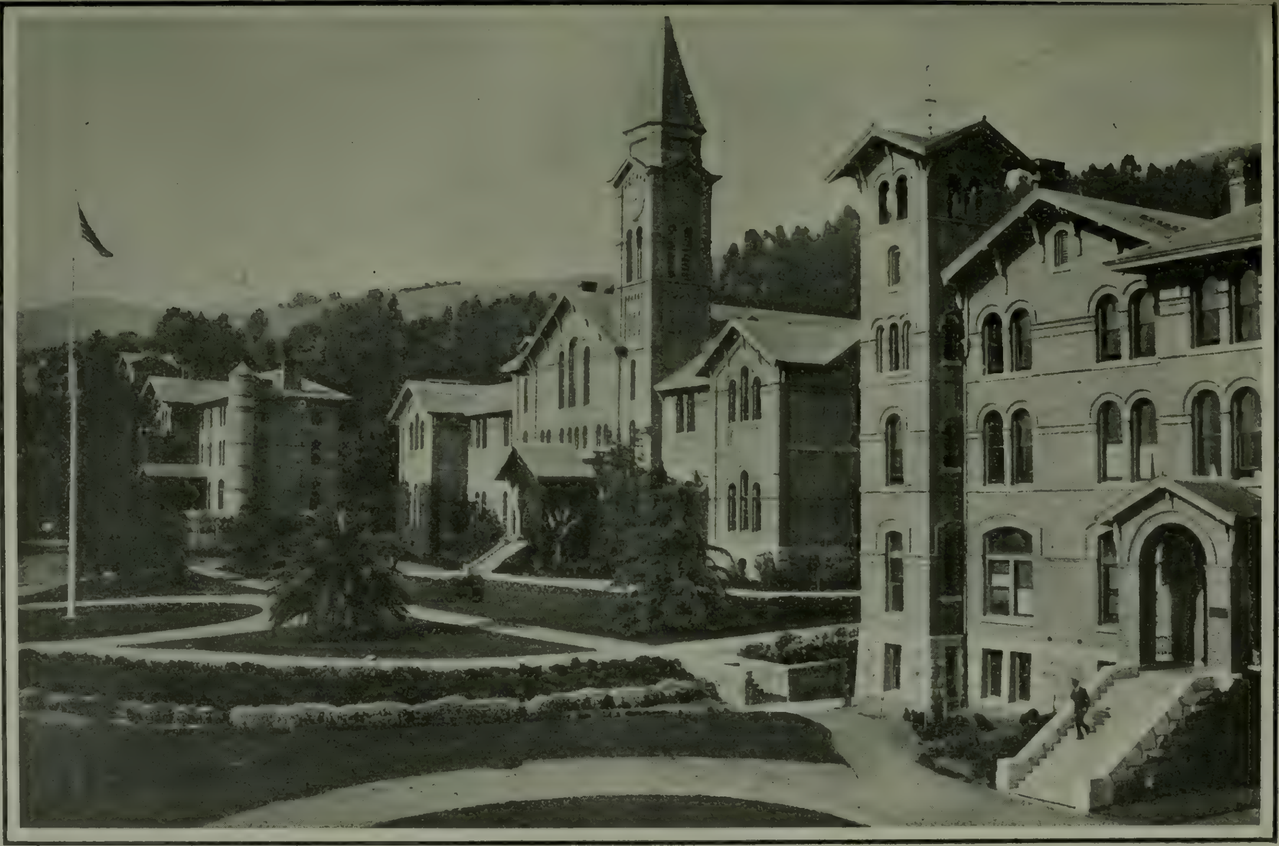
I mention these cases because three of them seem to warrant the inference that children are safer in a well regulated boarding school than they are at home, not because school is better than home, but because the simple, wholesome diet, regular hours of sleeping, waking and eating, careful sanitation, daily attendance of a skilled physician, whose business it is to detect the first symptoms of disordered functions or organic trouble, as well as to overcome disease after it is established; with matrons who are instructed to report every morning, and oftener if necessary, any deviation from normal health in their several families; above all, with pure air, pure water, unusual salubrious environment and the ocean breeze for the lungs, the lovely outlook for the eye, all these advantages which not many homes possess, and none surpass, justify the above inference, and the history of this and other similar institutions bears testimony to its truth.

There has been little change in the corps of instructors during the past two years. Mr. Clarence W. Peck resigned his position as teacher in the department for the blind on January 1, 1907, to engage in the real estate business, and his place was filled by the appointment of Mr. Richard S. French, a graduate of the State University, who has entered upon his work with a zeal and intelligence that bid fair to make him a useful member of the profession. The growth of this department has made it necessary to add to the corps a new teacher, and Miss Elma Goin, a young woman of several years' experience in the public schools was appointed to the position which she has filled satisfactorily.

It is my painful duty to report the death of Mr. Nathan F. Whipple, one of our articulation teachers, whose twenty years of service deserves something more than a mere perfunctory announcement of time and place of decease. Mr. Whipple was born at Ledyar, Connecticut, on the 8th of August, 1849, and inherited not only the physical stalwartness but the virtues of his New England ancestry. He was patient, kind, gentle in manner and speech, loved his pupils, and so won their love. His purity of life and integrity of character made his example an important factor in his work as a teacher. He never lost his temper in a profession that taxes to the utmost one's self control and patience. He was loyal to duty, faithful in his work, and devoted to the Divine Master whom he served. His temperament and disposition led him early to adopt the tenets of the Christian Science sect as his rule of faith and practice, and at the time of his death he was a reader in the church of that denomination in Oakland, and it was while officiating in that capacity on Wednesday evening, February 12th, that the call came to higher service. The tongue that had taught the voiceless to speak ceased its function, the gentle heart ceased to beat, and Nathan Whipple was translated to the eternal rest he had earned so well.

THE SEPARATION OF THE DEAF AND THE BLIND.

It hardly seems necessary for me to repeat the opinion I hold in regard to the segregation of the deaf and the blind in the near future. In my last report I set forth the reasons for such segregation, and in the twenty-fifth report, I made some suggestions as to how the blind and the deaf could be separated without incurring the expense of purchasing a new site. The more I think of that plan, the more feasible it seems to me. Ultimately, the building proposed will be inadequate for the housing and educational facilities which the blind of the State of California will require, but when that time comes, the building can be utilized as a primary department for the deaf children who will profit by a separation from the older pupils. This will be an ideal arrangement for a school for the deaf.



INSTITUTION FOR THE DEAF AND THE BLIND—FROM THE SOUTHWEST.

As it may not be convenient to refer to what was said in the twenty-fifth report, it will not be out of place to reprint the paragraph in which the proposed plan was set forth with its economical advantages.

> "The time is rapidly approaching when the segregation of the blind into an institution for their sole use must be considered. The growth of population in California and the present number of pupils in this school justify such segregation. The motive of economy which has prevailed until now ought not to stand in the way any longer. The location need not be considered, for there is a site on the present property of the State which can be utilized for the purpose, and so segregated as to give all the advantages of complete isolation from the deaf. At the same time, many of the economies of the present method of management could be preserved and continued. One principal could attend to all the executive functions of the two establishments, with the aid of a first-class vice-principal, who should reside in the new building, and have immediate control of the pupils, both as to instruction and discipline. One clerk could look after the books, accounts, and supplies. The present garden and dairy could furnish vegetables and milk to both establishments with little or no additional expense. One physician could attend to the sick, and one hospital serve the needs of both in case of contagious disease, and one laundry could do the washing. The foreman of the cabinet shop with his apprentices could do the minor repairs to buildings and furniture. The main Assembly Hall now in use would serve the needs of both in case of contagious disease, and one laundry could do the washing. The foreman of the cabinet shop with his apprentices could do the minor repairs to buildings and furniture. The main Assembly Hall now in use would offer accommodations for the important public occasions, such as concerts, graduation exercises, etc., and thus save much space in the new building. And so in many ways the blind department would profit financially by being located on the same grounds, and yet have all the advantages of complete isolation. The additional expense would be the salary of a vice-principal, cook, and a few servants, together with a small percentage of increase of expenditures growing out of keeping up two kitchens."

I strongly urge the careful consideration of this or some other plan of segregation of these two departments upon the attention of the legislature about to convene.

SCHOOLS.

The work of the class rooms for the two years under review has been continued upon lines pursued for the twenty-two years since the Eleventh National Convention of American Instructors of the Deaf held its session at this Institution in July, 1886, when the following preamble and resolution were unanimously adopted:

> "WHEREAS, The experience of many years in the instruction of the deaf has plainly shown that among the members of this class of persons great differences exist in mental and physical conditions, and in capacity for improvement, making results easily possible in certain cases which are practically and sometimes actually unattainable in others, these differences suggesting widely different treatment with different individuals: it is, therefore,
>
> "*Resolved*, That the system of instruction existing at present in America commends itself to the world for the reason that its tendency is to include all known methods and expedients which have been proved to be of value in the education of the deaf, while it allows diversity and independence of action, working at the same time harmoniously and aiming at the attainment of a common object by all.

> "*Resolved.* That earnest and persistent endeavors should be made in every school for the deaf to teach every pupil to speak and to read from the lips, and that such effort should only be abandoned when it is plainly evident, after examination by experienced teachers, that the measure of success attainable is so small as not to justify the necessary amount of labor."

I think this action of one of the largest and most representative bodies of instructors of the deaf ever gathered in this country is worthy of careful consideration. While the resolutions were voted for by the advocates of the oral or German method who were in attendance, it probably did not satisfy those radical oralists who wish to eliminate the language of signs from the education and life of the deaf, but it served to allay somewhat the bitterness which has often characterized the relations between the respective advocates of the French and German methods of instructing the deaf, and to establish a sort of *modus vivendi* whereby we may ''labor and wait'' till time and experience and results obtained shall afford us a common ground whereon all the teachers of the deaf may unite. This happy end will be hastened by laying aside all inherited prejudices and petty jealousies which date back to the sharp controversies between the Abbe de l'Epee and Samuel Heinecke one hundred and fifty years ago, and approaching the subject with the single purpose of determining what will most largely secure the moral and intellectual development of the deaf, his efficiency and economic value as a member of the commonwealth, and especially promote his personal happiness.

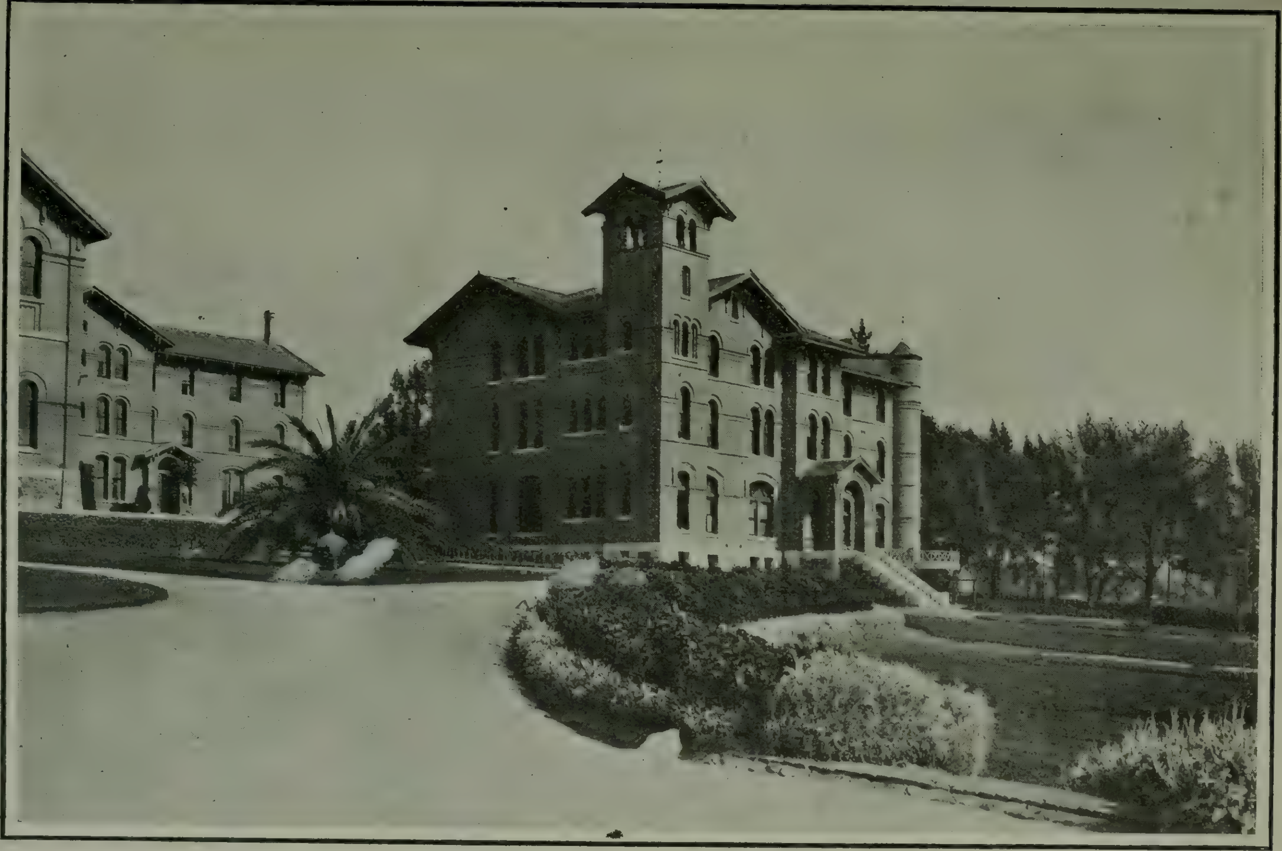
The problem in the matter of educating the deaf is made difficult of universal solution because the factors involved are so diverse by reason of the different physical and mental condition of the pupils who however, in the minds of the public, are all alike classed as ''deaf and *dumb.*''

First, we have the *congenitally* deaf, and those who from accident or disease have lost hearing under two years of age, and who for purposes of classification might as well have been born deaf. This limit of two years is arbitrary, and serves only to express my personal belief that, save in cases of great precocity, the exercise of the vocal organs and the dim remnants of self consciousness at or under two years of age are lost by the complete disuse of the apparatus of speech while memory is a *tabula rasa* so far as intellectual impressions are concerned. I know that others whose opinion has weight disagree with me. Helen Keller, who became deaf and blind at twenty months, claims to recollect in a vague way events that took place before the illness which bereft her of sight and hearing, but Helen Kellers are few. Mr. William G. Jenkins of the American School for the Deaf held strongly to the belief that deafness occurring at any time after birth differentiates a child from the congenitally deaf, but a large opportunity of observation fails to convince me that a child deaf under two years of age shows in his school life any advantage over the congenitally deaf. According to the records of this Institution, this group embraces about 65 per cent of all admissions.

Secondly, we have to consider what are known as the "semi-mutes." It is not a very felicitous phrase, but it is well understood by members of our profession as referring to those children who by accident or disease become deaf after they have acquired a knowledge of such colloquial speech as all boys and girls learn by intercourse with family and playmates, but without any formal instruction. This general group embracing about 35 per cent is subdivided into many classes, depending upon the age when deafness occurred, the efforts of parents to cultivate and enlarge the speech acquired before the loss of hearing, the child's environment, and his natural ability. It is evident that a child made deaf at eight years of age has a great advantage over a child deaf at four, and indeed in his intellectual habits and processes, the former differs in no respect from the normal child.

Third, the "semi-deaf," as he is called for convenience sake, offers a serious complication in the conduct of our work. A certain percentage of those who apply for admission to a school for the deaf have hearing sufficient to enable them to learn to speak if there were no brain lesion that has destroyed or abolished that peculiar function or faculty by which the vibrations of articulate speech falling upon the tympanum of the ear are translated into speech again, but very often the lack of this faculty and the consequent inability to talk is a symptom of such mental deficiency as to forbid admission because we do not deal with the feeble minded, but recommend them to those special schools provided for this unfortunate class.

Fourth, there are others whose congenital or accidental brain lesion has affected only the Broca convolution, if the conjecture of that physiologist is correct, leaving the other brain functions little if at all impaired. In such children, there is often, I may say generally, a certain amount of hearing that can be made available in teaching articulation. The same is true of many children who have become deaf or partially so adventitiously from scarlet fever, measles, whooping-cough, and other accidental causes.



BARTLETT HALL—INSTITUTION FOR THE DEAF AND THE BLIND.

Now, it is very evident in considering any method of instructing the deaf, these varied mental and physical characteristics and conditions must be taken into account. Nor would it be reasonable for the advocates of one method, the German for instance, to claim that the oral method is best for all the deaf, because of success with a few children of perhaps exceptional aptitude, and whose parents are able and willing to expend unlimited money for special and skilled teachers with every helpful device of apparatus, travel, opportunity and educated companionship. And yet with all such advantages, I have known many failures to secure a broad mental development, a fluent and grammatical speech, and above all, that happiness which arises from free and facile means of communication with one's fellows.

And this leads me to say that I could never consent to adopt a method of instruction for the deaf which forbids the use of their own copious and expressive language on the playground, or at table in social intercourse. In the first place, it would be impossible to prevent such use, and secondly, it would tend to impoverish the intellectual life of the child; and worse than all, the rigid enforcement of such a ban leads to a deceit which can not fail to exert a demoralizing effect upon character.

It may be, as some believe, that sign making interferes somewhat with the acquirement of good English, but a violation of Murray's rules is not so bad as making signs "on the sly," when their use is forbidden by the school authority. An offense against grammatical construction is venial and retrievable, but deception easily develops into a habit of untruth that weakens the whole basis of character. For a boy to break a window is unfortunate, often reprehensible, but to lie about it converts an accident or a bit of carelessness into a crime. For these and other reasons, I can not agree with those radical oralists who would deprive the deaf of much of the joy of life and of an efficient instrument in stimulating intellectual activity, especially during the primary years of instruction, by forbidding the use of signs outside the class room. Nor do I believe it is necessary to deprive the deaf of this source of pleasure in order to acquire whatever speech they are capable of. On the contrary, I believe that the quickening of the intellectual faculties through the use of the sign language outside the class room is a material aid in learning to talk. "How do you mix your colors, Mr. Opie?" asked a visitor at the studio of this artist. "With brains, madam," was the reply. The more brains a deaf-mute can put into his toilsome work of learning speech, the more successful he will be. No one who has watched the varied expression of a deaf-mute's face in conversation or play; the tear stained cheek at a pathetic story of human suffering or self-sacrifice; the glad light of the eye when the good news of a nation's victory at the polls, or the battlefield is proclaimed at the breakfast table, or the hearty laugh at the joke or repartee that requires no "feeling about for a smile or handling of a neighbor's cheek to be sure that he understands it," as Charles Lamb says—I say no one who has witnessed all this can doubt the mental stimulation produced thereby, or refuse to believe that it is a help rather than a hinderance in mastering any difficulty involving mental effort. And yet saying this much, and with the limitations implied above, I am a strong believer in oralism. I have seen enough during my visits to American and European schools to convince me that a fair percentage of the congenitally deaf can be taught a speech which is useful and comforting to parents and friends, even if it does not suffice to take the place of pencil and paper as a means of intercourse in the activities of life; that another much smaller percentage can acquire such speech and lip reading as will serve a valuable asset in the equipment of a deaf person for business and employment. For the semi-mute and the semi-deaf as defined above, there is no question concerning the importance of cultivating their articulation and power of lip reading to the fullest extent which financial resources will allow, with a due regard for that symmetrical development of intellectual power which goes up to make up what we mean by education.

It is not necessary here to interject the query, whether there is any educational value in making "mouth" signs rather than the manual signs for conveying thought, nor is it pertinent at this juncture to make inquiry if the ability of a deaf-mute to talk more or less imperfectly is obtained by a sacrifice of something better than speech, such as it is, and if it is so obtained, what is the loss? Dr. L. E. Crouter of the Pennsylvania Institution stoutly maintains that there is no loss, and if this be true, it must be admitted that the German method has the advantage, because an imperfect speech is worth something, and if it can be added to an education equally broad and cultured with that produced by a rival method, I for one would not hesitate to adopt it, always with the conditions that signs should be at least "tolerated" as at Mount Airy, outside the class rooms.

It is for the purpose of making a practical test of this important question that a teacher of experience and ability has been given a class of ten new pupils with whom she is to use the pure oral system. The children will be allowed to make signs and use the manual alphabet when not in the class room, and by this sort of combination of methods, we ought to secure the best results of the oral school, obtain the mental attrition which follows the use of signs when not under formal instruction, and not interfere with the happiness of the pupils in their play and social intercourse. I am so hopeful of good results from this experiment that the legislature will be asked to make an appropriation for the purpose of conducting it to a successful conclusion if possible upon these lines. It will involve additional teachers and smaller classes, the limit being ten pupils to one teacher, while eight would insure better results, but it is believed that the legislature will approve the experiment and grant the money necessary to carry it out.

THE BLIND IN DEBATE.

The Ecclesia Society is a literary organization in the department for the blind which has for its purpose the cultivation of debate and declamation among its pupils. It is a member of the California Debating League which embraces various high schools of San Francisco and the counties bordering the bay. Admitted to membership of the League in September, 1904, the record for the Society for the past four years seems worthy of mention in this report, and is given herewith to show what our pupils have done in this important field of intellectual effort. The contests between members of the League have been for a cup, offered by the student body of Stanford University, and which becomes a permanent possession of the team winning the cup three times. As will be seen by the record, the San Jose High School has held the cup two years, and the Ecclesia has held it for the past two years and still has it. The record since 1904 is as follows:

March, 1905, the Ecclesia defeated the Lowell High School of San Francisco.

Subject: "*Resolved*, That the United States should annex Hayti and Santo Domingo."

November, 1905, the Ecclesia defeated the Humboldt Evening High School of San Francisco.

Subject: "*Resolved*, That the national government should own and operate all of the railroads in the United States."

March, 1906, the Ecclesia defeated the Berkeley High School.

Subject: "*Resolved*, That the general concession to the principle of the closed shop would be beneficial to the American people."

May, 1906, the Ecclesia was defeated by the San Jose High School which won the cup.

Subject: "*Resolved*, That the United States should not prevent all further acquisitions of territory on the American continent by European powers."

April, 1907, the Ecclesia defeated the Humboldt Evening High School.

Subject: "*Resolved*, That the State capital should remain at Sacramento."

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May, 1907, the Ecclesia defeated the San Jose High School, and took the cup.

Subject: "*Resolved*, That a definitely announced policy of annexation by the United States would be the best solution of the questions arising out of our relations with Cuba."

May, 1908, the Ecclesia defeated the Commercial Evening High School, and retained the cup.

Subject: "*Resolved*. That the sale of intoxicating liquors at the army post exchanges should be reëstablished."

The Ecclesia also defeated the California College.

Subject: "*Resolved*. That the best interests of the public demand the incorporation and regulation of corporations doing interstate business under Federal law."

This debate, however, was extra League, and does not properly belong to the League contests.

The declamation contests are for a cup offered each year by Mr. Walter E. Trefts of San Francisco. The first cup was won by Miss Mildred Jameson of the Ecclesia Society in 1906; the second cup was won by Miss Marguerite French of the Ecclesia Society in 1907. The third cup was won in 1908 by a member of the San Jose High School.

The effect of these public debates and declamation contests has been most stimulating and salutary. The subjects for discussion have been timely and vital, and it is hoped that the pleasant relations which have been established between the respective schools may be continued and enlarged.

In this conection it may not be out of place to refer to a pamphlet prepared for, and submitted with, the school exhibit of this Institution at the Columbian International Exposition held in St. Louis, 1904. The pamphlet was written with no idea of claiming any superiority of method or instruction, but simply to show by concrete examples the ability of these handicapped classes to pursue college studies, and as a corollary, the right of their schools to be regarded as educational institutions and not as charities or asylums, an error which has possessed the minds of the public these many years, and it is in the hope of helping to reform popular prejudice in this direction that the following statistics condensed from the pamphlet and brought to date are reproduced in this report:

Since the opening of the California Institution for the Deaf and the Blind, there have been admitted—

Deaf pupils	762
Blind pupils	344
Total	1,106
Deduct present rolls	229
Graduated, discharged, and dropped from rolls	877
There have been matriculated:	
At the University of California	14
At Stanford University	1
At Gallaudet College, Washington, D. C.	6
Total	21
Of this number, there have graduated:	
At the University of California	7
At Stanford University	2
At Gallaudet College	4
Present undergraduates, Gallaudet College	2
Not graduated	6
Total	21

This table gives one matriculate to every 41.76 pupils, and of those who matriculated 61.8 have received their diplomas, leaving two yet to graduate. In addition to this history of achievement, one has taken his degree of Ph.D. at Munich, *magna cum laude*; two have taken their B.L. degree at the law school of the University of California, and one has taken his M.A. degree at the University of California. I need not say that these figures indicate a larger percentage of matriculated students and graduates going to college from this Institution than enter from the public schools of the State.

REPAIRS AND IMPROVEMENTS.

While the disastrous earthquake occurred on April 18, 1906, and therefore came within the purview of my report for the two years ending June 30, 1906, a portion of the cost of repairs was included in the biennial statement for that period, but the largest part of the expenditure was made in the months of July, August, and September, and therefore is included in the Treasurer's exhibit for the fiscal period ending June 30, 1908. The total cost was $9,710.87, and the money was drawn from the contingent fund which was exhausted at the time the report was sent to the Governor, October 1, 1906, leaving a deficit of $267.38 which was made good in October of the same year, so that no demands were made upon the legislature for a deficiency bill.

The tower of the Educational building, however, was not repaired in that year, but in the following year, 1907, after a thorough inspection by the architects, Mr. John Wright and Mr. George Applegate, and the Berkeley Building Inspector, Mr. Bull, it was deemed wise to strengthen the tower for a distance of twenty-five feet, beginning ten feet below the clock face to eight feet above it with strong angle irons, and seventy-two bolts and sixteen turn buckle tie rods which it is believed makes the tower secure against any ordinary earthquake. The cost of this repair was $772, and was made good out of the income of the Durham fund.

It is now nearly thirty-three years since the fire of January 17, 1875, which destroyed the buildings of the Institution. Since that time the present plan of reconstruction by a series of segregated buildings has been steadily pursued. The first permanent structures were Strauss, Moss, and Willard halls. At the time these three halls were constructed, the plumbing was executed in the best manner known at that time, as the small amount of repairs will show, but it is not up-to-date in the way of fixtures, and after thirty years of service it is time to reconstruct the lavatories, bathrooms, toilets, etc., and to introduce such interior sanitary appliances as modern science approves. The change should not be made piecemeal, but should be general and complete. All the floors and wainscots of the rooms mentioned should be tiled, and made impervious to moisture, the fixtures, piping, traps, etc., should be open and easy to inspect, and with proper arrangements made for safe-guarding against obstructions and for removing them. I can not at present writing give a definite estimate as to the cost of this reconstruction, but I expect to be able to present exact figures before the legislature meets, and I earnestly urge that a proper appropriation be asked for at the coming session.

The electric plant of the Institution needs some rearrangement and reconstruction to make it more convenient, efficient and economical. It is proposed to have all wires from the different buildings run direct to a switch board, located in the engine room, and under the immediate control of the engineer; also, to bring in a current from the Berkeley Electric Light Company to the same switch board which is to be so arranged as to cut off our own dynamo and turn on the current from the company's plant, and vice versa. By this arrangement the Institution is guaranteed against inconvenience by accident to its own plant, and will be able to utilize the all night service of the company in any or all the buildings, if necessary, day or night, a convenience of great value. At present the Institution dynamo is shut down at 9:30 o'clock p. m. to save the expense of a night engineer, to say nothing of the saving of fuel, and we are obliged to resort to the use of gas for the night lights which are necessary in an establishment like this. I have had an estimate made by a trustworthy and competent engineer who says that the cost of the complete change of wires, installation of combination switch board and equipment shall not exceed $700, and I respectfully recommend that the legislature about to convene be asked to make an appropriation of that amount for the installation of this very desirable improvement.

REFECTORY—INSTITUTION FOR THE DEAF AND THE BLIND.

During the past year we have had warning by leaks and breaks that the water pipe system which has been in use for nearly forty years is becoming dangerously weak, and the repairs made could be in the nature of the case only sporadic and temporary. Our own supply consists of the very valuable spring on the hill side, high enough to fill the tower tanks in the various buildings by gravity, and a ten foot well in the vegetable garden whence water is pumped for irrigation purposes. By running tunnels from the bottom of this well, it is believed that sufficient water for the lawns and gardens, the boilers and laundry, can be secured, leaving the pure water of the spring, which is beyond all possibility of contamination, for domestic purposes. To do this, separate pipe systems should be laid with facilities for connecting both systems in cases of emergency.

It is also desirable that a fire extinguishing system should be installed as a measure of safety. This improvement would cost in the neighborhood of $5,000. At present, we have no protection, except the character of the buildings which, while not fireproof, are what might be called "slow burning." There are no hydrants on the place, and the City Water Company has declined to put up any on our grounds. I therefore respectfully recommend that an appropriation by the legislature be asked for, covering the pipe reconstruction and fire protection.

I desire to call the attention of the unkempt conditions of portions of Derby street, Warring street, and Dwight way which has been the subject of complaint, and justly, I think, from property holders whose homes front on those public thoroughfares. Derby street on the south boundary line of the Institution for over a thousand feet is particularly discreditable. The Garber and Palache tract was purchased two years ago by a syndicate which has converted a farm into a fine residence park, and has added greatly to the beauty of Berkeley and its assessment valuation. The syndicate has graded, curbed, guttered and macadamized its half of the street, and now asks, with good reason, that the State should do the same work for its portion of the street.

Warring street on the western line of the Institution property has been improved on the whole frontage, over twelve hundred feet, and a sidewalk laid for nine hundred and seventy feet, leaving two hundred and ninety lineal feet of muddy pathway in winter, and dust in summer for the unfortunate foot passenger who has occasion to use this street. Dwight way has also been put in good shape from its intersection with Warring street to the north side gateway, but beyond that opening the whole street is an offense to our neighbors and a legitimate cause for complaint. The street should be improved from the north gate to the turn of the road into Hillside avenue.

The cost of making these street improvements will be as follows, the figures being submitted by a responsible firm:

Derby street; grading, cement curb, (concrete 7"x14") 4′ concrete gutter, macadamized, sidewalk 5′ wide	$3441 72
Dwight way, for same improvement	919 80
Warring street, sidewalk 290 lineal feet	145 00
Total street improvements	$4,506 52

I strongly urge the appropriation of this sum. It is called for in justice to Berkeley, to the dignity of the State, and to the neighbors who have built their homes in this vicinity, and added thereby to the taxable value of the adjoining properties. And in this connection it may not be out of place to remind the legislature of the great increment of value in this piece of State property. In 1866, the present site of the Institution was in common with all the other land now included in the city of Berkeley devoted to ranch purposes, and from the foothills to the bay, the raising of wheat and oats and garden truck was the business of the farmers. There were not twenty houses within the municipal limits, and most of these were small one-story buildings. There were no streets, but a few roads traversing the town in different directions gave the farmers access to Oakland and the bay. What was known as the Kearney farm seemed to satisfy in the highest degree the requirements of the legislature which in March, 1866, passed a law moving the Institution from its narrow and inadequate quarters at the corner of Fifteenth and Mission streets, San Francisco, to a new site which was to be within forty miles of that city, and after some weeks of negotiation 130 acres were purchased by the State at a cost of $12,500. Berkeley is now a city of about 40,000 inhabitants; the old time farms have been cut up into building lots, and are now covered with handsome homes, and the Institution has come to be the heart of the best residence district, and the land alone without counting the buildings is valued at $680,000.

Upon this large amount of property the State pays no taxes, nor does the city of Berkeley receive any revenue from lands and buildings which in private ownership would pay yearly thousands of dollars into the city treasury. Under these circumstances I can not believe that the legislature will refuse the relief which the citizens of Berkeley ask for.

FINANCIAL STATEMENT.

There is every reason to expect that the appropriation made by the last legislature for the support of this institution during the fiscal period ending June 30, 1909, will prove sufficient and unless some unforeseen exigency arises, there will be no deficit to provide for. It is a source of great satisfaction to know that the record which began many years ago is still unbroken, and it justifies a pardonable pride on the part of the Directors that in all these years it has never been necessary to apply to the legislature for the passing of a deficiency bill, either for the support of the Institution or for any building, though within the last thirty-three years fourteen buildings have been erected, costing from $1,000 to $85,000 each, or a total of $387,500. I need not say that this happy result has been accomplished only by the exercise of great care and economy. Sometimes it has been necessary to leave undone things which it was desirable to have done, but it has been considered better to wait than to establish a precedent that easily grows into a habit, and sometimes a precedent comes back to plague him who permits it. The Directors of this Institution have established a policy of not running into debt, unless the money is in sight for liquidating it, and the Principal has always cordially, loyally and successfully coöperate to carry out their wishes.

During the past year there has been drawn from the State treasury $133,742.25, and the same amount has been expended as per vouchers on file in the office of the State Controller. The various items included in these vouchers are all exhibited as usual in the dissections attached to this report. These dissections show the cost of different departments, and the gross cost of each article used by each department. This form of exhibit offers an easy way of showing the comparative increase or decrease in the price of supplies, and a file of the Institution reports makes a valuable contribution to the history of economics. For forty-three years the present system of dissecting bills has been followed, and every item of consumption and its cost can be verified by the receipted vouchers in the Controller's office at Sacramento. The Principal's file previous to 1875 was destroyed by the fire of that year, but for the last thirty-three years they are intact in the Principal's office.

For the two years ending June 30, 1911, it will be necessary to ask for an increase of appropriation of not less than $2,500 for the salaries and wages account, and $2,500 for the maintenance account, or a total of $5,000. This increase is called for because of additional new pupils, due to the increment of population, and to the continued high price of certain staple articles of consumption. The high price of meats, pork products, hay and ground feed for the dairy seems to have come to stay, and while it is good for the farmers, it increases the cost of maintenance in State institutions. The increase in the salaries and wages appropriation is asked for because of the expected addition to the corps of instructors in the articulation department, referred to in previous pages of this report. It is hoped that the financial record of this Institution will lead the members of the legislature to grant our request in the belief that all appropriations will be administered faithfully and economically.

Since my last report, the estate of Mrs Caroline C. Ver Huell has been settled, and the legacy of this Institution of $1,000, and an additional sum of $1,712.75 has been paid in accordance with a proviso in the will authorizing the executor to divide certain residuary moneys among such institutions as he might select. Acting under this authority, the executor, Mr. Antone Borel, added $2,000 to the original bequest in favor of this Institution. In order to avoid some adverse litigation, and to facilitate a settlement of the estate, all the heirs agreed to contribute a small percentage of their bequest to satisfy certain foreign claims. The total sum netted to the Institution after this percentage was deducted, and attorney's fees were paid, was $2,712.75, which sum has been placed in what is called the Caroline C. Ver Huell fund, and $2,650 of it has been invested in bond and mortgage on San Francisco real estate.

The will of Mrs. Elizabeth Ingalls, who died at her residence in San Rafael in May, 1908, devised one third of her estate to this institution. As the valuation of the property is estimated at $27,000, if the wish of this benevolent lady is carried into effect, this Institution should receive about $9,000.

ACKNOWLEDGMENTS.

It is a pleasant duty to call attention again to the courtesy of the management of the Southern Pacific Company to the pupils of this Institution at those times of the year when school closes for the summer vacation and the Christmas holidays. It is now over forty years since I first asked Governor Stanford, then president of the old Central Pacific Railroad, to grant such privileges to our pupils in the way of transportation as their needs required, and his heart approved. His response made through the general manager, Mr. A. N. Towne, was prompt and liberal, and the precedent then established of half fares for those whose parents were able to pay, and passes for those whose circumstances were so straitened as to forbid their going home for the summer vacation without this aid, was followed during the long administration of Mr. A. N. Towne, whose varied acts of kindness should never be forgotten; was continued by his successor, Mr. Julius

Kruttschnitt, whose gracious courtesies were always phrased in such kindly terms as to increase their value, and the present executive, Mr. E. E. Calvin, and his coadjutor, Mr. Charles S. Fee, who both grant my requests as if it were a pleasure and not a pain.

I desire also in behalf of the pupils and their parents to thank Mr. H. K. Gregory, passenger agent of the Atchison, Topeka and Santa Fe Railroad Company for half fares, and passes, when necessary, which he has kindly granted to those pupils living on the lines of this railroad. The number of my requests has not been so large, but Mr. Gregory has been no less gracious and prompt at every call for his aid.

I should be lacking in duty, if I did not speak of the generosity of the managers of the Emporium in contributing every year to the happiness of those pupils who, by reason of distance from home or lack of means, find it necessary to forego the pleasure of joining the circle around the family fireside at this glad season. The liberal contributions in the way of toys and orders for goods from their great establishment has helped to brighten life, and I thank the managers for their remembrance.

In concluding this report, I find it difficult to express my deep sense of obligation to you, the Directors, under whom I serve, for the confidence extended to me in all our official relations. The yoke and burden of my duties have been made easy and light by your advice and coöperation, and to the memory of your abiding support and goodness will be a solace and a comfort during the remainder of my life's journey toward the setting sun.

Respectfully submitted.

WARRING WILKINSON,
Principal.

BERKELEY, December 13, 1908.

PRINCIPAL'S RESIDENCE—INSTITUTION FOR THE DEAF AND THE BLIND.

REPORT OF PHYSICIAN.

The Principal and Directors, California Institution for the Deaf and the Blind.

GENTLEMEN: I beg to submit the following tabulated report of sickness occurring among the pupils of the Institution during the two years ending June 30, 1908:

Disease.	No. of Cases.
Abscess	8
Anemia, simple	1
Appendicitis, chronic	1
Appendicitis, acute suppurative	2
Bronchitis	31
Chilblains	1
Chorea	1
Conjunctivitis (acute)	1
Corneal ulcer	1
Dislocation, knee	1
Ecthyma	1
Eczema, various forms	6
Epilepsy	3
Erythema	1
Fracture, clavicle	1
Fracture, nasal bones	1
Hernia, inguinal	1
Impetigo	10
Indigestion, acute	24
Influenza	3
Ingrowing nail	7
Lymphadenitis, neck (acute)	1
Malaria	4
Measles	7
Mumps	63
Neuralgia, face	1
Otitis media, acute suppurative	2
Pneumonia	1
Panopthalmitis	2
Paronychia	1
Poison oak dermatitis	4
Rheumatism	2
Sprain, ankle	4
Sprain, knee	2
Stomatitis, acute apthous	1
Stye	1
Synovitis, knee (acute)	2
Tonsilitis (acute)	15
Tinea circinata, ringworm	4
Tinea tonsurans	6
Tumor of brain, undetermined	1
Urticaria	2
Varicella	21
Wounds (contused)	4
Wounds (incised)	6
Wounds (larcerated)	8
Wounds (punctured)	5

No deaths occurred at the Institution during this period, but one child, the case of brain tumor, died at home while still enrolled as a pupil. For the most part, the sickness noted has not been of a serious nature, and for the greater portion of the two years we have been free from contagious disease, the cases of mumps, measles, and chickenpox in the above list having all occurred early in 1907.

Very respectfully,

T. C. McCLEAVE,
Physician.

TREASURER'S STATEMENT.

FOR THE TWENTY-FOUR MONTHS, ENDING JUNE 30, 1908.

STATE APPROPRIATION.

Received from State Treasurer	$133,742 25	
Disbursements.		
Pay rolls		$91,572 67
Supplies as per vouchers		42,169 58
	$133,742 25	$133,742 25

CONTINGENT FUND.

To cash from State Treasurer	$13,673 04	
To miscellaneous receipts	12,693 18	
Disbursements.		
By sundry accounts as per vouchers		$13,673 04
By cash sent State Treasurer		12,693 18
	$26,366 22	$26,366 22

DURHAM FUND.

July 1, 1906—Cash on hand	$10,835 17	
June 30, 1908—Interest and dividends	6,870 61	
Received from loans	3,500 00	$21,205 78
Disbursements.		
June 30, 1908—As per vouchers, including loans		18,799 68
Cash on hand		$2,406 10

STRAUSS FUND.

July 1, 1906—Cash on hand	$6,009 55	
June 30, 1908—Interest and dividends	1,349 21	$7,358 76
Disbursements.		
June 30, 1908—Paid as per vouchers including loans		7,167 90
Cash on hand		$190 86

LIBRARY FUND.

July 1, 1906—Cash on hand	$837 60	
June 30, 1908—Interest and dividends	45 90	$883 50
Disbursements.		
Paid as per vouchers		90 00
Cash on hand		$789 50

VER HUELL FUND.

Cash on hand	$2,669 00	
Interest and dividends	43 75	$2,712 75
Loan		2,650 00
Cash on hand		$62 75

CASH BALANCE JUNE 30, 1908.

Durham Fund deposit with Farmers' and Merchants Savings Bank	$2,406 10
Strauss Fund deposit with Union Savings Bank, Oakland	190 86
Library Fund deposit with Union Savings Bank, Oakland	789 50
Ver Huell Fund deposit with Berkeley Bank of Savings and Trust Co.	62 75
Total	$3,449 21

ASSETS.

Cash on hand	$3,449 21
Bills receivable	74,914 53
	$78,363 74

DETAILED STATEMENT OF BILLS RECEIVABLE.

Charles Jurgens	$25,000 00
Gaskill Company	25,000 00
Eletta M. Brown	5,000 00
M. S. and W. H. Kellogg	3,500 00
M. Z. and W. P. Putnam	4,000 00
Carmel C. Jacott	5,000 00
Douglas Tilden	2,221 80
Newell Perry	1,990 00
G. S. Redmond	2,065 23
Theo. Grady	450 00
James W. Howson	687 50
	$74,914 53

Respectfully submitted.

W. E. GRIFFITH,
Treasurer, California Institution for the Deaf and Blind.

Subscribed and sworn to before me this 2d day of December, 1908.

JOHN C. COBURN,
[SEAL] Notary Public in and for the County of Alameda,
State of California.

DISSECTIONS.

SALARIES AND WAGES.

Principal and teachers	$44,872 44
Physician, clerks, and matrons	15,669 38
Help	19,123 89
Treasurer	2,000 00
Total	$81,665 71

GROCERIES AND PROVISIONS.

Ammonia carb., 20 ℔s	$4 40
Apple butter, etc	104 92
Bacon, 1,221¾ ℔s	233 32
Baking powder, 234℔s	72 78
Bath brick, 2 doz	80
Beans, bayo, 1,399 ℔s	56 05
Beans, Lima, 526℔s	26 63
Beans, white, 1,768 ℔s	61 79
Butter, 9,768½ ℔s	2,961 38
Canned goods, 203 doz	440 35
Capers	2 90
Cheese, 965 ℔s	175 41
Chocolate, 114 ℔s	54 98
Citron	5 75
Cocoa, 60 ℔s	22 38
Cocoanut, 54 ℔s	12 96
Coffee, 1,692 ℔s	284 39
Cornmeal, 4,220 ℔s	78 05
Cornstarch, 279 ℔s	22 42
Crackers, soda, 2,157 ℔s	155 63
Crackers, mixed	5 80
Cream of tartar, 24 ℔s	7 50
Currants, 351 ℔s	32 28
Eggs, 1,998 doz	625 94
Extracts	36 05
Farina, etc	9 50
Fish, fresh	288 18
Fish, salt	58 75
Flour, graham	25 80
Flour, rye, 1½ bbls	7 71
Flour, white, 438½ bbls	2,185 60
Fruit, dried	328 15
Fruit, fresh	762 98
Gelatine	4 80
Ham, 2,612½ ℔s	440 16
Honey, 11 gals	12 25
Lard, 2,605 ℔s	322 58
Lye, 9 doz	7 05
Macaroni, etc., 1,130 ℔s	53 02
Meat, 76,581 ℔s	6,060 79
Mincemeat, 479 ℔s	59 76
Molasses, 103 gals	39 73
Mustard, 90 ℔s	$14 45
Oats, rolled	95
Olive oil	125 57
Peas, split, 1,009 ℔s	45 86
Pepper	22 67
Pickles	23 85
Pickles, keg, 180 gals	43 92
Polish	26 95
Potatoes	1,109 19
Poultry	184 45
Raisins, 235 ℔s	21 70
Rice	182 20
Saleratus, 72 ℔s	3 60
Sal soda, 7,500 ℔s	111 75
Salt, coarse, 500 ℔s	2 80
Salt, dairy, 300 ℔s	2 10
Salt, table, 4,370 ℔s	35 40
Saltpeter, 55 ℔s	5 38
Salt pork, 810 ℔s	111 59
Sapolio, 5 gross	45 00
Sauce	26 85
Silicon, 2 doz	1 55
Soap, brown, 6,290 ℔s	287 80
Soap, Ivory, 21 boxes	147 25
Soap, powdered	34 20
Spices	17 80
Sugar, brown, 650 ℔s	28 12
Sugar, granulated, 28,400 ℔s	1,411 10
Sugar, cube, 250 ℔s	13 34
Sugar, powdered, 300 ℔s	19 34
Syrup, 394½ gals	115 17
Syrup, maple, 15 gals	13 40
Tapioca, etc	24 23
Tea, 465 ℔s	140 75
Vegetables	64 66
Vinegar, 230 gals	42 90
Washing ammonia, 18½ doz.	44 30
Wheat, rolled, 28½ bbls	111 35
Yeast	96 02
Total	$20,891 18

CLOTHING.

Buttons	$10 07	Rubber sheeting	$8 67
Combs, brushes, etc	23 62	Shoe blacking	12 49
Clothes brushes	7 00	Shoe laces	12 63
Darning cotton	7 02	Shoe repairs	66 10
Elastic	8 94	Shoe brushes, 6 doz	16 50
Handkerchiefs	3 50	Suspenders	6 47
Hosiery	45 35	Tape	2 10
Nail and tooth brushes	11 60	Thread	32 40
Overalls, 10 doz	58 66		
Pins, needles, etc	14 62	Total	$347 74

FURNITURE.

Baskets	$1 25	Oil cloth	$6 08
Blankets, 26 pair	69 00	Pails, 5¾ doz	28 90
Brooms, 17 doz	68 40	Pillows	3 00
Carpets, 78 yds	97 45	Preserve jars	12 25
Carpet cleaning	88 20	Quilts, 1 doz	11 28
Chairs and repairs	60 40	Rubber blankets	19 11
Clocks and repairs	6 22	Scrub brushes	19 55
Crockery	261 60	Sewing machine repairs	4 10
Cutlery	76 48	Sponges	4 00
Curtains	9 88	Sheeting, 1,120 yds	221 65
Dust and floor brushes	106 60	String	11 30
Dust pans	4 25	Table cloth	95 29
Enamel ware	8 85	Thread	5 50
Feather dusters	30 00	Ticking	11 26
Hair, 50 lbs	22 50	Tinware	51 45
Kitchen utensils	27 25	Toweling	199 93
Mats and matting	48 81	Upholstering	6 55
Mattresses and repairs	107 95	Wrapping paper	11 73
Mop cloths, 15 doz	64 60		
Mop and brush handles	19 65	Total	$1,921 95
Napkins	19 68		

BUILDING AND REPAIRS.

Belting	$5 21	Lumber	$624 58
Bricks	6 60	Painting and papering	1,268 05
Cement, 17 bbls	41 85	Paints, oils, etc	478 91
Fire clay	7 50	Plumbing and supplies	348 34
Glass, putty, etc	177 00	Pump repairs	16 50
Glue	7 45	Range repairs	55 15
Gravel and sand	94 00	Roof repairs	68 75
Hardware	173 45	Sewer pipe	1 00
Heating apparatus repairs	22 25		
Lime, 3 bbls	7 35	Total	$3,403 94

FUEL AND LIGHT.

Candles	$10 10	Gasoline, 100 gals	$17 75
Coal, 226 tons, 320 lbs	2,585 58	Lamps, etc	12 70
Coal scrgs., 432 tons, 2,110 lbs.	2,646 57	Machine oil, 140 gals	90 48
Coal oil, 150 gals	15 35	Matches	13 12
Electric lamps	76 25	Machine repairs	18 07
Electric lights	21 30	Wages	3,880 20
Electric repairs	32 26	Wheelbarrows, 2	14 66
Gas	832 92	Wood, 35¾ cords	350 50
Gas fixtures	11 15		
Gas regulator	27 80	Total	$10,656 76

LAUNDRY.

Baskets, 6	$10 50	Starch, 1,047 lbs.	$69 69
Blueing, 56 lbs.	7 70	Soda, 420 lbs.	11 50
Clothespins	05	Wages	2,723 48
Caustic soda, 720 lbs.	54 85	Wax	7 70
Chloride of lime, 766 lbs.	30 95	Washboard	30
Machine repairs	22 54		
Oxalic acid, 65 lbs.	8 05	Total	$2,958 51
Mangle blanket	11 20		

STABLE AND DAIRY.

Alfalfa meal, 500 lbs.	$6 25	Middlings, 24,856 lbs.	$396 23
Barley, 1,201 lbs.	18 82	Oats, 2,377 lbs.	42 66
Bran, 66,987 lbs.	883 21	Oil cake meal, 5,485 lbs.	122 95
Buggy and wagon repairs	14 00	Pails and cans	5 70
Cocoanut meal, 200 lbs.	3 15	Salt	1 00
Chopped feed, 1,554 lbs.	21 76	Veterinary expense	20 00
Corn, 927 lbs.	16 27	Wages	1,768 00
Farm implements	35 00	Wheat, 10,117 lbs.	178 22
Harness and repairs	21 40		
Hay, 363,738 lbs.	2,524 66	Total	$6,225 28
Horse shoeing	146 00		

INDUSTRIAL DEPARTMENT.

Carpenter Shop—		*Printing Office—*	
Ammonia	$7 35	Ink	$1 90
Glue	2 70	Machine repairs	22 66
Hardwood	177 86	Paper	153 72
Tools	42 45	Type, etc.	32 55
Wages	1,037 35	Wages	550 00
		Total	$2,028 54

MISCELLANEOUS.

Blacksmithing	$5 25	Piano and organ repairs	$129 50
Books and stationery	655 61	Rope	4 94
Collection charges	60 10	Scales	6 00
Diplomas	6 50	Seal	8 50
Directories	12 00	Seeds	15 35
Drugs, etc.	277 40	Stamps	134 36
Electric bells and fixtures	32 20	Subscriptions to magazines	62 28
Expense, pupils, parties, etc.	46 00	Telegrams	5 13
Express charges	164 90	Telephones	239 15
Flag	8 50	Traps, poisons, etc.	6 80
Freight	61 70	Traveling expenses	8 05
Garden tools	103 09	Typewriter repairs	44 80
Hose	63 75	Water	1,324 07
Ice	20 05	Wrapping paper, etc.	85 00
Lye	2 15		
Music	49 51	Total	$3,642 64

RECAPITULATION.

Salaries and wages	$81,665 71
Groceries and provisions	20,891 18
Clothing	347 74
Furniture	1,921 95
Building and repairs	3,403 94
Fuel and light	10,656 76
Laundry	2,958 51
Stable and dairy	6,225 28
Industrial department	2,028 54
Miscellaneous	3,642 64
Total	$133,742 25

CONTINGENT FUND.

Blacksmithing	$30 25
Chair seats	19 50
Carpenter work	1,829 15
Carpets and cleaning	270 28
Christmas expenses	95 35
Clothing	775 28
Coal	1,269 46
Dental work	33 25
Earthquake repairs	5,349 93
Engineer's supplies	38 97
Expressage	12 00
Garden tools	11 10
Gas	47 60
Glass	36 27
Glass eyes	18 00
Hardware	78 60
Heaters, etc	480 53
Hides	24 00
Hospital expenses	55 50
Labor on grounds	238 25
Lumber	501 52
Paints	$348 36
Paper	11 00
Phaeton	160 00
Piano tuning, etc	81 00
Plumbing	37 31
Retinning boilers, etc	35 00
Rock	70 00
Roof repairs	87 83
Sewer pipe	14 30
Shoes	396 35
Shoe repairing	679 40
Subscription to Annals of the Deaf	15 00
Traveling expenses and sund.	410 82
Type	18 73
Typewriter repairs	29 15
Veterinary expenses	12 00
Watchman's clock	52 00
Total	$13,673 04

LIST OF PUPILS IN THE INSTITUTION.

FOR THE TWO YEARS ENDING JUNE 30, 1908.

DEAF BOYS.

Name.	Town.	County.
Abbott, Ashbel	Soledad	Monterey
Barthe, John	Livermore	Alameda
Barwise, William	Pomona	Los Angeles
Beck, Mark	Vallejo	Solano
Beck, Hyrum	Oakland	Alameda
Behl, Joseph	San Jose	Santa Clara
Beebe, Arthur	Safford	Arizona
Bonetti, Henry	Santa Clara	Santa Clara
Bonetti, Olivo	Santa Clara	Santa Clara
Bonzani, Charles	San Gregorio	San Mateo
Burrell, Fred	Dos Palos	Merced
Broderick, Edward	Berkeley	Alameda
Brinkley, Ray	Fort Apache	Arizona
Burton, Roy	Fresno	Fresno
Cademartori, David	San Francisco	San Francisco
Christiansen, George	Berkeley	Alameda
Connick, Platt	Dougherty	Alameda
Comerford, William	Barnwell	San Bernardino
Cordero, Augustin	Santa Barbara	Santa Barbara
Croll, Martin	Alameda	Alameda
Curtiss, Almon	Chico	Butte
Curtiss, Oscar	Chico	Butte
Davidson, Melvin	Oakland	Alameda
Davis, George	Lawrence	Santa Clara
De Grosellier, A.	Carson City	Nevada
Dodge, Morse	Mendocino	Mendocino
Doane, Clarence	Rialto	San Bernardino
Dutton, Clive	Berkeley	Alameda
Dwyer, Loren	Richmond	Alameda
Elmer, Leslie	San Jose	Santa Clara
Ferguson, Harold	Holtville	San Bernardino
Franck, Henry	San Francisco	San Francisco
Francis, George	Pomona	Los Angeles
Fonseca, William	San Francisco	San Francisco
Gabrielli, Joe	Sacramento	Sacramento
Genignani, Victor	Sacramento	Sacramento
Gleason, Thomas	San Francisco	San Francisco
Gliddon, Don	Berkeley	Alameda
Guire, Oscar	Colton	San Bernardino
Hart, William	Princeton	Colusa
Hawvichorst, Robert	Los Angeles	Los Angeles
Heitshusen, John	Anaheim	Los Angeles
Hill, Vivian	Berkeley	Alameda
Hytti, Hjalmar	Sawyer's Bar	Siskiyou
Issoglio, Arthur	Jerome	Arizona
Jones, Verdi O.	Porterville	Tulare

DEAF BOYS—*Continued.*

Name.	Town.	County.
Johnson, Harold	Los Angeles	Los Angeles
Kaiser, Diedrich	Fruitvale	Alameda
Kett, Robert	Tehachapi	Kern
Kibby, Norman	Cupertino	Santa Clara
Knarston, Irvine J.	Nanaimo	British Columbia
Kohrumel, William	Red Bluff	Tehama
Kramback, Herman	Santa Cruz	Santa Cruz
Land, Bruce	Napa	Napa
Lawton, William	San Francisco	San Francisco
Lopez, Clemons	Berkeley	Alameda
Matson, George	San Francisco	San Francisco
Marlatt, Thomas	San Francisco	San Francisco
Martorano, Michele	San Jose	Santa Clara
Majourau, Victor	Redwood City	San Mateo
Matthews, Charles	Arcata	Humboldt
McNeil, Charles	Loyalton	Sierra
McNeilly, Harold	Reno	Nevada
McLaughlin, Charles	Fresno	Fresno
Moore, Clinton G.	Richmond	Contra Costa
Moynahan, John	Vallejo	Solano
Neil, Henry	Pope Valley	Napa
Nelson, Carl	Visalia	Tulare
Nutting, George	San Francisco	San Francisco
O'Brien, Meredith	Oakland	Alameda
Pale, Charles	San Francisco	San Francisco
Patheal, Monroe	San Jose	Santa Clara
Peixotto, Antone	Centerville	Alameda
Phillips, Charles	Oakland	Alameda
Phillips, George C.	Oakland	Alameda
Phelps, George	Oroville	Butte
Poole, Earl	Yreka	Siskiyou
Purbeck, Ernest	St. Helena	Napa
Ross, Leslie	Napa	Napa
Sanchez, Reginaldo	Los Angeles	Los Angeles
Sangmaster, Nome	Blue Canyon	Placer
Schneider, Milton	Oakland	Alameda
Schwarzlose, Harry	Alameda	Alameda
Sherman, John	Fresno	Fresno
Sherman, Lafayette	Fresno	Fresno
Smith, Alexander	Colusa	Colusa
Spencer, Albert	Lodi	San Joaquin
Stewart, Ernest	Eureka	Humboldt
Stevens, William	Virginia City	Nevada
Taylor, Fred C.	San Francisco	San Francisco
Thomas, Rhea	San Francisco	San Francisco
Thurman, Merle	Redding	Shasta
Tyhurst, William	Napa	Napa
Thorn, Milton	Berkeley	Alameda
Vaio, Charles	Stockton	San Joaquin
Valiant, Walter	San Francisco	San Francisco
Walker, William H.	Pollasky	Fresno
Weber, Carl	Chico	Butte
White, Albert	Richmond	Contra Costa
Whitworth, George	Newman	Stanislaus
Wile, Edward	San Francisco	San Francisco
Wilder, Herman	Visalia	Tulare

DEAF BOYS—*Continued.*

Name.	Town.	County.
Wilsey, Silas	Highland	San Bernardino
Wills, Eddie	San Francisco	San Francisco
Wimber, John W.	Hanford	Tulare
Winters, Ebbie	Oakland	Alameda
Wilson, Harry P.	Berkeley	Alameda
Wilson, James W.	Berkeley	Alameda
Yeghoian, Joseph N.	Fresno	Fresno

DEAF GIRLS.

Arnold, Lily	Allendale	Alameda
Baars, Charlotte	Berkeley	Alameda
Baertschiger, Anna	Los Angeles	Los Angeles
Beal, Elsie	San Francisco	San Francisco
Bilby, Stella M.	Fresno	Fresno
Billings, Caro	Yountville	Napa
Bonzani, Pauline	San Gregorio	San Mateo
Broderick, Amy	Berkeley	Alameda
Case, Viola	Paradise	Nevada
Castro, Millentino	San Francisco	San Francisco
Cohn, Annie	San Francisco	San Francisco
Cohn, Ida	San Francisco	San Francisco
Comacho, Annie	San Leandro	Alameda
Conrad, Goldie	Dinuba	Tulare
Cota, Maria	Montecito	Santa Barbara
Cowles, Inez	Sacramento	Sacramento
Cook, May Belle	Yreka	Siskiyou
Cox, Agnes J.	Fresno	Fresno
Cruz, Hortense	Compton	Los Angeles
Cundiff, Beulah	San Francisco	San Francisco
De Large, Irene	Prescott	Arizona
Delmas, Caroline	Millwood	Fresno
Dunsmore, Laura	Turlock	Stanislaus
Dunnigan, Florence	Berkeley	Alameda
Egan, Edna	San Francisco	San Francisco
Freel, Ida	Stockton	San Joaquin
Freitas, Annie	Haywards	Alameda
Fries, Ethel	Long Beach	Los Angeles
Forbes, Ramona	Santa Maria	San Luis Obispo
Garcia, Josefa	Pomona	Los Angeles
Ghiorsi, Marie	Stockton	San Joaquin
Golden, Algie	San Francisco	San Francisco
Gregory, Elva	Oil Center	Kern
Grider, Edna	Porterville	Tulare
Guerrero, Rebecca	Bakersfield	Kern
Hansen, Meta	Cupertino	Santa Clara
Hall, Grace	Phœnix	Arizona
Harde, Freda	San Francisco	San Francisco
Hare, Irene	Berkeley	Alameda
Harrison, Carmelita	Sebastopol	Sonoma
Heil, Grace	Los Angeles	Los Angeles
Hoffmann, Martha	St. Helena	Napa
Hogan, Myrtle	San Jose	Santa Clara
Hopkins, Amy	Potter Valley	Mendocino
Ikin, May	Berkeley	Alameda
Johnson, Amelia	Oceanview	San Francisco

DEAF GIRLS—*Continued.*

Name.	Town.	County.
Johnson, Myrtle	Black Diamond	Contra Costa
Jesson, Louise	Watsonville	Santa Cruz
Kaiser, Augusta	Fruitvale	Alameda
Kenney, Anna	Madera	Madera
Larimer, Mildred	Santa Rosa	Sonoma
Lee, Lily	Reno	Nevada
Lund, Grace	Elmhurst	Alameda
Marketta, Pearl	Weed	Siskiyou
Matsuda, Mary	San Francisco	San Francisco
McCarthy, Sadie	Los Angeles	Los Angeles
Millar, Irene	San Rafael	Marin
Mitchell, Wildey	Selma	Fresno
Montgomery, Gladys	Oakland	Alameda
Montgomery, Joycie	Oakland	Alameda
Moynahan, Annie	San Francisco	San Francisco
Mutch, Viola	Honolulu	Hawaiian Islands
Nash, Mary E.	Edenvale	Santa Clara
Nelson, Edith M.	Turlock	Stanislaus
Noll, Martha	Irvington	Alameda
Overton, Georgia	Chico	Butte
Peters, Maggie	San Francisco	San Francisco
Reilly, Mary E.	Porterville	Tulare
Risher, Mary	San Bernardino	San Bernardino
Roy, Ella R.	Los Angeles	Los Angeles
Schiff, Lena	San Francisco	San Francisco
Schmidt, Freda	Santa Rosa	Sonoma
Shattuck, Phebe	San Francisco	San Francisco
Shea, Lilian	Los Angeles	Los Angeles
Shimonowsky, Dora	Willits	Mendocino
Simpson, Nora	Coronado	San Diego
Simpson, Mollie	Coronado	San Diego
Sink, Genevieve	Cloverdale	Sonoma
Stacks, Bessie	Elliott	San Joaquin
Stauts, Edith	Carson City	Nevada
Stubbs, Gertrude	Duarte	Los Angeles
Sturm, Hattie	Berkeley	Alameda
Taylor, Helen	Napa	Napa
Tanzmann, Helen	San Francisco	San Francisco
Terrell, Stella	Oroville	Butte
Thom-Wohrden, Edna	San Francisco	San Francisco
Waters, Ava	Tracy	San Joaquin
Walker, Ethel C.	Los Angeles	Los Angeles
Walker, Myrtle	Santa Rosa	Sonoma
Yung, Ada	Oakland	Alameda
Zoanni, Maria	Hamilton	Nevada

BLIND BOYS.

Name.	Town.	County.
Abraham, Gabriel	San Francisco	San Francisco
Allen, Walter	Grass Valley	Nevada
Baker, Henry	Sacramento	Sacramento
Bailey, George C.	San Jose	Santa Clara
Bangs, George A.	Santa Cruz	Santa Cruz
Bohlender, Ernest	Berkeley	Alameda
Booth, Robert	Nanaimo	British Columbia
Breuyer, Fred	Los Angeles	Los Angeles

BLIND BOYS—*Continued.*

Name.	Town.	County.
Cloutman, Joseph	San Francisco	San Francisco
Craig, Walter	Martinez	Contra Costa
Cunha, Anthony	San Lorenzo	Alameda
Dean, Franklin	Los Angeles	Los Angeles
Deckard, Everett	Melrose	Alameda
Ernst, Roy	Sacramento	Sacramento
Forester, Frank	Pomona	Los Angeles
Gedge, Jonathan	Vallejo	Solano
Groshell, William	Del Mar	San Diego
Hammers, George	Alameda	Alameda
Harlan, Leland	Williams	Colusa
Hines, Charles J.	San Francisco	San Francisco
Ingalls, William	San Francisco	San Francisco
Ingalls, Chester	San Francisco	San Francisco
Kaunitz, Hilbert	San Francisco	San Francisco
Kenyon, Floyd	Chico	Butte
Kenyon, Roy	Chico	Butte
Leslie, Ernest	Berkeley	Alameda
Leonard, John	San Francisco	San Francisco
Lee, Cecil	San Francisco	San Francisco
Luna, Rafael	Los Angeles	Los Angeles
Lyon, Earl	Reno	Nevada
Macdonald, Carl	Sites	Colusa
McDonald, George	San Francisco	San Francisco
Miller, Polk	Ukiah	Mendocino
Miller, Valentine	Ukiah	Mendocino
Morgan, Edward	Berkeley	Alameda
McEnerny, Paul	Galt	San Joaquin
Olcese, Frank	Hornitos	Mariposa
Pettis, Charles	Fresno	Fresno
Phillips, Owen	Niles	Alameda
Platt, Raymond	Oakland	Alameda
Poulsen, Charles	Lompoc	Santa Barbara
Rinaldi, Bertolo	Visalia	Tulare
Robinson, Arthur	Compton	Los Angeles
Scurlock, Walter	San Francisco	San Francisco
Sheely, Ira	Oakland	Alameda
Schlingheyde, Leslie	Berkeley	Alameda
Shepherd, James	Arcata	Humboldt
Smithers, Shelby	Cambria	San Luis Obispo
Stover, Elmer	San Francisco	San Francisco
Sullivan, George J.	Windsor	Sonoma
Svensen, Andrew	Berkeley	Alameda
Weis, Edward	San Francisco	San Francisco
Wheaton, Donald	Alameda	Alameda

BLIND GIRLS.

Alison, Tilly	Lincoln	Placer
Barker, Laura	Cornwall	Contra Costa
Bowles, Jessa	Livermore	Alameda
Brown, Marguerite	Milton	Calaveras
Carter, Mabel L.	Los Angeles	Los Angeles
Chambers, Leah	Sacramento	Sacramento
Dawson, Kathleen	San Francisco	San Francisco
Dean, Martha	Long Beach	Los Angeles

BLIND GIRLS—*Continued*

Name.	Town.	County.
Dixon, Edna	Los Angeles	Los Angeles
Finnerty, Ruby	San Francisco	San Francisco
French, Marguerite	Oakland	Alameda
Graham, Marguerite	Berkeley	Alameda
Hamann, Eva	San Francisco	San Francisco
Hickcox, Winifred	Etiwanda	San Bernardino
High, Minnie	Berkeley	Alameda
Jeffrey, Minnie B.	San Francisco	San Francisco
Keough, Margaret	San Francisco	San Francisco
Knapp, Ethel	Redding	Shasta
La Flamme, Bernice	Los Angeles	Los Angeles
Mange, Clorinda	Alameda	Alameda
McAtee, Marguerite	San Francisco	San Francisco
Muir, Marguerite	Oakland	Alameda
Murphy, Maud	Bauvard	Nevada
Phillips, Frances	Winnemucca	Nevada
Pierson, Edith E.	Oracle	Arizona
Piper, Hazel	Virginia City	Nevada
Reilly, Rose E.	Bella Vista	Shasta
Reynolds, Ruth	San Leandro	Alameda
Schumacher, Annie	San Francisco	San Francisco
Shorten, Marion	San Francisco	San Francisco
Ward, Marie	Calistoga	Napa
Wilber, Leona	Clovis	Fresno
Young, Louise	San Francisco	San Francisco

TERMS OF ADMISSION.

The California Institution for the Deaf and the Blind is located at Berkeley, about four miles north of the city of Oakland.

Between San Francisco and Berkeley, railroads and ferries offer communication every ten minutes of the day, and from Oakland there are two lines of electric cars which land passengers within five minutes' walking distance of the Institution.

The Institution offers its benefits to all deaf or blind persons who are of age suitable for instruction, who are of sound intellect, and free from vicious habits and contagious or offensive diseases.

No charge is made for pupils from this State, except for clothing and traveling expenses.

Pupils from other States or Territories are charged $300 per annum, payable quarterly in advance. No reduction is made from annual charge, except in case of prolonged absence by reason of sickness.

The session begins on the fourth Wednesday in August, and ends on the second Wednesday in June. Parents are earnestly requested to enter or return their children promptly at the beginning of the term. Only in extreme cases will pupils be permitted to leave before school closes.

Pupils should be provided with comfortable clothing when they enter the Institution, and their wardrobe renewed twice a year.

All moneys designed for pupils should be placed in the hands of the Principal, to whom, also, all letters of inquiry should be addressed. Money orders should be drawn on the Berkeley post office, and all letters, packages, trunks, etc., should be addressed "Institution for the Deaf and the Blind, Berkeley, Cal."

Parents or guardians of applicants for admission are requested to furnish answers to the following questions:

1. What is the name of the applicant?

2. When and where was he born?

3. Is his deafness or blindness from birth, or is it from accident or disease? If from accident or disease, at what age and from what cause did he become deaf or blind?

4. Is his deafness or blindness total or partial? If the latter, what is his degree of hearing or sight?

5. Have any attempts been made to remove his deafness or blindness? If so, what were the results?

6. Are there any other cases of deafness, blindness, idiocy, or insanity in the family, or among the collateral branches of kindred? If so, state the relationship?

7. Was ther any blood relationship between parents and grandparents?

8. Has the child had smallpox, scarlet fever, mumps, whooping-cough, or measles? Has it been vaccinated?

9. What are the names, nationally, and post office address of parents?

10. What is the number of other children?

11. How long have parents lived in California?

REPORT

OF

Commissioner for Revision and Reform of the Law

GENERAL LAWS CODIFIED, GENERAL LAWS REPEALED, CODE SECTIONS AMENDED AND NEW SECTIONS ADDED

J. W. WILEY, Commissioner

1909

SACRAMENTO:
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1909.

December, 5, 1908.

The following acts of the legislature, commonly called ''General Laws,'' have been recommended for repeal or codification as stated in the notes thereto.

In codifying the general laws, it has not been the purpose of the Commissioner to make any substantial changes therein, except where necessary to harmonize with other portions of the law, or to render the same more efficient, but to bring them under the proper headings in the respective codes.

GENERAL LAWS CODIFIED AND NEW SECTIONS ADDED.

The act of March 31, 1891 (Statutes 1891, page 237), authorizing the controller and treasurer to transfer to the general fund all moneys to the state drainage construction fund, is codified as section 691 of the Political Code.

The new section reads as follows:

Sec. 691. The controller is hereby authorized to transfer to the general fund all moneys standing to the credit of the state drainage construction fund, and also, from time to time, to transfer to the general fund all moneys that may hereafter be paid into the state drainage construction fund. The controller immediately after making such transfers shall notify the treasurer of the same, and the treasurer shall thereupon make corresponding transfers upon the books of his office.

The act of March 2, 1899 (Statutes 1899, page 46), relating to the desecration of the American flag, is codified as section 648*b* (new) of the Penal Code.

The new section reads as follows:

Sec. 648*b*. Any person who shall desecrate the flag of the United States, by printing thereon or attaching thereto any advertisement of any nature whatsoever, shall be deemed guilty of a misdemeanor.

The act of February 20, 1872 (Statutes 1872, page 121), relating to military academies, is codified as sections 2047 and 2048 of the Political Code.

The new sections read as follows:

Sec. 2047. When any military academy has been established within the state, having not less than eighty boys, uniformed, drilled, and instructed in strict accordance with the tactics of the regular United States army service, and all its course of education and economy conducted upon strict military principles, the military instructor of such academy, when regularly elected by the board of trustees or other lawful authority of the academy, be commissioned in the national guard of California, with the rank of major.

Sec. 2048. Upon giving bond, with good security, to be approved by a judge of the superior court of the county where the academy is situated, conditioned for the safe-keeping against fire, loss, and against all damages, in twice the value, that arms and accoutrements, the property of the state, be issued for the use of the military academy, mentioned in section two thousand forty-seven, and the adjutant-general of the state is hereby authorized to issue such arms and accoutrements as may be needed by the said military academies, without a monthly allowance, in the same manner as arms and accoutrements are issued to regular organized companies of the national guard of California, upon requisition made for this purpose, approved by the commander-in-chief.

The act of March 10, 1891 (Statutes 1891, page 47), requiring municipalities to grant annual vacations to members of the police force in the respective municipalities, is codified as section 721 of the Penal Code.

The new section reads as follows:

Sec. 721. In every city or city and county of this state where there is a regularly organized paid police force, the board of supervisors, common council, commissions, or other body having the management and control of the same, and required once in every year to provide for granting each member thereof a leave of absence from active duty for a period of not less than ten nor more than fifteen days. Leaves of absence so granted must be arranged by said board or commission so as not to interfere with the police protection of any such city or city and county, or to impair in any way the efficiency of the department; and leaves of absence granted in case of sickness or in consequence of wounds or injuries received while in the discharge of duty shall not be construed to be or become a part of the leave of absence provided for by this act. No deduction must be made from the pay of any police officer granted a leave of absence under the provisions of this section.

The act of March 23, 1893 (Statutes 1893, page 183), relating to the powers and duties of parole commissioners for the parole of and government of paroled prisoners, is codified as section 1088*a* (new) of the Political Code.

The new section reads as follows:

Sec. 1088*a*. The state board of prison directors of this state shall have power to establish rules and regulations under which any prisoner who is now or hereafter may be imprisoned in any state prison, and who may have served one calendar year of the term for which he was convicted, and who has not previously been convicted of a felony and served a term in a penal institution, may be allowed to go upon parole outside of the buildings and inclosures, but to remain while on parole in the legal custody and under the control of the state board of prison directors, and subject at any time to be taken back within the inclosures of said prison; and full power to make and enforce such rules and regulations and retake and imprison any convict so upon parole is hereby conferred upon said board of directors, whose written order so certified by the president of said board shall be a sufficient warrant for all officers named therein to authorize such officer to return to actual custody any conditionally released or paroled prisoner, and it is hereby made the duty of all chiefs of police, marshals of cities and villages, and sheriffs of counties, and all police, prison and peace officers and constables to execute any such order in like manner as ordinary criminal process; *provided, however,* that no prisoner imprisoned under a sentence for life shall be paroled until he shall have served at least seven calendar years. The governor of the state shall have like power to cancel and revoke the parole of any prisoner, and his written authority shall likewise be sufficient to authorize any of the officers named therein to retake and return said prisoner to the state prison, and his written order canceling or revoking the parole shall have the same force and effect and be executed in like manner as the order of the state board of prison directors. If any prisoner so paroled shall leave the state without permission from said board he shall be held as an escaped prisoner and arrested as such. (Amendment, Stats. 1901, p. 82.)

The act of March 20, 1905 (see amendments), relating to contagious diseases of animals, was amended March 23, 1907 (Stats. and Amdts. 1907, page 932), by substituting in lieu thereof an entirely different act relating to the different subject-matter.

It is therefore recommended that the substance of the original act of March 20, 1905, be reënacted as sections 374*b*, 374*c*, and 374*d*, of the Penal Code.

The new sections read as follows:

Sec. 374*b*. Any person having the care, custody, or control of any animal that dies from tuberculosis, glanders, farcy, Texas fever, or other infectious disease, who does not immediately upon the death of such animal cremate or bury the carcass of the same, or cause the same to be cremated or buried, shall be deemed guilty of a misdemeanor.

Sec. 374*c*. Any common carrier of persons or freight that shall transport any animal suffering with, or that has died from the diseases, or any of them mentioned in section 374*b* of this code a greater distance than is necessary to transport such animal to the nearest crematory, shall be deemed guilty of a misdemeanor.

Sec. 374*d*. Any person who uses or sells the carcass or any portion thereof, of an animal that has died of any contagious disease as food for human beings or any domestic animal, or fowl, is guilty of a misdemeanor.

The act of April 18, 1880 (Statutes 1880, page 102), relating to the payment of the expenses of posse commitatus by the respective boards of supervisors, is codified as section 151 of the Penal Code.

The new section reads as follows:

Sec. 151. The board of supervisors of any county may allow, in their discretion, such compensation as they may deem just, to defray the necessary expenses that have been incurred by a posse comitatus in criminal cases; *provided,* no claim shall be allowed for expenses which have not been incurred within one year before such allowance.

A new section relating to appeals in divorce proceedings is added to the civil code, to be known as section 149.

The new section reads as follows:

Sec. 149. The right of the superior court to enforce its orders or judgments for the payment of money, or giving security therefor under the provisions of sections 136, 137, 138, 139, and 140, shall not be stayed or suspended by appeal unless an undertaking is given as provided in section 942 of the Code of Civil Procedure.

The various cemetery acts contained in the general laws have been combined with title XIII of the Civil Code relating to cemetery corporations, by amendment, repeal, and new sections added, and all of the general laws relating to the management and conduct of cemetery corporations repealed.

The sections of the Civil Code relating to cemetery corporations would then read as follows:

Sec. 608. Corporations, for the purpose of procuring, holding, and managing lands to be exclusively for a cemetery or place for the burial or cremation of the dead, may be formed by seven or more persons who must execute and file articles of incorporation as provided in chapter I, title I, part IV of this code. Upon receiving from the secretary of state a certificate of the filing with him of a certified copy of its articles of incorporation, such corporation becomes a body corporate, and by its corporate name has succession for the period limited in its articles and power—

First—To sue and be sued in any court.

Second—To make and use a common seal, and alter the same at pleasure.

Third—To purchase, hold, sell, and convey, such real and personal estate as the purposes of the incorporation shall require.

Fourth—To appoint such officers, agents, and servants, as the business of the corporation shall require to define their powers, prescribe their duties, and fix their compensation.

Fifth—To require of them such security as may be thought proper for the fulfillment of their duties, and to remove them at will, except that no trustee shall be removed from office unless by a vote of two thirds of the whole number of trustees, or by a vote of a majority of the trustees, on a written request, signed by one half of the lot owners.

Sixth—To make by-laws, not inconsistent with the laws of this state, for the organization of the company, the management of the property, regulation of its affairs, for holding meetings, and for carrying on all kinds of business within the object and purposes of the corporation. The affairs and property of such associations shall be managed by the trustees, who shall annually appoint, from among their number, a president and vice-president, and shall also appoint a secretary and treasurer, who shall hold their places during the pleasure of the board of trustees, and the trustees may require the treasurer to give security for the faithful performance of the duties of his office.

Seventh—To take and hold any real or personal property bequeathed, granted or given to it in trust, to apply the income thereof under the direction of the trustees of such corporation for the improvement or embellishment of such cemetery or crematory, or for the erection or preservation of any building, fence, or walks, erected or to be erected upon the land of such corporation or upon the lots or plats of any of the members, or for the preservation or removal of any tomb, monument, gravestone, fence, railing, or other structure or improvement, in or around any cemetery lot, plat or grave, or for the planting or cultivating of trees, shrubs, flowers, or plants, in, upon, or around any such lot, plat, or grave, or for improving or embellishing such cemetery, or any of the lots, or plats, in any form or manner, consistent with the design and purpose of the association, according to the terms of such grant, devise or bequest.

Sec. 610. Any association incorporated under this title may take, by purchase or devise, and hold, within the county in which the articles of incorporation are filed, not exceeding three hundred and twenty acres of land, to be held and occupied exclusively for a cemetery for the burial or cremation of the dead. Such land, or such parts thereof as may from time to time be required for that purpose, shall be surveyed and subdivided into lots or plats of such size as the trustees may direct, with such avenues, paths, alleys, and sites for buildings as the trustees deem proper; and a map or maps of such surveys shall be filed in the office of the county recorder of the county in which the land shall be situated; and after filing such map, the trustees may sell and convey the lots or plats designated upon such map, upon such terms as shall be agreed upon, and subject to such conditions and restrictions, to be inserted in or annexed to the conveyances, as the trustees shall prescribe. Any association incorporated under this act may hold personal property to an amount not exceeding five thousand dollars, besides what may arise from the sale of lots or plats.

Sec. 611. Such corporation may issue their bonds, bearing interest not exceeding twelve per cent per annum, for the purchase of lands for their cemeteries, payable out of the proceeds of the cemetery and not otherwise; sixty per cent of the proceeds of sale of lots, plats, and graves must be applied at least every three months to the payment of the bonds and interest. Such corporations may also agree with the person or persons from whom cemetery land shall be purchased, to pay for such lands, as the purchase price thereof, any specified share or portion, not exceeding sixty per cent of the proceeds of all sales made from such lands; such payment to be made at such intervals as may be agreed upon. In all cases where cemetery lands shall be purchased and agreed to be paid for in the manner last provided, the prices for lots or plats specified in the by-laws, rules, or regulations first adopted by such association, or prescribed in the agreement between the cemetery and the person or persons from whom the cemetery lands were purchased, shall not be changed without the written consent of a majority in interest of the persons from whom such lands were purchased, their heirs, representatives, or assigns.

Sec. 612. The annual election of trustees to supply the place of those whose term of office expires shall be holden on the day fixed in the by-laws, and at such hour and place as the trustees shall direct; at which election shall be chosen such member of trustees as will supply the places of those whose term expires. The trustees chosen at any election subsequent to the first, shall hold their places for three years, and until others shall be chosen to succeed them. But in all elections after the first, the trustees shall be chosen from among the proprietors of lots, or plats, and the trustees shall have power to fill any vacancy in their number occurring during the period for which they hold their office. Public notice of the annual elections shall be given in such manner as the by-laws of the corporation shall prescribe.

Sec. 617. Corporations incorporated under this title shall, have authority to purchase, lease, or erect buildings and appliances to be used exclusively for the purpose of cremating human bodies, and they may purchase, or lease, and hold land necessary for cremation purposes, or for the erection of columbariums for the entombing of the ashes of the cremated, when inclosed in metal or stone or cement vessels, and not otherwise; but no uncremated body shall be interred or placed for any time whatever inside of the walls, or in the walls of a place where the ashes of the cremated are deposited. Such associations shall invest their funds and use the proceeds thereof, after current expenses are paid, for the perpetual care of grounds, lots, buildings, and niches, according to contracts made and to be made with patrons, and in conducting its business such association shall have the same powers granted by law to corporations in general; *provided,* they shall have no authority to contract any pecuniary obligation whatever, nor shall they have power to levy or collect assessments. In case of epidemics or the prevalence of contagious diseases, or otherwise, the proper authorities of any county, city and county, city, or town, may order the unclaimed or unknown dead, and the dead who die in public institutions under the control of any county, city and county, city, or town, and the dead commonly buried at public expense, cremated, and their ashes immured or otherwise preserved in receptacles in columbariums, or interred in burial places; and human bodies, and parts of bodies, used in medical or other schools (except specimens to be preserved) shall not be cast into the waters of the state, nor on the ground, nor in the receptacles for refuse matter, nor in vaults, nor in sewers, but shall either be buried as deep in the ground as is by law required for dead bodies, or cremated, as in this act provided. But the remains of a person shall not be cremated by compulsion, under the provisions of this section, if he or his family, or any member thereof, or his church or spiritual adviser objects.

The act of March 23, 1893 (Statutes 1893, page 203), relating to the appointment of guardians of children, has been codified by the amendment of section 246 of the Civil Code.

The amended section reads as follows:

Sec. 246. In awarding the custody of a minor, or in appointing a general guardian, the court or officer is to be guided by the following considerations:

1. By what appears to be for the best interest of the child in respect to its temporal and its mental and moral welfare; and if the child is of a sufficient age to form an intelligent preference, the court may consider that preference in determining the question;

2. As between parents adversely claiming the custody or guardianship, neither parent is entitled to it as of right; but other things being equal, if the child is of tender years, it should be given to the mother; if it is of an age to require education and preparation for labor and business then to the father;

3. Of two persons equally entitled to the custody in other respects, preference is to be given as follows:

(1) To a parent;

(2) To one who was indicated by the wishes of a deceased parent;

(3) To one who already stands in the position of a trustee of a fund to be applied to the child's support;

(4) To a relative.

4. Any person who knowingly or willfully abandons, or having the ability so to do, fails to maintain his minor child under the age of fourteen years, forfeits the guardianship of such child; and any parent or guardian who knowingly permits his child or ward to remain for the space of one year in any orphan asylum of this state, wherein such child is supported by charity, and who, during such period, fails to give notice in writing to the managers or officers of such asylum that he is such parent or guardian, abandons and forever forfeits all right to the guardianship, care, custody, and control of such child. The officers and managers of any orphan asylum having any such abandoned child in its care have thereafter the preferred right to the guardianship of such child; *provided, however,* that such managers shall not be appointed guardian of a minor child over fourteen years of age without its consent, nor shall anything herein preclude the court of competent jurisdiction from inquiring into the fitness of such managers for the guardianship of such children.

The act of February 25, 1897 (Statutes 1897, page 29), should be amended to take effect January 1, 1909, and codified as section 1207 of the Civil Code.

The amended section reads as follows:

Sec. 1207. Any instrument affecting real property, which was, previous to the first day of January, one thousand nine hundred and nine, copied into the proper book of record, kept in the office of any county recorder, imparts, after that date, notice of its contents to subsequent purchasers and encumbrancers, notwithstanding any defect, omission, or informality thereof, or the absence of any such certificate; but nothing herein affects the rights of purchasers or encumbrancers previous to that date. Duly certified copies of the record of any such instrument may be read in evidence with like effect as copies of an instrument duly acknowledged and recorded; *provided,* when such copying in the proper book of record occurred within fifteen years prior to the trial of the action, it is first shown that the original instrument was genuine.

The act of March 11, 1874 (Statutes 1873-4, page 345), relating to conveyances of real estate and indexing thereof, is codified as follows:

Section 1 of said act is included in section 1096 of the Civil Code, and sections 2 and 3 thereof are included in section 4136 of the Political Code amended.

The amended section reads as follows:

Sec. 4136. The recorder may keep in the same volume any two or more of the indices mentioned in section forty-one hundred and thirty-two; but the several indices must be kept distinct from each other, and the volume distinctly marked on the outside in such a way as to show all the indices kept therein. The names of the parties in the first column in the several indices must be arranged in alphabetical order, and when a conveyance is executed by any public officer pursuant to any law of this state, the name of the officer and the party against whom the process or order was issued must be inserted in the index; and when an instrument is recorded to which an executor, administrator, or trustee is a party, the name of such executor, administrator, or trustee, together with the name of the testator, or intestate, or party for whom the trust is held, must be inserted in the index; if the title to the real estate is conveyed by or under a different name from that by or under which it was acquired, the county recorder shall alphabetically index in the "index of grantors," both in the name by which the title was acquired, and also in the name by which the same was conveyed.

The act of March 23, 1901 (Statutes 1901, page 589), relating to the powers of supervisors, is codified as an amendment to section 4041 of the Political Code.

The amended section reads as follows:

Sec. 4041. The boards of supervisors, in their respective counties, shall have jurisdiction and power, under such limitations and restrictions as are prescribed by law;

1. To supervise the official conduct of all county officers, and officers of all districts and other subdivisions of the county charged with the assessing, collecting, safe-keeping, management, or disbursement of the public revenues; to see that they faithfully perform their duties, direct prosecution for delinquencies, and, when necessary, require them to renew their official bonds, make reports and present their books and accounts for inspection.

2. To divide the counties into townships, election, school, road, supervisor, sanitary, and other districts required by law, change the same, and create others, as convenience requires.

3. To establish, abolish, and change election precincts and to appoint inspectors, clerks and judges of election, canvass all election returns, declare the result, and order the county clerk to issue certificates thereof; but no election precinct shall be established or abolished, or the boundaries of any precinct changed, within ninety days prior to any election.

4. To lay out, maintain, control, construct, repair, and manage public roads, turnpikes, ferries, wharves, chutes, and other shipping facilities and bridges within the county, unless otherwise provided by law, and to grant franchises and licenses to collect tolls thereon; *provided*, where the cost of the construction of any bridge, wharf, chute, or other shipping facilities that may be built under the provisions of this subdivision exceeds the sum of five hundred dollars, they must cause to be prepared

and must adopt plans and specifications, strain sheets, and working details, and must advertise for bids for the construction of such bridge, wharves, chutes, or other shipping facilities, unless otherwise provided by law, in accordance with the plans and specifications so adopted. All bidders shall be afforded opportunity to examine such plans and specifications, and said board shall award the contract to the lowest responsible bidder, and the plans and specifications so adopted shall be attached to and become a part of the contract; and the person or corporation to whom the contract is awarded shall be required to execute a bond, to be approved by said board, for the faithful performance of such contract; *provided,* that after the submission of the bids as herein provided, the board of supervisors being advised by the county surveyor that the work can be done for a sum less than the lowest responsible bid, it shall then be their privilege to reject all bids and to order the work done or structure built by day's work, under the supervision and control of the said surveyor; *provided further,* that the surveyor in such cases shall be held personally responsible, under his official bond, to construct said bridge or structure, according to his plans and specifications, at a cost not to exceed the amount of the lowest responsible bid received; *provided,* that the road commissioners or road overseers in their respective districts shall employ all labor required and direct the conduct of work of any kind upon any and all public roads; *provided further,* that in cases of great emergency, by the unanimous consent of the whole board, they may proceed at once to replace or repair any and all bridges and structures without notice.

5. To construct or lease, officer and maintain hospitals and almshouses, or otherwise, in their discretion; provide for the care and maintenance of the indigent sick or dependent poor of the county; and for such purposes to levy the necessary property or poll taxes, or both. The board of supervisors shall appoint some suitable person to take care of and maintain such hospitals and almshouses, and shall also appoint some suitable graduate or graduates in medicine to attend to such indigent sick or dependent poor, and to the patients in such hospitals and almshouses. The board shall not let the care, maintenance, or attendance of such indigent sick or dependent poor by contract to the lowest bidder.

6. To provide a farm, in connection with the county hospital, or almshouse, and make regulations for working the same.

7. To purchase, receive by donation, or lease any real or personal property or water rights necessary for use of the county, and to purchase or otherwise acquire necessary real estate upon which to sink wells to obtain water for sprinkling roads, and other county purposes, and to erect thereon tanks and reservoirs for the storage of water for such purposes, and to erect pumping apparatus for obtaining the same,

to preserve, take care of, and manage and control the same; but no purchase of real property shall be made unless a notice of the intention of the board to make such purchase, describing the property to be purchased, the price to be paid therefor, from whom it is proposed to be purchased, and fixing the time when the board will meet to consummate such purchase, has been published for at least three weeks in some newspaper of general circulation, published in the county; or if none be published in the county, has been posted at least three weeks prior to the time when the board meets to consummate such purchase, in at least three public places in each supervisor district.

8. To cause to be erected, or rebuilt, or furnished, a courthouse, jail, hospital, and such other public buildings, as may be necessary, or to provide suitable buildings for such purposes. None of the aforesaid buildings shall be erected or constructed until the plans and specifications have been made therefore and adopted by the board. All such buildings must be erected by contract, let to the lowest responsible bidder, after notice by publication in a newspaper of general circulation published in such county for at least thirty days. In case there is no newspaper published in such county, then such notice shall be given by posting in three public places.

9. To sell at public auction, at the courthouse door, or at such other place within the county as the board may, by a four-fifths vote, order, after thirty days' notice, given either by publication in a newspaper published in the county, or by posting in five public places in the county, and convey to the highest bidder for cash, any property belonging to the county not required for public use, paying the proceeds into the county treasury for the use of the county; *provided,* if in the unanimous judgment of the board, the property does not exceed in value the sum of seventy-five dollars, or if it be the product of the county farm, the same may be sold at private sale, without advertising, by any member of the board empowered for that purpose by a majority of the board.

10. To examine and audit, at least every twelve months, the accounts of all officers having the care, management, collection, or disbursement of moneys belonging to the county, or moneys received or disbursed by them under authority of law.

11. To examine, settle, and allow all accounts legally chargeable against the county, except salaries of officers, and such demands as are authorized by law to be allowed by some other person or tribunal, and order warrants to be drawn on the county treasurer therefor.

12. To levy taxes upon the taxable property of their respective counties for all county purposes, and also upon the taxable property of any district, for the construction and repair of roads and highways and other district purposes; *provided,* that no tax shall be levied upon any dis-

trict until the proposition to levy the same has been submitted to the qualified electors of such district, and received a majority of all the legal votes cast upon such proposition.

13. To acquire and take by purchase, condemnation, or otherwise, land for the uses and purposes of public boulevards; to lay out, establish and improve public boulevards and to incur a bonded indebtedness for any of such purposes; *provided,* that no such indebtedness shall be incurred for any such purposes until after the question of the issue of bonds therefor shall have been submitted to the qualified electors of the county, at a special election called for that purpose and two thirds of the electors of the county voting at such election shall have voted in favor of issuing such bonds; said election to be called and held, and said bonds, if authorized, to be issued, sold and made payable in the manner and form prescribed by section four thousand and eighty-eight. Said boards shall also have power to maintain public boulevards, established and laid out under the provisions of this title, and to make and enforce rules and regulations for the protection, management, control and use of such boulevards.

14. To maintain, regulate, and govern public pounds, fix the limits within which animals shall not run at large, and appoint poundkeepers, who shall be paid out of the fines imposed and collected from the owners of impounded animals, and from no other source.

15. To equalize assessments.

16. To direct and control the prosecution and defense of all suits to which the county is a party, and by a two-thirds vote of all the members may employ counsel to assist the district attorney in conducting the same.

17. To insure the county buildings and other property in the name of and for the benefit of the county.

18. To establish a salary fund, and such other county funds as they may deem necessary for the proper transaction of the business of the county, and to transfer moneys from one fund to another, as the public interest may require.

19. To fill, by appointment, all vacancies that may occur in any office filled by the appointment of the board of supervisors and elective county or township officers, except in those of judge of the superior court and supervisor, the appointee to hold office for the unexpired term or until the next general election.

19*a*. To employ the copyists necessary to reproduce any of the county records that may be in danger of destruction by age, obliteration, or constant use in any of the county offices.

20. To make and enforce such rules and regulations for the government of their body, the preservation of order, and the transaction of business, as may be necessary.

21. To adopt a seal for the board, a description and impression of which must be filed in the office of the county clerk and of the secretary of state.

22. To license, in the exercise of their police powers, and for the purpose of regulation, as herein provided, and not otherwise, all and every kind of business not prohibited by law, and transacted and carried on within the limits of their respective jurisdictions, and all shows, exhibitions, and lawful games carried on therein, to fix the rates of license tax upon the same, and to provide for the collection of the same by suit or otherwise; *provided, however,* no license can be collected, or any penalty for the nonpayment thereof enforced against any commercial traveler whose business is limited to the goods, wares, merchandise sold or dealt in in this state at wholesale.

23. To provide for the destruction of gophers, squirrels, other wild animals, noxious weeds, and insects injurious to fruit or fruit trees, or vines, or vegetable or plant life.

24. To provide for the prevention of injuries to sheep by dogs, and to tax dogs and direct the application of the tax.

25. To provide, by ordinances not in conflict with the general laws of the state, for the protection of fish and game, and may shorten the season for the taking or killing of fish and game, within the dates fixed by the general state laws, but shall not lengthen the same.

26. To provide for the working of prisoners confined in the county jail, under judgment of conviction of misdemeanor, under the direction of some responsible person, to be appointed by the sheriff, whose compensation shall not exceed one hundred dollars per month, upon the public grounds, roads, streets, alleys, highways, or public buildings, or in such other places as may be deemed advisable, for the benefit of the county.

27. To provide for the burying of the indigent dead.

28. To make and enforce, within the limits of their county, all such local police, sanitary, and other regulations as are not in conflict with general laws.

29. To adopt such rules and regulations, within their respective counties, with regard to keeping and storing of every description of gunpowder, Hercules powder, giant powder, or other explosive or combustible material, as the safety and protection of the lives and property of individuals may require.

30. To appropriate from the general fund of the county, unless otherwise in this title provided, not to exceed, in counties of the first and second class, the sum of three thousand dollars, and in all other counties the sum of two thousand dollars in any one year, to aid in or carry on the work of inducing immigration thereto, or for the purpose of exhib-

iting or advertising the agricultural, mineral, manufacturing, or other resources of the county.

31. To enforce, by ordinance, within the limits of their counties, all such regulations concerning the size of wagons and vehicles of all kinds to be used on the roads or highways, and the width of tires on the same, as are not in conflict with general laws.

32. To grant licenses and franchises for constructing, keeping, and taking tolls on roads, bridges, ferries, wharves, chutes, booms, and piers, and to grant franchises along and over the public roads and highways for all lawful purposes, upon such terms and conditions and restrictions as in their judgment may be necessary and proper, and in such manner as to present the least possible obstruction and inconvenience to the traveling public.

33. To grant, on such terms, conditions, and restrictions as in their judgment may be necessary and proper, licenses and franchises for taking tolls on public roads or highways, whenever in their judgment the expense necessary to operate or maintain such public roads or highways as free public highways is too great to justify the county in so operating or maintaining them. It shall always be a condition attached to the granting of such licenses and franchises, that such roads or highways shall be kept in reasonable repair by the person or persons to whom such licenses or franchises may be granted.

34. To enact ordinances and regulations for the construction, alteration, repair, and control of all public roads and highways in the county, unless otherwise provided by law.

35. To levy a special road fund tax, not to exceed two (2) mills on the one dollar of assessed valuation, on all the property in such counties, outside of any incorporated city or town. Such tax shall be in addition to all taxes otherwise provided for, and the fund so created shall be expended for the construction and maintenance of the main public roads or county highways in the several road districts, in proportion to the amount collected from such districts.

36. To encourage, under such regulations as they may adopt, the planting and preservation of shade and ornamental trees on the public roads and highways, and on and about the public grounds and buildings of the county, and pay to persons planting and cultivating the same, for every living tree thus planted, at the age of four years, a sum not exceeding one dollar.

37. To provide by ordinance for the organization and government of districts, to protect and preserve the banks of rivers and streams and lands lying contiguous thereto from injury by overflow or the washing thereof, and to provide for the improvements of said rivers and streams, and prevent the obstruction thereof, and to provide for the assessment, levy, and collections within such districts of a tax therefor.

38. To appropriate a sum not exceeding two cents per one hundred dollars of the assessed valuation of their county in any one year, in addition to any sum which may be chargeable to the county for the repayment of money expended by the state for protection against fire in such county, for the purpose of protecting forest, brush and grass lands therein, against fire or other injury, and of aiding the state and federal authorities in forestry work.

39. To do and perform all other acts and things required by law not in this title enumerated, or which may be necessary to the full discharge of the duties of the legislative authority of the county government.

40. The boards of supervisors of the several counties within the State of California, or any of them, are hereby authorized and empowered to levy a special tax on the taxable property within their respective counties, for the purpose of creating a fund not exceeding ten thousand dollars in any one year in any one county, to be used for collecting, preparing, and maintaining an exhibition of the products and industries of the county of any domestic or forign exposition, for the purpose of encouraging immigration and increasing trade in the products of the State of California; *provided,* the total tax levies for such purposes in any one year shall not exceed two cents on each one hundred dollars of taxable property in the county, according to the assessment roll.

The act of March 23, 1901 (Statutes 1901), relating to the exclusion of aliens from employment by the state, county, city and county of this state, is codified as sections 3251, 3253, and 3254 of the Political Code.

The new sections read as follows:

Sec. 3251. No person, except a native-born or naturalized citizen of the United States, shall be employed in any department of the state, county, city and county or incorporated city or town government in this state.

Sec. 3253. It shall be unlawful for any person, whether elected, appointed, or commissioned to fill any office in either the state, county, city and county, or incorporated city or town government of this state, or in any department thereof, to appoint or employ any person to perform any duties whatsoever, except such person be a native-born or naturalized citizen of the United States.

Sec. 3254. No money shall be paid out of the state treasury, or out of the treasury of any county, or city and county, or incorporated city or town, to any person employed in any of the offices mentioned in section 3253 of this code, except such person shall be a native-born of naturalized citizen of the United States.

Sec. 1. An act entitled "An act to secure to native-born and naturalized citizens of the United States, the exclusive right to be employed in any department of the state, county, city and county, or incorporated city or town government in this state,'' approved March 23, 1901, is hereby repealed.

The act of March 25, 1889 (Statutes 1889, page 451), providing for improvements in the capitol building should be codified as an amendment to section 412 of the Political Code.

The amended section reads as follows:

Sec. 412. The secretary of state is the superintendent of the state capitol and keeper of the public archives, and shall have charge of the state capitol, and he must keep the same, together with all property therein, in good order and repair.

The act of April 1, 1872 (Statutes 1872, page 951), to protect the wages, salaries, and fees of subordinate officers, is codified as section 74*a* (new) of the Penal Code.

The new section reads as follows:

74*a*. Every officer of this state, or of any county, city and county, city, or township therein, who accepts, keeps, retains, or diverts, for his own use or the use of any other person any part of the salary or fees allowed by law to his deputy, clerk, or other subordinate officer, and every person who employs laborers upon the public works, and who takes, keeps, or receives, any part or portion of the wages due to such laborers from the state, county, or municipal corporation for which such work is done, is guilty of a felony.

The act of March 21, 1905 (Statutes 1905, page 673), relating to the sale of intoxicating liquors to minors, is codified as an amendment to section 397*b* of the Penal Code.

The amended section reads as follows:

Sec. 397*b*. Every person who sells, gives, or delivers to any minor child, male or female, under the age of eighteen years, any intoxicating drink in any quantity whatsoever, or who, as proprietor, manager, or barkeeper of any saloon or public house where intoxicating liquors are sold, permits any such minor child under the age of eighteen years, to visit said saloon or public house where intoxicated liquors are sold, shall be guilty of a misdemeanor, and shall, upon conviction thereof, be punished by a fine of not more than three hundred dollars, or by imprisonment in the county jail for a period not exceeding one hundred and fifty days, or by both such fine and imprisonment; *provided*, that this section shall not apply to the parents of such children, or to guardians of their wards.

The act of March 29, 1877-8 (Statutes 1878, page 695), to protect stockholders and persons dealing with corporations, is codified as section 564 of the Penal Code, amended.

The new section reads as follows:

564. Any superintendent, director, manager, officer or agent of any corporation or joint-stock association formed, or existing, under the laws of this state, or any foreign corporation transacting business in this state, or any person representing himself as such superintendent, etc., who knowingly makes, publishes, or posts, or concurs in making, publishing, or posting, either generally or privately, to any of the stockholders or other persons, any written report, exhibit, or statement of its affairs, or pecuniary condition, or book or notice, containing any statement which is false, or any untrue or false, fraudulent, or exaggerated report, prospectus, account, statement of operations, values, business, profits, expenditures, or prospects, or any other paper or document intended to produce or give, or having a tendency to produce or give, the shares of stock in such corporation a different actual or market value than they really possess, or refuses to make any book or post any notice required by law, in the manner required by law, is guilty of a felony.

THE FOLLOWING AMENDMENTS TO THE POLITICAL CODE ARE RECOMMENDED FOR THE REASONS STATED IN THE ACCOMPANYING NOTES.

Section 3608 of the Political Code is amended to eliminate the argumentative parts at the beginning thereof, and made to read as follows:

Sec. 3608. All property belonging to corporations, save and except the property of national banking associations not assessable by federal statute, shall be assessed and taxed. But no assessment shall be made of shares of stock in any corporation, save and except in national banking associations, whose property, other than real estate, is exempt from assessment by federal statute.

Sections 3446 and 3492 of the Political Code, relate to the same subject-matter, and in most respects, are identical. It is therefore suggested that section 3446 be amended to include the provisions of section 3492 by inserting the first clause thereof, and repealing section 3492. Section 3446 as amended reads as follows:

Sec. 3446. Whenever the holders of title or evidence of title representing one half or more of any body of swamp and overflowed, salt marsh or tide lands, or other lands subject to flood or overflow, susceptible of one mode of reclamation, desire to reclaim the same, or, whenever the holders of title or evidences of title representing one half or more of any body of swamp and overflowed, salt, marsh, or tide lands, susceptible of one mode of reclamation, and already reclaimed, or in progress of reclamation, and not included in any existing reclamation district, who may desire to form a reclamation district for the maintenance, protection, and repair of the reclamation works, in, upon, or appertaining to such body of lands, or for the completion of the reclamation thereof, they may present to the board of supervisors of the county in which the lands, or the greater part thereof, are situated, at a regular meeting of the board, a petition, setting forth that they propose to form a district for the reclamation of the same, a description of the lands by legal subdivisions or other boundaries, the county in which they are situated, the number of acres in the proposed district, and in each tract, with the names (if known) of the owners thereof, and designating as unsold any lands not reduced to private ownership.

Section 4300*a* of the Political Code requires the claimant to pay fifteen cents upon filing claim against the estate of a deceased person. The proposed amendment omits this item.

The amended section reads as follows:

Sec. 4300*a*. On the commencement of any action or proceeding in the superior court, except probate proceedings or on an appeal thereto, to be paid by the party commencing such action or proceeding, or taking such appeal, five dollars.

On the filing of a petition for letters of administration, testamentary, or guardianship, five dollars, to be paid by the petitioner.

On filing the petition to contest any will or codicil, three dollars.

On the appearance of any defendant, or any number of defendants answer jointly, to be paid upon filing the first paper in the action by him or them, two dollars.

On placing any action, excepting a probate proceeding, or default case, on the calendar for trial or hearing, to be paid by the party at whose request such action or proceeding is so placed, two dollars.

For every additional defendant appearing separately, one dollar.

The foregoing fees shall be in full for all services rendered by such clerk in the cause, to and including the making up of the judgment roll.

On the filing of any notice of motion to move for a new trial of any civil action or proceeding, the party filing same shall pay to the clerk, in full for all services to be rendered in connection with said motion, except as hereinafter in this section provided, two dollars.

For issuing an execution or order of sale in any action, one dollar.

In all proceedings or acts performed prior to this section becoming a law, such fees and charges as were provided by law at the time such proceedings were begun or acts performed.

The clerk shall also charge and collect the following fees and compensation not above provided for:

For any copy of any record, proceeding, or paper on file in the office of the clerk relating to any civil action pending in said court, when such copy is made by him, per folio, ten cents.

For each certificate of the clerk, under the seal of the court, twenty-five cents.

No fees shall be allowed or charged by the clerk for services rendered in any criminal case.

For services rendered by the clerk, not in connection with civil actions or proceedings in court, he shall charge and collect, for the benefit of the county, the following fees:

For issuing marriage license, one half to be paid to the county recorder, two dollars.

For filing and indexing articles of incorporation, one dollar.

For filing and indexing certificates of copartnership, one dollar.

For filing and indexing all papers to be kept by him, other than papers filed in actions or proceedings in court, and official bonds and certificates of appointment, each, twenty-five cents.

For issuing any license required by law, other than marriage licenses, one dollar.

For examining and certifying to a copy of any paper, record or proceedings prepared by another, and presented for his certificate, fifty cents, and one cent per folio for comparing the said copy with the original.

For making satisfaction of or credit on judgment, twenty-five cents.

For receiving and filing remittitur from supreme court, fifty cents.

For administering each oath, without certificate, except in a pending action or proceeding, ten cents.

For taking any affidavit, except in criminal cases, twenty-five cents.

For taking and approving each undertaking, and the justification thereof, except in criminal cases, fifty cents.

For searching records on files, for each year, fifty cents.

For taking acknowledgment of any deed or other instrument, including the certificate, fifty cents.

For filing notices of appeal and appeal bonds, each twenty-five cents.

Section eighteen hundred and seventy-five of the Political Code is in violation of section 4, article IX of the constitution, and should be repealed.

See *McCord* vs. *Slavin,* 143 Cal. 325.

Sections 1868, 1869, and 1870 of the Political Code are penal statutes entirely, and their codification is suggested, as follows:

Section 1868 as section 422 of the Penal Code; section 1869 as section 78 of the Penal Code, and section 1870 as section 79 of the Penal Code, and thereupon all of said sections, that is to say, 1867 to 1870 inclusive should be repealed.

The new sections read as follows:

Section 1867 of the Political Code is entirely covered by the provisions of 653*b* of the Penal Code, and should be repealed.

422. Any person who shall willfully disturb any public school, or any public school meeting, shall be guilty of a misdemeanor and be liable to a fine of not less than ten, nor more than one hundred dollars.

Sec. 78. Any state, county, or city and county superintendent, or any state, county, or city and county board of education, who shall issue a certificate or diploma, except as provided by law, shall be guilty of a misdemeanor.

Sec. 79. Any school officer or member of any board of education or any teacher in any public school who shall act as agent for any author, publisher, bookseller, or other person to introduce any book, apparatus, furniture, or any other article whatever, into the common schools or high schools of this state, or any one or more of them, or directly or indirectly contracts for, or receives any gift or reward for so introducing or recommending the same, is guilty of a misdemeanor, and shall be removed from office, and the certificate of such teacher be revoked.

Section 1. Section eighteen hundred and seventy-five of the Political Code is hereby repealed.

THE FOLLOWING AMENDMENTS TO THE CIVIL CODE ARE RECOMMENDED FOR THE REASONS STATED IN THE ACCOMPANYING NOTES.

Section 1193 of the Civil Code, relating to certificates of acknowledgment by officers, is amended to require such certificates to state when the term of office, or commission, expires.

The amended section reads as follows:

Sec. 1193. Officers taking and certifying acknowledgments or proof of instruments for record, must authenticate their certificates by affixing thereto their signatures, followed by the names of their offices; there must also be written or printed on some part of the certificate a statement of the date on which the term of office, or commission, of the officer expires. Also, their seals of office, if by the laws of the state or country where the acknowledgment or proof is taken, or by authority of which they are acting, they are required to have official seals.

Section 599 of the Civil Code is amended to permit corporations other than for profit to mortgage and sell their real estate without an order of court.

The amended section reads as follows:

Sec. 599. Corporations now organized or that may hereafter be organized for purposes other than profit, may, either in their by-laws, ordinances, constitutions, or articles of incorporation, provide for:

1. The qualification of members, mode of election or appointment, and terms of admission to membership;

2. The fees of admission and dues to be paid to their treasury by members;

3. The number of persons that shall constitute a quorum at any meeting of the corporation, and that an election of officers of the corporation by a meeting so constituted, or the appointment or selection of such officers, or any of them, in any manner required by the rules, regulations, or discipline of any specified religious denomination, society, or church, shall be as valid as if made at an election at which a majority of the members of the corporation were present and voted;

4. The expulsion and suspension of members for misconduct or nonpayment of dues, also for restoration to membership;

5. A special method of organizing the board of directors, and a special method of increasing or diminishing the number of directors within the limits as to number prescribed by section five hundred and ninety-three of this code;

6. Contracting, securing, paying, and limiting, the amount of their indebtedness;

7. That the rules, regulations, or discipline, for the time being, of any specified religious denomination, society, or church, shall always be a part of their by-laws, ordinances, constitutions, or articles of incorporation;

8. For the purchase and sale of real estate which they may be authorized by law to hold, and to mortgage and hypothecate the same to secure fulfillment of its obligations;

9. Other regulations not repugnant to the constitution or laws of the state and consonant with the objects of the corporation.

Sections 1390 and 1393 of the Civil Code are combined as section 1390, and section 1391 and 1392 are combined as section 1391.

The amended sections read as follows:

Sec. 1390. The series of degrees forms the line; the series of degrees between persons who descend from one another is called direct or lineal consanguinity; and the series of degrees between persons who do not descend from one another, but spring from a common ancestor, is called the collateral line or collateral consanguinity. In the collateral line the degrees are counted by generations, from one of the relations up to the common ancestor, and from the common ancestor to the other relations. In such computation the decedent is excluded, the relative included, and the ancestor counted but once. Thus, brothers are related in the second degree; uncle and nephew in the third degree; cousins-german in the fourth, and so on.

Sec. 1391. The direct line is divided into a direct line descending and a direct line ascending. The first is that which connects the ancestors with those who descend from him. The second is that which connects a person with those from whom he descends. In the direct line there are as many degrees as there are generations. Thus, the son is, with regard to the father, in the first degree; the grandson in the second; and vice versa with regard to father and grandfather toward the sons and grandsons.

Section 1265 of the Civil Code is amended to harmonize with section 1474 of the Code of Civil Procedure, relating to the same subject-matter.

The amended section reads as follows:

Sec. 1265. From and after the time the declaration is filed for record, the premises therein described constitute a homestead. If the selection was made by a married person from the community property, or from the separate property of the spouse making the selection or joining therein, the land so selected on the death of either spouse, vests in the survivor, subject to no other liability than such as exists or has been created under the provisions of this title; in other cases, upon the death of the person whose property was selected as a homestead, it shall go to his heirs or devisees, subject to the power of the superior court to assign the same for a limited period to the family of the decedent; but in no case shall it be held liable for the debts of the owner, except as provided in this title.

Section 3005 of the Civil Code is amended to give pledgee right to sell pledged property without foreclosure proceedings.

The amended section reads as follows:

Sec. 3005. The sale by a pledgee, of property pledged, must be made by public auction, in the manner and upon the notice sale of personal property under execution.

As section 300*a* of the Civil Code now reads, no provision is made for showing change of name of record in any county where copies of the original article or copies thereof are filed.

The proposed amendment includes such provision, and reads as follows:

Sec. 300*a*. Every corporation which has changed its name under the provisions of sections one thousand two hundred and seventy-five, one thousand two hundred and seventy-six, one thousand two hundred and seventy-seven, one thousand two hundred and seventy-eight, and one thousand two hundred and seventy-nine of the Code of Civil Procedure, must file in the office of secretary of state and in the office of the county clerk of each county in which the original articles or certified copies thereof are required by law to be filed, a certified copy of the decree of the court changing such name.

Section 1386 of the Civil Code, relating to successions of property of deceased persons, is amended by striking out the word ''issue'' in the first sentence of subdivision eight and substituting the word ''heirs,'' in lieu thereof.

Sec. 1386. When any person having title to any estate not otherwise limited by marriage contract, dies without disposing thereof by will, it is succeeded to and must be distributed, unless otherwise expressly provided in this code and the Code of Civil Procedure, subject to the payment of his debts, in the following manner:

1. If the decedent leaves a surviving husband or wife, and only one child, or the lawful issue of one child, in equal shares to the surviving husband, or wife and child, or issue of such child. If the decedent leaves a surviving husband or wife, and more than one child living, or one child living and the lawful issue of one or more deceased chil-

dren, one third to the surviving husband or wife, and the remainder in equal shares to his children and to the lawful issue of any deceased child, by right of representation; but if there is no child of decedent living at his death, the remainder goes to all of his lineal descendants; and if all of the descendants are in the same degree of kindred to the decedent, they share equally; otherwise, they take according to the right of representation. If the decedent leaves no surviving husband or wife, but leaves issue, the whole estate goes to such issue; and if such issue consists of more than one child living, or one child living and the lawful issue of one or more deceased children, then the estate goes in equal shares to the children living, or to the child living and the issue of the deceased child or children by right of representation.

2. If the decedent leaves no issue, the estate goes one half to the surviving husband or wife, and the other half to the decedent's father and mother in equal shares, and if either is dead the whole of said half goes to the other. If there is no father or mother, then one half goes in equal shares to the brothers and sisters of decedent and to the children or grandchildren of any deceased brother or sister by right of representation. If the decedent leaves no issue, nor husband nor wife, the estate must go to his father and mother in equal shares, or if either is dead then to the other.

3. If there is neither issue, husband, wife, father, nor mother then in equal shares to the brothers and sisters of decedent and to the children or grandchildren of any deceased brother or sister, by right of representation.

4. If the decedent leaves a surviving husband or wife, and neither issue, father, mother, brother, sister, nor the children or grandchildren of a deceased brother or sister, the whole estate goes to the surviving husband or wife.

5. If the decedent leaves neither issue, husband, wife, father, mother, brother, nor sister, the estate must go to the next of kin, in equal degree, excepting that, when there are two or more collateral kindred, in equal degree, but claiming through different ancestors, those who claim through the nearest ancestor must be preferred to those claiming through an ancestor more remote.

6. If the decedent leaves several children, or one child and the issue of one or more children, and any such surviving child dies under age and not having been married, all the estate that came to the deceased child by inheritance from such decedent descends in equal shares to the other children of the same parent and to the issue of any such other children who are dead, by right of representation.

7. If, at the death of such child, who dies under age, not having been married, all the other children of his parents are also dead, and any of them has left issue, the estate that came to such child by

inheritance from his parent descends to the issue of all other children of the same parent; and if all the issue are in the same degree of kindred to the child, they share the estate equally, otherwise they take according to the right of representation.

8. If the deceased is a widow, or widower, and leaves no heir, and the estate, or any portion thereof, was common property of such decedent and his or her deceased spouse, while such spouse was living, such property goes in equal shares to the children of such deceased spouse and to the descendants of such children by right of representation, and if none, then one half of such common property goes to the father and mother of such decedent in equal shares, or to the survivor of them if either be dead, or if both be dead, then in equal shares to the brothers and sisters of such decedent and to the descendants of any deceased brother or sister by right of representation, and the other half goes to the father and mother of such deceased spouse in equal shares, or to the survivor of them if either be dead, or if both be dead, then in equal shares to the brothers and sisters of such deceased spouse and to the descendants of any deceased brother or sister by right of representation.

If the estate, or any portion thereof, was separate property of such deceased spouse, while living, and came to such decedent from such spouse, by descent, devise, or bequest, such property goes in equal shares to the children of such spouse and to the descendants of any deceased child by right of representation, and if none, then to the father and mother of such spouse, in equal shares, or to the survivor of them if either be dead, or if both be dead, then in equal shares to the brothers and sisters of such spouse and to the descendants of any deceased brother or sister by right of representation.

9. If the decedent leaves no husband, wife, or kindred, and there are no heirs to take his estate or any portion thereof, under subdivision eight of this section, the same escheats to the state for the support of the common schools.

It is recommended that section 598 of the Civil Code, requiring religious societies and benevolent corporations to obtain an order of court to mortgage or sell the real property belonging to them, be repealed, giving such corporations the right to mortgage and convey their real estate the same as other corporations.

THE FOLLOWING AMENDMENTS TO THE CODE OF CIVIL PROCEDURE ARE RECOMMENDED FOR THE REASONS STATED IN THE ACCOMPANYING NOTES.

Section 692 of the Code of Civil Procedure, relating to notice of sale under execution, is amended to read as follows:

Sec. 692. Before the sale of property on execution, notice thereof must be given as follows:

1. In case of perishable property: by posting notice of the time and place of sale in three public places of the township or city where the sale is to take place, for such time as may be reasonable, considering the character and condition of the property, and at the same time filing a copy thereof with the clerk of the court from which the execution was issued.

2. In case of other personal property: by posting a similar notice in three public places in the township or city where the sale is to take place, for not less than five nor more than ten days, and at the same time filing a copy thereof with the clerk of the court from which the execution was issued.

3. In case of real property: by posting a similar notice, particularly describing the property, for twenty days, in three public places of the township or city where the property is situated, and also where the property is to be sold, and publishing a copy thereof once a week for the same period, in some newspaper published in the county, if there be one, and at the same time filing a copy thereof with the clerk of the court from which the execution was issued.

4. When the judgment under which the property is to be sold is made payable in a specified kind of money or currency, the several notices required by this section must state the kind of money or currency in which bids may be made at such sale, which must be the same as that specified in the judgment, and at the same time filing a copy thereof with the clerk of the court from which the execution was issued.

Section 553 of the Code of Civil Procedure contains a clerical error in referring to section 537, which is corrected by the following amendment.

The amended section reads as follows:

Sec. 553. If the defendant recovers judgment against the plaintiff, and no appeal is perfected and undertaking to continue the attachment in force as provided in section 946 of this code, any undertaking received in the action, all the proceeds of sales and money collected by the sheriff, and all the property attached remaining in the sheriff's hands, must be delivered to the defendant or his agent, the order of attachment be discharged, and the property released therefrom.

Section 1469 of the Code of Civil Procedure was evidently intended to prevent the family of a deceased person from being left entirely without means of support. As the section now stands, if the estate is valued at more than $1,500, it is subject to the debts of the deceased, although such debts may equal or exceed the value of the estate. To meet this manifest injustice an amendment is suggested by which the estate will be set over to the surviving widow when the net value of the estate does not exceed the sum of $1,500.

The section as amended reads as follows:

Sec. 1469. If, upon the return of the inventory of the estate of a deceased person, and after the expiration of the time for filing claims, it shall appear therefrom that the value of the whole estate does not exceed the sum of fifteen hundred dollars net, and, if there be a widow or minor children of the deceased, the court, or a judge thereof, shall, by order, require all persons interested to appear on a day fixed to show cause why the whole of said estate should not be assigned to the widow or minor children of the deceased, as hereinafter provided. Notice thereof shall be given and proceedings had in the same manner as provided in sections one thousand six hundred and thirty-three, one thousand six hundred and thirty-five, and one thousand six hundred and thirty-eight of this code. If, upon the hearing, the court finds that the net value of the estate over and above all claims and incumbrances, does not exceed the sum of fifteen hundred dollars, it shall, by decree for that purpose, assign to the widow of the deceased, if there be a widow, if no widow, then to the minor children of the deceased, if there be minor children, the whole of the estate, subject to whatever mortgages, liens or incumbrances there may be upon said estate at the time of the death of the deceased, after the payment of the expenses of the last illness of the deceased, funeral charges, and expenses of administration, and the title thereof shall vest absolutely in such assignees, and there must be no further proceedings in the administration, unless further estate be discovered.

Section 1991 of the Code of Civil Procedure, is amended to enlarge the powers of the court to punish disobedience to a subpœna, or a refusal to be sworn, or to answer as a witness, in giving a deposition before a notary public.

The amended section reads as follows:

Sec. 1991. Disobedience to a subpœna, or a refusal to be sworn, or to answer as a witness, or to subscribe an affidavit or deposition when required, may be punished as a contempt by the court or officer issuing the subpœna or requiring the witness to be sworn; and if the witness be a party, his complaint or answer may be stricken out.

The witness shall not be punished for contempt, except upon order of the court issuing the subpœna to appear at a time and place named in such order, and show cause why he should not be punished for such disobedience.

Section 1194 of the Code of Civil Procedure is amended to conform to the construction given this section by the supreme court in *Miltimor* vs. *Nofziger Bros. Lumber Co.*, 150 Cal. 790.

The amended section reads as follows:

Sec. 1194. In every case in which different liens are asserted against any property, the court in the judgment must declare the rank of each lien, or class of liens, which shall be in the following order, viz.:

1. Mechanics, material men, artisans, and laborers of every class.
2. Subcontractors.
3. Original contractors.

And the proceeds of the sale of the property must be applied to each lien or class of liens in the order of its rank; and whenever, in the sale of the property subject to the lien, there is a deficiency of proceeds, judgment may be docketed for the deficiency in like manner with like effect as in actions for the foreclosure of mortgages.

Section 1034 of the Code of Civil Procedure, relating to the taxation of costs in appellate courts, is amended to provide for the service of a bill of costs on appeal, and for the taxation of such costs to meet the difficulties suggested by the supreme court. See *Bell* vs. *Superior Court,* 150 Cal. 131.

The amended section reads as follows:

Sec. 1034. Whenever costs are awarded to a party by an appellate court, if he claims such costs, he must, within thirty (30) days after the remittitur is filed with the clerk of the trial court, deliver to such clerk and serve upon the adverse party, a memorandum of the items of his costs and necessary disbursements on the appeal, which memorandum must be verified by the oath of the party, or his attorney or agent, or by the clerk of his attorney, stating that to the best of his knowledge and belief the items are correct and that the disbursements have been necessarily incurred on the appeal. A party dissatisfied with the costs claimed, may, within five (5) days after service of the bill of costs upon him, serve upon the party claiming such costs and file with the clerk of the trial court, notice of a motion to have the costs taxed by such court. When the costs shall have been taxed, or, if no notice of a motion to tax is given within said five (5) days, then, after the expiration of such five (5) days, the party to whom costs have been awarded may have an execution therefor as upon a judgment.

Section 339 of the Code of Civil Procedure is amended by striking from subdivision one thereof the last clause, "In an action founded upon an instrument in writing executed out of the state."

The amended section reads as follows:

Sec. 337. 1. An action upon any contract, obligation, or liability founded upon an instrument in writing; *provided,* that wherever the time within which any such action must be so commenced would in any case expire by the terms of this section after the first day of June, one thousand nine hundred and six and before the first day of January, one thousand nine hundred and seven, such action may be commenced at any time before the first day of January, one thousand nine hundred and seven, with the same force and effect as if commenced within four years as in this section provided.

2. An action to recover a balance due upon a mutual open and current account or upon an open book account.

Sec. 339. 1. An action upon a contract, obligation, or liability not founded upon an instrument of writing, other than that mentioned in subdivision two of section three hundred and thirty-seven of this code.

2. An action against a sheriff, coroner, or constable upon a liability incurred by the doing of an act in his official capacity and in virtue of his office, or by the omission of an official duty, including the nonpayment of money collected upon an execution. But this subdivision does not apply to an action for an escape.

Section 199 of the Code of Civil Procedure, relating to the competency of jurors, is amended to eliminate a clerical error in subdivision three thereof, which refers to section 203 (there being no such numbered section) instead of section 200.

The amended section reads as follows:

Sec. 199. A person is not competent to act as a juror:

1. Who does not possess the qualifications prescribed by the preceding section;

2. Who has been convicted of malfeasance in office or any felony or other high crime; or,

3. Who has been discharged as a juror by any court of record in this state within a year, as provided in section two hundred of this code, or who has been drawn as a grand juror in any such court and served as such within a year and been discharged.

4. A person who is serving as a grand juror in any court of record in this state is not competent to act as a trial juror in any such court.

And a person who is serving as a trial juror in any court of this state is not competent to act as a grand juror in any such court.

Section 850 of the Code of Civil Procedure makes no provision for serving a notice of trial by mail when the party has not appeared by attorney.

The amended section contains such provision, and reads as follows:

850. *Notice of hearing.* When all the parties served with process shall have appeared, or some of them have appeared, and the remaining defendants have made default, the justice must fix the day for the trial of said cause, whether the issue is one of law or fact, and give notice thereof to the parties to the action who have appeared, but in case any of the parties are represented by an attorney, then to such attorney. Such notice shall be in writing, signed by the justice, and substantially in the following form (filling blanks according to the facts):

In the justice court, ... township (or city, or city and county), county, or city and county of..........., State of California, ..., plaintiff, vs. ...., defendant, To ...., plaintiff, or ...., attorney for plaintiff, and to ...., defendant, or ...., attorney for defendant.

You and each of you will please take notice that the undersigned justice of the peace before whom the above-entitled cause is pending, has set for hearing the demurrer of ...., filed in said cause (or has set the said cause for trial, as the case may be), before me at my office in said township (or city, or city and county), at .... o'clock .... M., on the .... day of ...., 19....

Dated this ...... day of ...., 19....

(Signed) ....,
Justice of the Peace.

Said notice shall be served by mail or personally. When served by mail the justice of the peace shall deposit copies thereof in a sealed envelope in the post office at least ten days before the trial or hearing addressed to each of the persons on whom it is to be served at their place of residence and the postage prepaid thereon; *provided,* that such notice shall be served by mail only when the person on whom service is to be made, resides out of the county in which said justice's court is situated, or is absent therefrom. When personally served said notice shall be served at least five days before the trial or hearing on the persons on whom it is to be served by any person competent and qualified to serve a summons in a justice's court, and when personally served it shall be served returned and filed in like manner as a summons. The judge shall enter on his docket the date of trial or hearing; and when such notice shall have been served by mail the justice shall enter on his docket the date of mailing such notice, of trial or hearing and such entry shall be prima facie evidence of the fact of such service. The parties are entitled to one hour in which to appear after the time fixed in said notice, but are not bound to remain longer than that time unless both parties have appeared and the justice being present is engaged in the trial of another cause.

It is recommended that section twenty hundred and twenty of the Code of Civil Procedure, relating to taking testimony of a witness out of the state, be amended to provide for taking depositions in default cases.

The amended section reads as follows:

Sec. 2020. The testimony of a witness out of this state may be taken by deposition in the following cases:

1. In an action, at any time after the service of summons, or the appearance of the defendant.
2. In a special proceeding, any time after a question of fact as arisen therein.
3. Where default has been made by any or all of the defendants.

Section 1327 of the Code of Civil Procedure, relating to the contest of wills or the probate thereof, is amended to permit any person to contest the validity of a will at any time before final distribution. As the section now stands such contest may be commenced at any time within one year after the will is admitted to probate, and in cases of small estates, the estate is distributed before the time has expired for contesting the will.

The section as amended reads as follows:

Sec. 1327. When a will has been admitted to probate, any person interested may, at any time before final distribution, contest the same or the validity of the will. For that purpose he must file in the court in which the will was proved, a petition in writing, containing his allegations against the validity of the will or against the sufficiency of the proof, and praying that the probate may be revoked.

Section 2024 of the Code of Civil Procedure, relating to the taking of depositions out of this state, is amended by providing that such depositions may be taken before a notary public.

The amended section reads as follows:

Sec. 2024. The deposition of a witness out of this state may be taken upon a commission issued from the court under the seal of the court, upon an order of the court, or a judge or a justice thereof, on the application of either party, upon five days' previous notice to the other. If the court is a justice's court, the commission must have attached to it a certificate of the clerk of the superior court of the county in which such justice's court is held, under the seal of such superior court, to the effect that the person issuing the same was an acting justice of the peace at the date of the commission. If issued to any place within the United States, it may be directed to a person agreed upon by the parties, or if they do not agree, to any judge, notary public, or justice of the peace or commissioner selected by the court or judge or justice issuing it. If issued to any country out of the United States, it may be directed to a minister, ambassador, consul, vice-consul, or consular agent of the United States in such country, or to any person agreed upon by the parties.

Section 1723 of the Code of Civil Procedure is amended to include "joint tenancy."

The amended section reads as follows:

Sec. 1723. If any person die who, at the time of his death, was the owner of a life estate which terminates by reason of the death of such person; or if such person at the time of his death was one of the spouses owning lands as a homestead, which lands by reason of the death of such person, vested in the surviving spouse; or if such person was a married woman who at the time of her death was the owner of community property which passed upon her death to the surviving husband; or if such person was the owner of property as joint tenant, which upon his death passed to the survivors of such joint tenancy, any person interested in the property, or in the title thereto, in which such estates or interests were held, may file in the superior court of the county in which the property is situated, his verified petition setting forth such facts, and thereupon and after such notice by publication or otherwise, as the court may order, the court shall hear such petition, and the evidence offered in support thereof, and if upon such hearing it shall appear that such life estate of such deceased person absolutely terminated by reason of his death, or such homestead or community property vested in the survivor of such marriage, or if the property held as such joint tenant passed to the survivor, the court shall make a decree to that effect, and thereupon a certified copy of such decree may be recorded in the office of the county recorder, and thereafter shall have the same effect as a final decree of distribution so recorded.

Section 1774*a* of the Code of Civil Procedure, relating to the settlement of accounts of guardians, is amended to provide for the settlement of accounts of a deceased guardian by his personal representatives.

The section as amended reads as follows:

Sec. 1774*a*. The guardian must upon the expiration of a year from the time of his appointment and as often thereafter as he may be required, present his account to the court for settlement and allowance;

provided, that no final account of the guardian of any insane person, who is or has been during such guardianship confined in a state hospital in this state, shall be settled or allowed unless notice of the settlement of said account shall have been first given to the secretary of the state commission in lunacy. If any guardian die, his accounts may be presented by his personal representatives to, and settled by, the court, and, upon the petition of the successor of such deceased guardian, the court may compel the personal representatives of such deceased guardian to render an account of the administration of their testator or intestate, and must settle such accounts as in other cases.

It is recommended that section 705, Code of Civil Procedure, be amended by adding after the word "sheriff," the following: "Making the sale or his successor in office."

The amended section reads as follows:

Sec. 705. A redemptioner must produce to the officer or person from whom he seeks to redeem and serve with his notice to the sheriff making the sale, or his successor in office:

1. A copy of the docket of the judgment under which he claims the right to redeem, certified by the clerk of the court, or of the county where the judgment is docketed; or, if he redeem upon a mortgage or other lien, a note of the record thereof, certified by the recorder.

2. A copy of any assignment necessary to establish his claim, verified by an affidavit if himself, or of a subscribing witness thereto;

3. An affidavit by himself or his agent, showing the amount then actually due on the lien.

As section 1678 of the Code of Civil Procedure now reads, it makes no provision for distributing personal property to the assignee of the heirs, legatees, or devisees.

The amended section makes such provision, and reads as follows:

Sec. 1678. Partition or distribution of the estate may be made as provided in this chapter, although some of the original heirs, legatees, or devisees may have conveyed their shares to other persons, and such shares must be assigned to the person holding the same, in the same manner as they otherwise would have been to such heirs, legatees, or devisees.

Section 422 of the Code of Civil Procedure is amended to provide for issue and service of summons on cross-complaint.

See *Hibernia Savings and Loan Society* vs. *Clarke,* 110 Cal. 27.

Sec. 422. Whenever the defendant seeks affirmative relief against any party to the action, relating to or depending upon the contract or transaction upon which the action is brought, or affecting the property to which the action relates, he may, in addition to his answer, file at the same time, or by permission of the court subsequently, a cross-complaint. The cross-complaint must be served upon the parties affected thereby, and such parties may demur or answer thereto as the original complaint. If any of the parties affected by the cross-complaint have not appeared in the action, a summons upon the cross-complaint must be issued and served upon them the same manner as upon the commencement of an original action.

Sec. 692. Before the sale of property on execution, notice thereof must be given as follows:

1. In case of perishable property: by posting notice of the time and place of sale in three public places of the township or city where the sale is to take place, for such time as may be reasonable, considering the character and condition of the property, and at the same time filing a copy thereof with the clerk of the court from which the execution was issued.

2. In case of other personal property: by posting a similar notice in three public places in the township or city where the sale is to take place, for not less than five nor more than ten days, and at the same time filing a copy thereof with the clerk of the court from which the execution was issued.

3. In case of real property: by posting a similar notice, particularly describing the property, for twenty days, in three public places of the township or city where the property is situated, and also where the property is to be sold, and publishing a copy thereof once a week for the same period, in some newspaper published in the county, if there be one, and at the same time filing a copy thereof with the clerk of the court from which the execution was issued.

4. When the judgment under which the property is to be sold is made payable in a specified kind of money or currency, the several notice required by this section must state the kind of money or currency in which bids may be made at such sale, which must be the same as that specified in the judgment, and at the same time filing a copy thereof with the clerk of the court from which the execution was issued.

The act of 1873-4 (Statutes 1873-4, page 132), relating to the collection of money belonging to estates of deceased persons, and on deposit in banks, is codified as section 1454 of the Code of Civil Procedure.

The new section reads as follows:

Sec. 1454. The surviving husband or wife of any deceased person, or if no husband or wife be living, then the next of kin of such decedent, may, without procuring letters of administration, collect from any bank any sum which said deceased may have had on deposit in such bank at the time of his or her death; *provided,* said deposit shall not exceed the sum of five hundred dollars. Any bank, upon receiving an affidavit stating that said depositor is dead, and that affiant is the surviving husband or wife, as the case may be, or stating that said decedent left no husband or wife, and that affiants are the next of kin of said decedent, and entitled to distribution of his or her estate, and that the estate of said decedent consists wholly of personally property of a value less than fifteen hundred dollars, and stating of what said estate consists, and that the whole amount that decedent left on deposit in any and all banks of deposit. in this state does not exceed the sum of five hundred dollars, and give an undertaking to the people of the State of California, that such heirs will restore said moneys to any person lawfully claiming the same, may pay to said affiant any deposit of said decedent, if the same, together with deposits in other banks, does not exceed the sum of five hundred dollars, and the receipt of such affiant shall be a sufficient acquittance therefor.

The present procedure for filing claims against estates of deceased persons is generally unsatisfactory for many reasons, among which are the following:

1. There is no provision by which a record is made of when the claim is presented.

2. The claim being presented to the administrator in person, or to his attorney, is sometimes lost, causing dispute as to when the actual presentation took place.

3. The administrator is required, immediately upon his appointment, to give notice to the creditors and state the time within which the claims shall be presented, and by section 1491, the time of presenting claims depends whether the estate exceeds in value the sum of ten thousand dollars. If the estate should be estimated by the administrator to be worth eleven thousand dollars, and he had published notice accordingly, and the inventory and appraisement would show a value of only nine thousand dollars, there is no provision by which the notice could be changed.

To eliminate these and other defects, I have recommended a procedure by which the claims shall be filed with the county clerk, and the statute of limitation begins from that time.

Sec. 1490. Every executor or administrator must, immediately after his letters are issued, cause to be published in some newspaper of the county, if there be one, if not, then in such newspaper as may be designated by the court, a notice to the creditors of the decedent, requiring all persons having claims against said deceased to file them with the necessary vouchers in the office of the clerk of the court from which the letters were issued. Such notice must be published as often as the judge or court shall direct, but not less than once a week for four weeks. The court or judge may also direct additional notice by publication or posting. There must be added to the published notice the date of the first publication.

Sec. 1493. All claims arising upon contracts, whether the same be due, or contingent must be filed in the office of the clerk within the time limited in the notice, and any claim not so filed, is barred forever; *provided, however,* that when it is made to appear by the affidavit of the claimant, to the satisfaction of the court, or a judge thereof, that the claimant had no notice as provided in this chapter, by reason of being out of the state, it may be presented at any time before a decree of distribution is entered.

Sec. 1494. Every claim which is due, when filed must be supported by the affidavit of the claimant, or some one in his behalf, that the amount is justly due, that no payments have been made thereon which are not credited, and that there are no offsets to the same, to the knowledge of the affiant. If the claim be not due when filed, or be contingent, the particulars of such claim must be stated. When the affidavit is made by a person other than the claimant, he must set forth in the affidavit the reason why it is not made by the claimant. The oath may be taken before any officer authorized to administer oaths. The executor or administrator may also require satisfactory vouchers or proofs to be produced in support of the claim. If the estate be insolvent, no greater rate of interest shall be allowed upon any claim after the first publication of notice to creditors than is allowed on judgments obtained in the superior court.

Sec. 1495. Any judge of a superior court may file a claim against the estate of a decedent for allowance to the executor or administrator thereof, and if the executor or administrator allows the claim, he must in writing, designate some other judge of the superior court of the same or an adjoining county, who, upon the presentation of such claim to him, is vested with power to allow or reject it, and the judge presenting such claim, in case of its rejection by the executor or administrator, or by such judge as shall have acted upon it, has the same right to sue in a proper court for its recovery as other persons have when their claims against an estate are rejected.

Sec. 1496. At any time after the filing of a claim the executor or administrator may allow the same, in whole or in part, or reject the same. Such allowance or rejection must be in writing and filed with the clerk, and the clerk upon filing the same, must immediately note the same in the register, and mail a notice thereof to the claimant at the place designated on the claim. If the claim is allowed by the executor or administrator, it must be presented to the judge of the court for his approval, who must indorse upon it his allowance or rejection, and the clerk must immediately note such allowance or rejection upon the register, and mail notice thereof to the claimant at the address designated on the claim. If the executor or administrator refuses or neglects, for the period of thirty days after the filing of the claim, to allow or reject the same, or if the judge refuses or neglects, for the period of ten days after the claim has been presented to him, to indorse his allowance or rejection thereon, such refusal or neglect may, at the option of the claimant, be deemed equivalent to a rejection thereof. Any claim filed before the expiration of the time limited in the notice for the presentation of claims is presented in time, whether acted upon within that period or not.

Sec. 1504. A judgment rendered against an executor or administrator, upon any claim for money against the estate of his testator or intestate, only establishes the claim in the same manner as if it had been allowed by the executor or administrator and the judge; and the judgment must be that the executor or administrator pay, in due course of administration, the amount ascertained to be due. A certified transcript of the original docket of the judgment must be filed among the papers of the estate in court. No execution must issue upon such judgment nor shall it create any lien upon the property of the estate, or give to the judgment creditor any priority of payment, except a lien by attachment or otherwise previously existed.

It is recommended that a new section, to be known as section 1455, be added to the Code of Civil Procedure, authorizing any bank having on deposit a sum of money not exceeding one hundred dollars to pay the same to certain persons for the liquidation of claims against such deceased person for the expenses of last sickness, etc.

This section is proposed at the suggestion of several savings banks, who find it a custom of many poor people to leave an amount in the bank sufficient to pay their funeral expenses, which amount is materially reduced by the expenses of probate procedure.

The proposed section reads as follows:

Sec. 1455. Any bank having on deposit money of a deceased person not exceeding the sum of one hundred dollars, may, thirty days after the death of such person, pay the same to any hospital, home, physician, nurse, or undertaker, upon receiving an affidavit of an officer of such hospital or home, or of such physician, nurse or undertaker, showing the death of the depositor, and that the depositor died possessed of no estate other than said deposit, and that the same at the time of the death of such depositor, did not exceed the sum of one hundred dollars, and that the balance of said deposit is to be used for the sole purpose of paying the expenses of the last sickness and funeral expenses of such depositor. If the aggregate amount of the claim so presented exceeds the sum on deposit, such deposit shall be paid to such claimants in proportion to the amount of their respective claims.

A new section of the Code of Civil Procedure, to be numbered 751*a* is recommended, declaring that the effect of a judgment in certain actions shall *ipso facto* have the effect of vesting the title in the particular party without the necessity of a conveyance.

The new section reads as follows:

Sec. 751*a*. In an action by the holder of the equitable title against the holder of the legal title to quiet title or determine adverse claims to real property, the judgment or decree shall have the effect of passing title and interest of the adverse party thereto to the party in whose favor judgment is rendered, without any act on the part of the party against whom judgment is rendered for the purpose of conveying or transferring such title and interest; and such judgment shall be considered and taken to have the same operation and effect as if a conveyance, release or acquittance had been executed by the party against whom the judgment is rendered. In like manner, in an action for specific performance, the judgment requiring a conveyance shall operate to convey the title and interest of the person whose title or interest is required to be conveyed, without the execution of any instrument or deed by him or by any commissioner or officer of the court for that purpose.

Section 726 of the Code of Civil Procedure is amended to permit a mortgagee holding additional security for the payment of the debt secured by the mortgage, such as notes or bonds, to make the person liable on such note or bond, a party to the action to foreclose.

Such revision is suggested under *Ould* vs. *Stoddard,* 54 Cal. 613, and *Adams* vs. *Wallace,* 119 Cal. 67.

The section as amended is copied substantially from section 1627 of the Code of Procedure of New York, and is as follows:

Sec. 726. There can be but one action for the recovery of any debt, or the enforcement of any right secured by mortgage upon real or personal property, which action must be in accordance with the provisions of this chapter. In such action the court may, by its judgment, direct the sale of the encumbered property (or so much thereof as may be necessary), and the application of the proceeds of the sale to the payment of the costs of court, and the expenses of the sale, and the amount due plaintiff, including, where the mortgage provides for the payment of attorney's fees, such sum for such fees as the court shall find reasonable, not exceeding the amount named in the mortgage.

Any person who is liable to the plaintiff for the payment of the debt secured by the mortgage, or any part thereof, may be made a defendant in the action; and if he has appeared or has been personally served with the summons, the final judgment may award payment by him of the residue of the debt, or the part thereof for which he is liable remaining unsatisfied after a sale of the mortgaged property and the application of the proceeds pursuant to the directions contained therein.

The court may, by its judgment, or at any time after judgment, appoint a commissioner to sell the encumbered property. It must require of him an undertaking in an amount fixed by the court, with sufficient sureties, to be approved by the judge, to the effect that the commissioner will faithfully perform the duties of his office according to law. Before entering upon the discharge of his duties he must file such undertaking so approved, together with his oath that he will faithfully perform the duties of his office. If it appear from the sheriff's return, or from the commissioner's report, that the proceeds are insufficient, and a balance still remains due, judgment must then be docketed by the clerk in the manner provided in this code for such balance against the defendant or defendants personally liable for the debt, and it becomes a lien on the real estate of such judgment debtor, as in other cases in which execution may be issued.

No person holding a conveyance from or under the mortgager of the property mortgaged, or having a lien thereon, which conveyance or lien does not appear of record in the proper office at the time of the commencement of the action, need be made a party to such action, and the judgment therein rendered, and the proceedings therein had, are as conclusive against the party holding such unrecorded conveyance or lien as if he had been a party to the action.

If the court appoints a commissioner for the sale of the property, he must sell it in the manner provided by law for the sale of like property by the sheriff upon execution; and the provisions of chapter one, title nine, part two, of this code are hereby made applicable to sales made by such commissioner, and the powers therein given and the duties therein imposed on sheriffs are extended to such commissioner.

In all cases heretofore, now or hereafter pending in the courts of this state, in the event of the death, absence from the state, other disability or disqualification of the commissioner appointed to sell encumbered property under the foregoing provisions of this section, the court may, upon the happening of either the death, absence from the state, other disability or disqualification of the commissioner, appoint an elisor to perform the duties of such commissioner which are then to be performed in such action.

The elisor so appointed shall give the undertaking and take the oath hereinbefore provided to be given and taken by a commissioner, before entering upon the discharge of his duties, and shall thereafter perform all duties left unperformed by the commissioner whom he is appointed to succeed with like effect as if such duties had been performed by the commissioner.

If the land mortgaged consists of a single parcel, or of two or more contiguous parcels, situated in two or more counties, the court may, in its judgment, direct the whole thereof to be sold in one of such counties, by the sheriff, commissioner, or elisor, as the case may be, and upon such proceedings, and with like effect, as if the whole of the property were situated in that county.

THE FOLLOWING AMENDMENTS TO THE PENAL CODE ARE RECOMMENDED FOR THE REASONS STATED IN THE ACCOMPANYING NOTE.

Section 507 of the Penal Code does not directly include within its provisions, the conversion of property by conditional vendee thereof. It is proposed to remedy this defect by amending the section as follows:

See *People* vs. *Goodrich*, 142 Cal. 216; *Krause* vs. *Commonwealth*, 95 Pa. St. 418.

Sec. 507. Every person intrusted with any property as bailee, tenant, as vendee under conditional contract before title thereunder has vested, or lodger, or with any power of attorney for the sale or transfer thereof, who fraudulently converts the same or the proceeds thereof to his own use, or secretes it or them with a fraudulent intent to convert to his own use, is guilty of embezzlement.

Section 532 of the Penal Code was intended, by the amendment of 1905 to change the rule announced in *People* vs. *Cummings*, 114 Cal. 437, but it is doubtful if the defect there pointed out is covered. Therefore, the following amendment is recommended.

The amended section reads as follows:

Sec. 532. Every person who knowingly and designedly, by any false or fraudulent representation or pretense, defrauds any other person of money, labor, or property, whether real or personal, or who causes or procures others to report falsely of his wealth or mercantile character, and by thus imposing upon any person obtains credit, and thereby fraudulently gets possession of money or property, or obtains the labor or service of another, is punishable in the same manner and to the same extent as for larceny of the money or of personal property of the value of the property or services obtained.

Section 269*a* of the Penal Code is amended by striking therefrom the words, "open and notorious."

The amended section reads as follows:

Sec. 269*a*. Every person who lives in a state of cohabitation and adultery is guilty of a misdemeanor, and punishable by a fine not exceeding one thousand dollars, or by imprisonment in the county jail not exceeding one year, or by both.

Sec. 269*b*. If two persons, each being married to another, live together in a state of cohabitation and adultery, each is guilty of a felony, and punishable by imprisonment in the state prison not exceeding five years. A recorded certificate of marriage or a certified copy of the record thereof. there being no decree of divorce, proves the marriage of a person for the purposes of this section.

Section 1070 of the Penal Code is amended to give the people the same number of peremptory challenges as the defense in the selection of jurors.

The amended section reads as follows:

Sec. 1070. If the offense charged be punishable with death, or with imprisonment in the state prison for life, the defendant is entitled to twenty and the state to twenty peremptory challenges. On a trial for any other offense, the defendant is entitled to ten and the state to ten peremptory challenges.

Section 995 of the Penal Code is amended by striking out subdivision four thereof. By omitting this subdivision the indictment can not be quashed for the bias or prejudice of any member of the grand jury.

The amended section reads as follows:

Sec. 995. The indictment or information must be set aside by the court in which the defendant is arraigned, upon his motion, in either of the following cases.

If it be an indictment:

1. Where it is not found, indorsed, and presented as prescribed in this code.

2. When the names of the witnesses examined before the grand jury, or whose depositions may have been read before them, are not inserted at the foot of the indictment, or indorsed thereon.

3. When a person is permitted to be present during the session of the grand jury, and when the charge embraced in the indictment is under consideration, except as provided in section nine hundred and twenty-five.

If it be on information:

1. That before filing thereof the defendant had not been legally committed by a magistrate.

2. That it was not subscribed by the district attorney of the county.

Section 1171 of the Penal Code, relating to bill of exceptions in criminal cases, is amended by changing the time in presenting a bill of exceptions for settlement to thirty days, instead of ten days after judgment has been entered.

This amendment is deemed advisable because in the very large majority of cases the bill of exceptions can not be prepared and presented for settlement within the time allowed under the section at the present time.

Sec. 1171. When the defendant desires to have exceptions taken at the trial settled in a bill of exceptions, the draft of a bill must be prepared by him, and presented to the judge for settlement within thirty days after judgment has been entered against him, or, if the judge is absent from the county, or ill, so that presentation can not be made, the draft must, within that period, be delivered to the clerk for the judge. Notice in writing of the intended presentation of such draft to the judge, or of the delivery thereof to the clerk, must be served upon the district attorney at least two days before such presentation or delivery. When received by the clerk, he must note thereon the date of such receipt, and transmit or deliver the same to the judge at the earliest period practicable. The judge must, immediately upon the draft being presented or delivered to him, designate a time for the settlement of the bill, and, if the parties are not present, require the clerk to notify them in writing of such date. The time so fixed must not be changed for inconvenience to a party, except upon good cause, shown by affidavit of necessity therefor. When settled and engrossed, the bill must be signed by the judge and filed with the clerk.

Section 971 of the Penal Code relates to the prosecution of accessories in felony cases only. The amended section includes misdemeanors to harmonize with sections 659 and 31 of the same code.

The amended section reads as follows:

Sec. 971. The distinction between an accessory before the fact and a principal and between principals in the first and second degree, in cases of felony and misdemeanor, is abrogated; and all persons concerned in the commission of a felony or misdemeanor, whether they directly commit the act constituting the offense, or aid and abet in its commission, though not present, shall hereafter be prosecuted, tried, and punished as principals, and no other facts need be alleged in any indictment or information against such an accessory than are required in an indictment or information against his principal.

An amendment of section 954 of the Penal Code is suggested. As the same now reads there can be no joinder of offenses, except such as grow out of the same transaction, and there can be but a single conviction under the section. By the proposed amendment, a series of offenses of the same class may be prosecuted under the same indictment or information.

The amended section reads as follows:

Sec. 945. The indictment or information may change different offenses, of the same kind and class, or different offenses growing out of the same act, transaction or event, or different statements of the same offense under separate counts. The court may in its discretion limit the prosecution to any one or more of such offenses charged as may in its judgment be tried at one and the same time. Subject to such limitation the defendant may be convicted of any one or more of such offenses so charged.

The act of March 21, 1905 (Statutes 1905, page 652), relating to the sale of intoxicating liquors in public institutions, or in the vicinity thereof, is codified as an amendment to section 172 of the Penal Code.

The amended section reads as follows:

Sec. 172. Every person who, within two miles of the land belonging to this state upon which any state prison or reformatory is situated; or within one mile of the grounds belonging and adjacent to the University of Californa, or any other university, college, or institution devoted to higher education; or within one mile of the asylum building of the Mendocino State Hospital for the Insane; or within one and one half miles of the lands occupied by any home, retreat, or asylum for disabled volunteer soldiers or sailors established or to be established by this state or by the United States within this state, or within the state capitol, or within the limits of the grounds adjacent and belonging thereto, sells, gives away, or exposes for sale or consumption by others, any beer, wine, whiskey, brandy, or other vinous or alcoholic liquors, is guilty of a misdemeanor.

THE FOLLOWING ACTS OF THE LEGISLATURE HAVE BEEN SUPERSEDED BY SECTIONS OF THE CODES OR BY SUBSEQUENT ACTS AND SHOULD BE REPEALED.

Sections 597*a*, 597*b*, 597*c*, and 597*d* of the Penal Code, relating to the importation and docking of horses' tails, are in many respects unconstitutional.

· Section 597, in so far as it relates to the importation of docked horses into this state, is an interference with interstate commerce and is void. *Railroad Co.* vs. *Husen,* 95 U. S. 465.; *Chy Lung* vs. *Freeman,* 92 U. S.; *People* vs. *Marx,* U. S. 378.

The provisions of this section prohibit any one from driving, working, using, or dealing in any unregistered docked horse, or horses, is not within the police power of the state, and would therefore be void.

See *Ex parte Hayden,* 147 Cal. 649; *Ex parte Dietrich,* 149 Cal. 106.

Sections 597*c* and 597*d* also contain the same infirmities, and all of said sections should be repealed, except 597*a*.

The act of March 20, 1905 (Statutes 1905, page 316), is in violation of article I of the constitution, and should be repealed.

See *Ex parte Dietrich*, 149 Cal. 104; *Ex parte Hayden*, 147 Cal. 649.

The act of March 19, 1889 (Statutes 1889, page 404), regulating the government of the state prisons, has been covered by sections 1572 and 1596 of the Penal Code (see Statutes 1907, page 585), and should be repealed.

The act of March 11, 1893 (Statutes 1893, page 132), authorizing the justices of the supreme court to appoint a librarian for said court, and fixing a salary, is covered by the provisions of section 2314 of the Political Code, and should be repealed.

The act of February 28, 1901 (Statutes 1901, page 75), providing for a luncheon hour for laborers in sawmills, and shingle and shake mills in logging camps, and making a violation thereof a misdemeanor, is in conflict with sections 11 and 21, of article I of the constitution of the State of California, and should be repealed.

See *Ex parte Sohncke*, 148 Cal. 262; *Ex parte Jentzsch*, 112 Cal. 468; *Bailey* vs. *People,* 190 Ill. 28 (60 N. E. 98).

The act of March 26, 1880 (Statutes 1880, page 15), relating to the transportation of passengers to and from foreign ports, is obsolete and should be repealed.

The act of March 27, 1872 (Statutes 1872, page 622), legalizing applications made to purchase state lands, is obsolete and should be repealed.

The act of March 30, 1874 (Statutes 1874, page 938), relating to discrimination against female teachers, is repealed as being obsolete and unnecessary.

The act of March 21, 1905 (Statutes 1905, page 711), regulating the lending of money on personal property by corporations violates article IV, section 25, subdivision 23 of the constitution, and should be repealed.

See *Ex parte Sohncke*, 148 Cal. 262; *Slocum* vs. *Bear Valley Irrigation Co.*, 122 Cal. 555; *Johnson* vs. *Goodyear Rubber Company*, 127 Cal. 4.

The act of April 23, 1880 (Statutes 1880, page 136), relating to procedure in actions to recover delinquent taxes, has been superseded by section 3899 of the Political Code, and is recommended for repeal.

The act of March 12, 1880, page 8, recited in Henning's General Laws, page 66, relating to currency of the United States, is entirely obsolete, as all of the provisions of the act are fulfilled by the laws of congress.

See *Lick* vs. *Faulkner*, 25 Cal. 404.

The act of March 24, 1905 (Statutes 1905, page 372), creating the office of sheep inspector, has been superseded by the later act of March 23, 1907, page 905, and should be repealed.

The act of March 21, 1899 (Statutes 1899, page 158), relating to members of the national guard who volunteered service in the Spanish-American war, has served its purpose and should be repealed.

The act of February 27, 1893 (Statutes 1893, page 30), to prevent combinations to obstruct the sale of live stock, has been covered by the Cartwright Act of March 23, 1907, and should be repealed.

The act of March 31, 1891 (Statutes 1891, page 473), to prevent destruction of property by fire, is superseded by section 384*a* of the Penal Code, and should be repealed.

The act of March 23, 1875-6 (Statutes 1875-6, page 408), has been superseded by sections 608, 384*c*, and 384*b* of the Penal Code, and should be repealed.

For the same reason the act of March 16, 1872 (Statutes 1871-2, page 384), should be repealed.

The act of April 1, 1878 (Statutes 1877-8, page 963), authorizing the managers of orphan asylums to consent to the adoption of children under their care, has been superseded by section 224 of the Civil Code, and should be repealed.

The act of March 23, 1893 (Statutes 1893, page 234, ch. CXC), relating to the removal of human remains from cemeteries, is contrary to the provisions of article XI, sections 11-12 of the constitution, and should be repealed.
See *Darcey* vs. *Mayor*, 104 Cal. 642.

The act of March 20, 1899 (Statutes 1899, page 146), providing an expert for the controller, has been superseded by section 439 of the Political Code as amended February 3, 1905 (Statutes 1905, page 785), and should be repealed.

The act of February 17, 1897 (Statutes 1897, page 12), regulating the medical practice, to prevent blindness in infants, is obsolete, impracticable, and seems to be a dead letter, and should be repealed.

The act of March 16, 1901 (Statutes 1901, page 324), relating to license tax on bicycles, seems to have become obsolete in all respects, except such parts thereof as are included in section 524 of the Civil Code, and should be repealed.

The act of March 10, 1891 (Statutes 1891, page 210), regulating the sale of imitation olive oil, as amended March 23, 1893, has been superseded by the act of March 11, 1907 (Statutes 1907, page 208), and should be repealed.

The act of March 15, 1899 (Statutes 1899, page 103), relating to suits to abate public nuisances, has been superseded by section 731 of the Code of Civil Procedure, and should be repealed.

The act of March 26, 1895 (Statutes 1895, page 131), known as the Insolvency Act has been superseded by the Federal Bankruptcy Act.

The act of March 24, 1873-4 (Statutes 1873-4, page 707), relating to attorney's fees in foreclosure cases, has been superseded by section 726 of the Code of Civil Procedure, and should be repealed.

The act of March 15, 1901 (Statutes 1901, page 296), relating to the meeting place of high school boards within municipal corporations, is included in subdivision 10 of section 1670 of the Political Code, and should be repealed.

The act of February 9, 1878 (Statutes 1877-8, page 73), relating to special elections, has been superseded by sections 1116 and 1205 of the Political Code, and should be repealed.

The act of March 15, 1907 (Statutes 1907, page 300), relating to trespass of animals upon private lands in certain counties of California, is in violation of section 25 of article IV of the constitution, and should be repealed.

The act of March 10, 1887 (Statutes 1887, page 82), relating to the wearing of badges of the Grand Army of the Republic, has been superseded by section 538*b* of the Penal Code, and should be repealed.

The act of April 15, 1880 (Statutes 1880, page 75), has served its purpose and should be repealed.

The act of March 8, 1872 (Statutes 1871-2, page 304), relating to hunting and shooting on private grounds, has been superseded by section 627 of the Penal Code.

The act of March 20, 1905, exempting all licenses of ex-Union soldiers and sailors of the civil war, is special legislation, contrary to the constitution, and should be repealed.

The act of March 27, 1878 (Statutes 1877-8, page 563), to protect bee keeping in the county of San Bernardino, is unconstitutional, and should be repealed.

The act of March 26, 1895 (Statutes 1895, page 163), relating to suits against cities and counties, has been included in the act of March 23, 1901 (Statutes 1901, page 794), and should be repealed.

The act of March 27, 1895 (Statutes 1895, page 238), providing a clerk in the office of the superintendent of public instruction, has been included in section 515*a* of the Political Code, and should be repealed.

The act of March 20, 1899 (Statutes 1899, page 148), relating to encampments of the national guard, has been superseded by section 2005 of the Political Code, and should be repealed.

The act of April 15, 1880 (Statutes 1880, page 75), is covered by the subsequent act of March 23, 1901 (Statutes 1901, page 577), and should be repealed.

The act of March 30, 1871-2 (Statutes 1871-2, page 796), providing for public administrators in certain cases, has been superseded by section 996 of the Political Code, and subdivision 19 of section 4041 of the Political Code, and should be repealed.

The act of March 18, 1885 (Statutes 1885, page 216), to establish a state board of silk culture has become obsolete, and should be repealed.

The act of March 21, 1905 (Statutes 1905, page 711), regulating the lending of money on personal property by corporations, violates article IV, section 25, subdivision 23 of the constitution, and should be repealed. See *Slocum* vs. *Bear Valley Irrigation Company*, 122 Cal. 555; *Johnson* vs. *Goodyear Rubber Company*, 127 Cal. 4.

The act of March 20, 1905, regulating the rates of interest and charges on loans, has been declared unconstitutional, and is recommended that the same should be repealed. *Ex parte Sohncke,* 148 Cal. 262.

The act of April 3, 1876 (Statutes 1875-6, page 759), concerning the ventilation of sleeping apartments, is covered by section 401*a* of the Penal Code, and should be repealed.

The act of March 20, 1903 (Statutes 1903, page 338), providing for the marking, branding, or labeling of boxes, barrels, or packages containing fruits, is in violation of article 1, section 1 of the constitution of the State of California, and should be repealed. See *Ex parte Hayden,* 147 Cal. 649.

The act of March 23, 1901 (Statutes 1901, page 664), providing for prosecuting attorneys of police courts in cities of the second class, is in conflict with article IV, section 25, subdivision 28 of the constitution, and should be repealed. See *San Francisco* vs. *Broderick*, 125 Cal. 188.

The act of March 30, 1874 (Statutes 1873-4, page 937), providing for the appointment of certain permanent employees of the state capitol, has been superseded by the provisions of the Political Code, and should be repealed.

The act of February 14, 1891 (Statutes 1891, page 4), providing for the levy and collection of taxes by and for school districts, except in municipal corporations of the first class, has been superseded by sections 1830 to 1839 of the Political Code, and should be repealed.

The act of April 15, 1880 (Statutes 1880, page 77), relating to the intoxication of officers and providing a penalty therefor is codified as section 773 of the Penal Code.

The new section reads as follows:

Sec. 773. Any officer of a town, village, city, county or state, who shall be intoxicated while in discharge of the duties of his office, or by reason of intoxication is disqualified for the discharge of, or neglects his duties, shall be guilty of a misdemeanor, and on conviction of such misdemeanor shall forfeit his office; and in such case the vacancy occasioned thereby shall be filled in the same manner as if such officer had filed his resignation in the proper office, and it had been accepted by the proper authority; *provided,* such acceptance shall have been necessary to make the office vacant.

The act of March 23, 1901 (Statutes 1901, page 603), relating to estrays and providing for taking up and impounding the same, and sales thereof, is codified as sections 1873-1874, 1875, 1876, and 1877 of the Civil Code.

The new sections read as follows:

Sec. 1873. Any person finding any estray domestic animal or animals upon his premises, or upon the premises to which he has the right of possession, or upon highways adjacent thereto, may take up and impound them in a secure and suitable place, and within five days thereafter must file with the county recorder of the county in which such animal or animals have been taken up, a notice of such impounding, with a description of the animal or animals so impounded, giving the marks, brands, color, sex, and any other visible means of identification, together with the probable value of each animal, and a statement of the time and place of their being taken up and where confined. The county recorder shall receive for filing said notice the sum of fifty cents.

Sec. 1874. If no person appears and claims such animal or animals or possession thereof within thirty days after the date of the filing of the notice specified in section eighteen hundred and seventy-three, or having so appeared and claimed such animal or animals, or the possession thereof, but have failed or refused to pay the fees, costs, and expenses provided in section eighteen hundred and seventy-six, it shall be the duty of the person having taken up such animal or animals, to notify in writing a constable of the township in which said animals are held, or there being no constable in said township, or he be absent therefrom, or can not be found, then the sheriff of the county in which said animal or animals taken up, which notice shall specify that the provisions of this chapter have been complied with, and that no person has appeared and claimed such animal or animals, or having so appeared has failed to pay the fees, costs and expenses of taking up and caring for the same, and requiring said constable or sheriff to proceed to sell such animal or animals at public sale. Any constable or sheriff receiving said notice shall immediately proceed to sell such animal or animals at public sale in conformity with the law concerning sales of personal property on execution (except that at least ten days' notice thereof shall be given and each animal shall be sold singly), and shall be entitled to the same fees as are provided by law from the sale of personal property on execution.

Sec. 1875. The party taking up such animal or animals shall be entitled to receive only the following fees, costs, and expenses before releasing the same, to be estimated as follows:

1. For taking up and impounding each animal, five cents;

2. The amount paid for filing the notice required by section eighteen hundred and seventy-three.

3. For keep and care of such animal or animals while the same are legally impounded and in his possession the following:

For each horse, mule, jenny, ass, bull, ox, steer, or calf, fifteen cents per diem;

For each sheep, goat, hog, or other animal not hereinbefore specified, five cents per diem; *provided, however,* that if such animal or animals have not been properly fed or watered during the time they have been impounded, no charge shall be allowed or collected therefor.

Sec. 1876. Any person claiming such animal or animals, and who has been refused the possession thereof, may at any time before the sale thereof, commence an action in the proper court to recover the possession of such animal or animals, and any sale of property shall thereupon be postponed until the determination of such action. The law and procedure relating to claim and delivery of personal property, shall govern such action so far as applicable thereto. In any such action the defendant shall be entitled to his costs the same as in other civil actions and shall have a lien upon said property therefor.

Sec. 1877. The money received from the sale of any animal or animals under the provisions of section eighteen hundred and seventy-four and section eighteen hundred and seventy-five of this code shall be applied as follows:

1. To the payment of the fees of the officer making such sale.

2. The payment to the person taking up such animal or animals his fees, expenses, and costs as provided in section eighteen hundred and seventy-six of this code.

3. The surplus, if any, shall be paid into the county treasury, together with a statement of the prices received for each animal sold, to be held for the owner of such animal or animals for sale of which it was received. If such owner shall, within one year thereafter, prove to the satisfaction of the board of supervisors of the county in which such animal or animals were sold, that he, or they, were the owners of said animals at the

time the same were taken up or sold, or to any part thereof, the said board of supervisors shall order such sum, or the proportionate part thereof, to be paid over to such person or persons. Any part of said fund that has not been claimed, or if claim has not been allowed by the board of supervisors within one year after the receipt thereof by the treasurer, shall be paid into and become a part of the common school fund of said county.

The act of March 31, 1891, page 219, relating to the working, rights of way, easement, and drainage of mines in the State of California, is codified as section 1443 of the Civil Code.

The new section reads as follows:

Sec. 1443. Whenever any mine owner, company, or corporation shall have performed the labor and made the improvements required by law for the location and ownership of mining claims or lodes, such owner, company, or corporation shall file or cause to be filed, within thirty days after the time limited for performing such labor or making such improvements, with the county recorder of the county in which the mine or claim is situated, an affidavit particularly describing the labor performed and improvements made, and the value thereof, which affidavit shall be prima facie evidence of the facts therein stated. Upon the failure of any claimant or mine owner to comply with the conditions of this act in the performance of labor, or making of improvements upon any claim, mine, or mining ground, the claim or mine upon which such failure occurred shall be opened to relocation in the same manner as if no location of the same had ever been made; but, if previous to relocation, the original locators, their heirs, assigns, or legal representatives, resume work upon such claim, and continue the same with reasonable diligence until the required amount of labor has been performed or improvements made, and the required statement of accounts and affidavits filed with the county recorder, then the claim shall not be subject to relocation because of previous failure to file accounts. Upon the failure of any one of the several co-owners to contribute his portion of the expenditures required hereby, the co-owners who have performed the labor or made the improvement may, at the expiration of the year, give such delinquent co-owner personal notice, in writing, or by publication in the newspaper published nearest the claim, for at least once a week for ninety days; and if, at the expiration of ninety days after such notice in writing or publication, such delinquent shall fail or refuse to contribute his portion of the expenditures required by this section, his interest in the claim shall become the property of his co-owners who made the required expenditures. A copy of such notice, together with an affidavit showing personal service or publication, as the case may be of such notice, when filed or recorded with the recorder of the county in which such mining claim is situated, shall be evidence of the acquisition of title of such co-owners. Where a person or company has or may run a tunnel or cuts for the purpose and in good faith for the purpose of developing a lode, lodes, or claims owned by said person, or company, or corporation, the money so expended in running said tunnel shall be taken and considered as expended on said lodes or claims; *provided further,* that said lode, claim, or claims shall be distinctly marked on the surface as provided by law. All mining locations and mining claims shall be subject to a reservation of the right of way through or over any mining claims, ditches, roads, canals, cuts, tunnels, and other easements for the purpose of working other mines; *provided,* that any damage occasioned thereby shall be assessed and paid for in the manner provided by law for land taken for public use under the right of eminent domain.

The act of February 28, 1903 (Statutes 1903, page 58), relating to assaults upon certain officers of the United States, is codified as follows: Section 2 thereof as section 186 of the Penal Code and section 1 thereof as section 183 of the Penal Code.

The new sections read as follows:

Sec. 186. Every person who attempts to kill, or who commits any assault upon the president or vice-president of the United States, the governor of any state or territory, any United States justice or judge, or the secretary of any of the executive departments of the United States, is guilty of a felony, and upon conviction thereof shall be punished by imprisonment in the state prison not less than ten years.

Sec. 183. If two or more persons conspire to commit any crime against the person of the president or vice-president of the United States, the governor of any state or territory, any United States justice or judge, or the secretary of any of the executive departments of the United States, they are guilty of a felony, and upon conviction thereof shall be punished by imprisonment in the state prison not less than ten years.

The acts of March 13, 1903 (Statutes 1903, page 139), relating to cruelty to animals, is codified as an amendment to section 597 of the Penal Code.

The amended section reads as follows:

Sec. 597. Every person who maliciously kills, maims, or wounds an animal, the property of another, or who overdrives, overloads, drives when overloaded, overworks, tortures, torments, deprives of necessary sustenance, drink or shelter, cruelly beats, mutilates, or cruelly kills any animal, or causes or procures any animal to be so over-driven, overloaded, driven when overloaded, overworked, tortured, tormented, deprived of necessary sustenance, drink or shelter, or to be cruelly beaten, mutilated, or cruelly killed; and whoever having the charge or custody of any animal, either as owner or otherwise, uses thereon what is known as the bristle bur, tack bur, or other like device, by whatsoever name known or designated, on any said horse or other animal for any purpose whatsoever, or who otherwise subjects any animal to needless suffering, or inflicts unnecessary cruelty upon the same, or in any manner abuses any animal, or fails to provide the same with proper food, drink, shelter, or protection from the weather, or who cruelly drives, rides, or otherwise uses the same when unfit for labor, is for every such offense guilty of a misdemeanor.

The act of March 16, 1903 (Statutes 1903, page 156), relating to ferries across navigable rivers between counties, is codified as section 2882 of the Political Code.

The new section reads as follows:

Sec. 2882. When a navigable river forms a boundary between two counties of this state, the boards of supervisors of such counties are hereby given the power to establish and operate a ferry or ferries across such stream. Each of such counties shall pay such proportion of the expenses of establishing and operating said ferry or ferries as may be agreed upon by the boards of supervisors of such counties. In case either of said counties shall refuse to enter into an agreement to establish and operate such ferry or ferries, the county situated upon the opposite bank of such river may establish and operate a ferry or ferries across such river, and such county is hereby empowered to acquire landing places for such ferry or ferries on the bank of such river opposite the boundary of such county, and may pay the expense of establishing and operating said ferry or ferries out of the general road fund of such county.

The act of March 8, 1905 (Statutes 1905, page 88), relating to charges of city justices against counties, is codified as section 4326 of the Political Code.

The new section reads as follows:

Sec. 4326. In no case shall the fees of a city justice of the peace, town or city recorder, or city or town marshal, for services in any criminal action, be a charge against the county.

The act of March 23, 1893 (Statutes 1893, page 302), relating to contagious diseases of domestic animals, is codified as section 374*a* of the Penal Code.

The new section reads as follows:

Sec. 374*a*. Any person or persons, company, or corporation, owning or having possession or control of any animal affected by any contagious or infectious disease, who shall fail to keep the same within an inclosure, or herd the same in some place where they will be secure from contact with other animals of like kind not so affected, or who shall suffer such infected animals to be driven on the public highway or to range where they will be likely to come in contact with other animals not so affected, shall be guilty of a misdemeanor, and, on conviction, punished by a fine of not more than five hundred dollars for each offense.

Sections 1867 and 1868 of the Political Code, relating to disturbing schools and insulting teachers, are penal in character, and should be combined as section 653*b* of the Penal Code.

The new section reads as follows:

Sec. 653*b*. Any person who willfully disturbs any public school, or any public school meeting, or who upbraids, insults, or abuses any teacher, in the presence of the school, shall be guilty of a misdemeanor, and be liable to a fine of not less than ten nor more than one hundred dollars.

The act of March 23, 1893 (Statutes 1893, page 235), relating to the preservation of hides of slaughtered animals, is amended and codified as section 139 (new) of the Penal Code.

The new section reads as follows:

Sec. 139. Any person who shall at any time kill or slaughter any cow, heifer, calf, steer, or bull, shall retain and keep, in his possession the hides taken off said animals, with the ears attached thereto, without any alterations or disfigurations of the brands or marks on said hide or ears for the period of ten days, and upon demand produce the same for the inspection of any person during said period. Any person or persons who shall violate any of the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than twenty dollars nor more than one hundred dollars, or be imprisoned in the county jail for any term not less than ten days nor more than ninety days, or by both such fine and imprisonment.

The act of March 19, 1889 (Statutes 1889, page 352), is codified as section 172*a* of the Penal Code.

The new section reads as follows:

Sec. 172*a*. Any person who, after receiving notice in writing that a person named in said notice is addicted to the inordinate use of intoxicating liquors, should the person named in said notice be so addicted, shall thereafter within a period of twelve months, furnish to said person so addicted to the inordinate use of intoxicating liquors any spirituous liquors, wines, or intoxicating or malt liquors, shall be guilty of a misdemeanor, and punishable by imprisonment in the county jail not exceeding six months or by a fine not exceeding two hundred dollars, or by both such fine and imprisonment; *provided, however,* that nothing herein shall prohibit any regularly licensed physician from furnishing or prescribing said liquors in case of sickness.

The act of March 23, 1901 (Statutes 1901, page 553), relating to the unlawful administering of drugs to animals on exhibition, is amended and codified as sections 596*a* and 596*b* of the Penal Code.

The new sections read as follows:

Sec. 596*a*. Any person or persons, who, except for medicinal purposes, administers any poison, drug, medicine, or other noxious substance to any horse, stud, mule, ass, mare, horned cattle, neat cattle, gelding, colt, filly, dog, animals, or other live stock, entered or about to be entered in any race or upon any race course in the State of California, or entered or about to be entered at or with any agricultural park, or association, race course, or occupation, or other exhibition for competition for prize, reward, purse, premium, stake, sweepstakes, or other reward; or to expose any such poison, drug, medicine, or noxious substance, with intent that the same shall be taken, inhaled, swallowed, or otherwise received by any horse, stud, mule, ass, mare, horned cattle, neat cattle, gelding, colt, filly, dog, animal, or other live stock, with intent to impede or affect the speed, endurance, sense, health, physical condition, or other character or quality or the appearance of such above mentioned animal, or other live stock, is guilty of a misdemeanor.

Sec. 596*b*. Any person or persons who cause to be taken by or placed upon or in the body of any horse, stud, mule, ass, mare, horned cattle, neat cattle, gelding, colt, filly, dog, animal, or other live stock, entered or about to be entered in any race upon any race course in the State of California, or entered or about to be entered at or with any agricultural park, association, race course or corporation, or other exhibition for competition for prize, reward, purse, premium, stake, sweepstakes, or other reward, any sponge wood, or foreign substance of any kind, with intent to impede or affect the speed, endurance, sense, health, physical condition of such horse, stud, mule, ass, mare, horned cattle, neat cattle, gelding, colt, filly, dog, animal, or other live stock, is guilty of a misdemeanor.

The act of 1897, page 439, providing for the organization and management of county fire insurance companies, approved April 1, 1897, is carried into the Civil Code as sections 433, 434, 435, 436, 436*a*, 436*b*, 436*c*, 436*d*, 436*e*, 436*f*, 436*g*, 436*h*, 436*i*, and 436*j* (new sections).

The new sections read as follows:

Sec. 433. Any number of persons, not less than twenty-five, residing in any county in this state, owning insurable property aggregating not less than fifty thousand dollars in value, which they desire to have insured, may incorporate for the purpose of mutual insurance against loss or damage by fire. Such persons shall file with the insurance commissioner a declaration of their intention to incorporate for the purposes expressed in section 433 of this chapter, which declaration shall be signed by all of the incorporators, and shall contain a copy of the articles of incorporation proposed to be adopted. The insurance commissioner shall examine the proposed articles of incorporation, and if they conform to the requirements of the law, he shall deliver to such persons a certificate permitting them to incorporate as such insurance company. Such certificate shall be directed to the clerk of the county in which such corporation is proposed to be organized, and shall contain a copy of the proposed articles of incorporation. Upon filing with the county clerk duly executed articles of incorporation, and filing with the secretary of state the certified copies of the duly executed articles of incorporation, as required by section two hundred and ninety-six of the Civil Code of the State of California, and of the certificate above provided for, the secretary of state shall thereupon issue a certificate of incorporation to such county insurance company, and upon organizing under such articles of incorporation, such county fire insurance company may carry on a fire insurance business as hereinafter provided. The articles of incorporation and the charter or certificate obtained by any county fire insurance company operating under the provisions of this chapter shall be subject to the control and modification by the legislature of the State of California. The by-laws and all amendments thereto shall be filed with the insurance commissioner within sixty (60) days after their adoption.

Sec. 434. The number of directors shall not be less than (7) seven nor more than eleven (11), a majority of whom shall constitute a quorum to do business. These directors shall be elected from the members of the association by ballot, and shall hold office for one year, or until their successors are elected and qualified. The annual meeting of the members of the company shall be on the second Monday in January of each year. In the election of the first board of directors each member shall be entitled to one vote. At every subsequent election, every person insured shall be entitled to as many votes as there are directors to be elected, and an equal additional number for every risk or risks he holds in the company, and he may cast the same in person or by proxy, distributing them among the directors to be elected, or among a less number of directors, or cumulating them upon one candidate, as he shall see fit. The directors shall elect, from their own number, a president and a vice-president, and shall also elect a treasurer and a secretary, who may or may not be members of the company. All of such officers hold their office for one year from the date of their election, and until their successors are elected and qualified. The treasurer and secretary shall give bonds to the company for the faithful performance of their duties, in such amounts as shall be prescribed by the board of directors.

Sec. 435. Such corporation and its directors shall possess the usual powers, and be subject to the usual duties of corporations and directors thereof, and may make such by-laws, not inconsistent with the constitution and the laws of this state, as may be deemed necessary for the management of its affairs in accordance with the provisions of this chapter; also to prescribe the duties of its officers and to fix their compensation, and to alter and amend its by-laws, when necessary. Any person owning property in the county for which any such company is formed may become a member of such company by insuring therein, and shall be entitled to all the rights and privileges appertaining thereto, and no person not residing in the county in which the company is formed, or any person owning property in any county adjoining the county wherein such company is formed, as hereinafter provided, shall become a director of such company.

Sec. 436. Such company may issue policies only on detached dwellings, schoolhouses, churches, barns (except livery and hotel barns), and other farm buildings, and such property as may be contained therein; also other property on the premises owned by the insured; hay and grain in stack or in the field, and live stock on the premises of the insured, anywhere in the county, for any time not exceeding five years, and not to extend beyond the time limited for the existence of the charter, and for an amount not to exceed four thousand five hundred dollars on any one risk; *provided,* that no company which has been organized more than six months shall write insurance subject to one fire exceeding three per cent of the amount at risk upon the books of such company. All persons so insured shall give their obligation to the company, binding themselves, their heirs and assigns, to pay their pro rata share to the company of the necessary expense and of loss by fire which may be sustained by any member thereof during the time for which their respective policies are written, and they shall also at the time of effecting the insurance pay such a percentage in cash, and such other charges as may be required by the rules or by-laws of the company.

436*a*. All such companies must classify the property insured therein at the time of issuing policies thereon under different rates, corresponding as nearly as may be to the greater or less risk from fire loss which may be attached to the several kinds of property insured.

436*b*. No such company shall insure any property beyond the limits of the county within which the company is organized, except that a company may insure in an adjoining county to the amount of fifty-five thousand dollars and no more, where no mutual company exists, or is organized therein, and as soon as a mutual company shall organize therein, said company first insuring, and with its original place of business in an adjoining county, shall, as soon as its policies originally issued expire or shall be canceled, retire therefrom, nor shall any company issue policies of insurance on any property within the limits of any city containing over six thousand inhabitants at the time of the organization of such company; *provided,* that no dwelling shall be insured within the corporate limits of any city or town exposed by any other building within one hundred feet, or by any other disk than a dwelling or private barn, within two hundred feet of the risk assumed; *provided,* that the amount of insurance shall not exceed seventy-five per cent of the value of the property and that no additional insurance shall be allowed.

436*c*. Every member of such company who may sustain loss or damage by fire shall immediately notify the president, or in his absence, the secretary thereof, stating the amount of damages or loss sustained or claimed, and if not more than five hundred dollars, then the president and secretary shall proceed to ascertain the amount of such loss or damage, and adjust the same. If the claim for damage or loss be an amount greater than five hundred dollars, then the president of such company, or in his absence, the vice-president, or in the absence of both, the secretary thereof, shall forthwith convene the board of directors of such company, whose duty it shall be when convened to appoint a committee of not less than three disinterested members of such company to ascertain the amount of such damage or loss. If, in either case, there is a failure of the parties to agree upon the amount of such damage or loss, they shall submit the question of the amount of such loss to arbitration. The president of the company shall appoint one disinterested person to act as an arbitrator and the claimant or insured shall appoint another, and if such two arbitrators fail to agree upon the amount of such loss, then they shall select a third disinterested person to act with them. Such arbitrators so appointed shall have full authority to examine witnesses, and to do all other things necessary to the proper determination of the amount of loss sustained by the claimant, and shall make their reward in writing to the president of such company, and such award so as aforesaid made shall be final as to the amount of the loss sustained. The pay of the said committee shall be three ($3) dollars per day for each day's services so rendered, and five cents for each mile necessarily traveled in the discharge of their duties, which shall be paid by the claimant, unless the award of such committee shall exceed the sum offered by the company in liquidation of such loss or damage, in which case such expense shall be paid by the company.

436d. When the amount of any loss shall have been ascertained, which exceeds in amount the cash funds of the company, the president shall convene the directors of said company, who shall make an assessment upon all the property to the amount for which each several piece of property is insured, taken in connection with the rate of premium under which it may be classified; *provided, further,* that the board of directors may at their annual meeting levy an assessment not to exceed twenty-five cents on the one hundred dollars on first class insurance and a pro rata amount on other classes and said sum so raised shall constitute a reserve fund to be used in emergency cases only and another assessment for this fund shall not be made while this reserve remains intact.

436*e*. It shall be the duty of the secretary, whenever such an assessment shall have been made, to immediately notify every person holding a risk in such company, personally, by an agent, or by letter directed to his usual post office address, of the amount of such loss and the sum due from him, as his share thereof, and of the time and to whom such payment is to be made; but such time shall not be less than thirty days, nor more than ninety days, from the date of such notice.

436*f*. An action may be brought against any member of such company who shall neglect or refuse to pay any assessment made upon him by the provisions of this chapter, or other liabilities due the company, and the directors of any company so formed who shall willfully refuse or neglect to perform the duties imposed upon them by law or by the by-laws of the company shall be liable in their individual capacity to the person sustaining such loss. An action may also be brought and maintained against any such company by members thereof for losses sustained if payment is withheld after the amount of such losses have been determined, and is due by the terms of the policy.

436*g*. It shall be the duty of the secretary to prepare an annual statement, showing the condition of such company on the thirty-first day of December, and present the same at the annual meeting.

436*h*. Any member of such company may withdraw therefrom by surrendering his policy for cancellation at any time while the organization continues the business for which it was organized, by giving notice in writing to the secretary thereof and paying his share of all claims that may exist against such company; *provided,* that the company shall have power to cancel or terminate any policy by giving the insured five days' written notice to that effect, and returning to him any excess of premium he may have paid during the term of the policy, over the cost of his insurance, as measured by the rates of standard fire insurance companies doing business in this state.

436*i*. It shall be the duty of the president and secretary, within thirty days after the first day of January in each year, to prepare, under their own oath, and transmit to the insurance commissioner, a statement of the condition of the company on the last day of the month next preceding the annual meeting. If, upon examination, the insurance commissioner finds that such company is doing business correctly, in accordance with the provisions of this chapter, he shall thereupon furnish the company his certificate, which shall be deemed authority to continue business during the ensuing year, subject, however, to the provisions of this chapter. For such examination and certificate the company shall pay one dollar. Each company shall pay, at the time of organization, five dollars to the insurance commissioner for all services which he shall render in the matter of organization.

436*j*. Any such company may be proceeded against and dissolved in the manner and upon the same conditions as provided in case of other insurance companies incorporated in this state.

The act of April 18, 1859, as amended January 13, 1864, and the acts of 1891 and 1899 supplementary thereto, are codified as follows: Section 8 thereof is codified by amendment of section 296 of the Penal Code.

The new section reads as follows:

Sec. 296. Every person who willfully and maliciously destroys, mutilates, defaces, injures, or removes, any mausoleum, tomb, monument, gravestone, building, or other structure, placed in any cemetery, or any fence, railing, coping, or other work, for the protection or ornament of said cemetery, or any part thereof, or of any tomb therein, or who destroys, cuts, breaks, or injures any tree, shrub, or plant within such cemetery, shall be deemed guilty of a misdemeanor.

The act of March 20, 1905 (Statutes 1905, page 388), relating to payments on state lands, is codified as section 3575 of the Political Code.

The new section reads as follows:

Sec. 3575. Whenever it shall appear by final decree of any court of competent jurisdiction that title to any lands subject to sale by the State of California was obtained, or sought to be obtained, by fraudulent means, or in any manner contrary to the laws of this state relating to the acquisition of its public domain, all payments made in the interest of said fraudulent title shall revert to the State of California without suit, and it shall thereupon become the duty of the state surveyor general and ex officio register of the state land office to cancel all evidence of title to any land embraced in such fraudulent or invalid location, and to restore said land to public entry.

The act of March 31, 1880 (Statutes 1880, page 19), relating to writs and process issued by new courts before they have seals, is codified as section 80 of the Code of Civil Procedure.

The new section reads as follows:

Sec. 80. No writ, process, or certificate issued by any superior court, or the clerk thereof, before such court shall have been legally provided with a seal, shall be invalid, if in other respects valid, by reason of the absence of a lawful seal; but every such writ, process, or certificate, whether under the seal of one of the courts abolished on the first day of January, 1880, or under the private seal of the clerk, or under any other seal, or issued without a seal, shall have the same validity as if it had been authenticated by a legally adopted seal of the court out of which or by whose clerk it was issued.

The act of March 20, 1874 (Statutes 1874, page 2), prohibiting the collection of accounts for liquors sold at retail, is codified as section 3434 of the Civil Code.

The new section reads as follows:

Sec. 3434. The purchase of, or the sale and delivery of any spirituous or malt liquors, wine, or cider, by retail, or by the drink, is hereby declared to be an invalid consideration for any promise to pay, or assumpsit of account therefor, when the amount of such account or demand exceeds five dollars; and no court shall, in any action at law, render judgment for a greater amount than five dollars, for the sale at retail, or by the drink, of any spirituous or malt liquors, wine, or cider, together with costs.

The act of March 10, 1891 (Statutes 1891, page 70), relating to the insurance of property belonging to the state, should be codified as section 3236 of the Political Code.

The new section reads as follows:

Sec. 3236. No property belonging to this state shall hereafter be insured against risk of damage or destruction by fire, and no policy of fire insurance now existing upon any property belonging to this state shall be renewed at the expiration thereof, except the state printing office and its contents.

The act of March 23, 1893 (Statutes 1893, page 285), should be codified as section 689 of the Political Code.

The new section reads as follows:

Sec. 689. No officer or employee in the service of the state shall have power to create any deficiency in excess of any appropriation of money made by law, except in case of actual necessity, and only then upon the written authority, first obtained, of the governor, secretary of state, and attorney general; and any indebtedness attempted to be created against the state in violation of the provisions of this act shall be absolutely null and void, and shall not be allowed by the state board of examiners.

The act of March 6, 1872 (Statutes 1871-2, page 282), was codified as follows: Section 1 by amendment of section 502, and section 2 by amendment of section 502*a* of the Penal Code.

The amended sections read as follows:

502*a*. Every person who shall convert any manner of real estate into personal property, by severing the same from the realty of another, with felonious intent to and shall so steal, take, and carry away the same, shall be deemed guilty of larceny, and upon conviction thereof, shall be punishable by imprisonment in the state prison for any term not less than one year nor more than fourteen years.

502*b*. Every person who shall convert any manner of real estate, of the value of under fifty dollars, into personal property, by severing the same from the realty of another with felonious intent, and shall so steal, take, and carry away the same, shall be deemed guilty of petit larceny, and upon conviction thereof shall be punishable by imprisonment in the county jail for a period not more than one year or by fine not exceeding one thousand dollars, or by both such fine and imprisonment.

The act of March 16, 1901 (Statutes 1901, page 515), relating to the powers of the state board of prison directors, is codified as sections 1597 and 1598 (new) to the Penal Code.

The new sections read as follows:

Sec. 1597. The state board of prison directors are authorized and empowered to purchase California grown hemp, to be used in the manufacture of grain bags, and to pay for the same from the revolving fund created by law for the purchase of jute. The price for which grain bags made at said prison from hemp shall be sold shall be fixed by the state board of prison directors, in the same manner as the price of bags made from jute is now by law fixed by said board.

Sec. 1598. The costs and expenses of all trials which have heretofore been had in the county in this state where the state prison is situated, for any crime committed by any convict in the state prison, and the costs of guarding and keeping such convict, and the execution of the sentence of said convict by said county, and the costs and expenses of all trials heretofore had for the escape of any convict from the state prison, and the costs and expenses of all coroner inquests heretofore had of any convict at the state prison by the county where said prison has been situated shall be certified to by the county clerk of said county wherein said trials and inquests have been held to the board of state prison directors for their approval, and after such approval they shall pay the same out of the money appropriated for the support of the state prison to the county treasurer of said county where said trials have been had; *provided,* that this act shall not apply to any costs or expenses incurred since January first, eighteen hundred and seventy-three. This section shall only apply to cases which have not been settled for by the state.

The act of March 9, 1893 (Statutes 1893, page 109), relating to claims of counties against the state, is codified as section 3881 (new) of the Political Code.

The new section reads as follows:

Sec. 3881. On the presentation of the claim of any county in this state, or treasurer thereof, to the state controller for commissions, charges, or fees fixed or directed to be allowed by law for the collection of state taxes, the said commissions, charges, or fees for which claim is made, not having been allowed by the state, and the same having been paid into the state treasury, thereupon the state controller shall, in the next settlement thereafter to be made with the treasurer of the county presenting such claim, allow to be retained out of any moneys then in the hands of such treasurer belonging to the state the amount of such claim; *provided, however,* that the moneys thus retained shall be paid into the county treasury, and shall be the property of such county.

The act of February 13, 1872 (Statutes 1871-2, page 96), to prevent the destruction of forests by fires on public lands, is codified by including the same in the provisions of section 384*a* of the Penal Code, covering the same subject-matter.

The section as amended reads as follows:

Sec. 384*a*. Any person or persons who shall willfully and deliberately set fire to any wooded country or forest belonging to this state, or the United States, within this state, or to any place from which fire shall be communicated to any such wooded country or forest, or who shall accidentally set fire to any such wooded country or forest, or to any place from which fire shall be communicated to any such wooded country or forest, and shall not extinguish the same, or use every effort to that end, or who shall build any fire, for lawful purpose or otherwise, in or near any such wooded country, or forest, and through carelessness or neglect shall permit said fire to extend to and burn through such wooded country or forest, shall be deemed guilty of a misdemeanor, and on conviction before a court of competent jurisdiction shall be punishable by fine not exceeding one thousand dollars or imprisonment not exceeding one year, or by both such fine and imprisonment; *provided,* that nothing herein contained shall apply to any person who in good faith shall set a back-fire to prevent the extension of a fire already burning. All fines collected under this act shall be paid into the county treasury for the benefit of the common school fund of the county in which they are collected.

The acts of March 13, 1883 (Statutes 1883, page 298), providing for the disposal of surplus moneys in the building fund of school districts, is codified as section 1892 (new) of the Political Code.

The new section reads as follows:

Sec. 1892. All moneys that have been or shall be raised by special tax for the purpose of erecting school buildings, that shall remain in the hands of the county treasurer after all bonds that have been or may be issued on account of such buildings shall have been redeemed, and all other indebtedness arising on account of such buildings shall have been liquidated, shall be placed in the county school fund of the school district for which such moneys were raised, subject to the order of the trustees of said district.

The act of March 16, 1903 (Statutes 1903, page 163), relating to the change of name of school districts, is codified as section 1575*a* of the Political Code (new).

The new section reads as follows:

Sec. 1575*a*. Whenever a petition shall be presented to the board of supervisors, signed by at least fifteen qualified electors of said district, asking that the name of any school district be changed, the said board of supervisors shall designate a day upon which they will act upon such petition, which day must not be less than ten days nor more than forty days after the receipt thereof. The clerk of the said board of supervisors must give notice, by sending by registered mail to each of the trustees of such school district, a notice of the time set for the hearing of said petition, which notice must be mailed at least ten days before the day set for hearing; whereupon, the board shall by resolution either grant or deny the petition, and if granted, the clerk shall notify the county superintendent of the change of the name of said district.

The act of March 20, 1903 (Statutes 1903, page 289), regulating the use of illuminating gas, is codified as section 653 (new) of the Penal Code.

The new section reads as follows:

Sec. 653*e*. Every hotel keeper, lodging-house keeper, and innkeeper, or keeper of any place where rooms are let to lodgers in which or any of which such places illuminating gas is used, who shall turn off, or cause to be turned off at the meter, the flow of such illuminating gas during the time of the use of any such room or rooms, shall be guilty of a misdemeanor; *provided, however,* that this act shall not apply to any of the persons herein enumerated when such person or persons shall have connected every exit orifice upon the gas fixtures used in such place or places with a practical and safe automatic gas igniter.

The act of March 10, 1891 (Statutes 1891, page 56), relating to costs in civil actions, is codified as section 1020 (new) of the Code of Civil Procedure.

The new section reads as follows:

Sec. 1020. In all civil actions when a summons or subpœna is served by a person other than the sheriff, the person so serving shall be allowed by the court issuing the process such sum as the court may think proper, not exceeding the amount allowed sheriffs by law.

The act of January 23, 1893 (Statutes 1893, page 5), is codified as section 4304 (new) of the Political Code, relating to fees of justices, constables, city recorder, and city marshal against county.

The new section reads as follows:

Sec. 4303. All commissions or fees paid by the state to the officers of any county, or city and county, for services rendered in the assessment, equalization, auditing, and collection of ad valorem taxes, are hereby abolished; *provided,* that this shall not affect the commissions paid to the assessor of the several counties for services rendered in the collection of personal property taxes, as provided by chapter eight of the Political Code, or the mileage allowed to the treasurer of the several counties, or cities and counties, in making settlements with the state, as provided by section three thousand eight hundred and seventy-six of the Political Code.

The act of March 18, 1905 (Statutes 1905, page 243), relating to the organization of school districts, is codified as section 1580 (new) of the Political Code.

The new section reads as follows:

Sec. 1580. All school districts in this state that for a period of five (5) years have been acting as school districts under the laws of this state, are hereby declared to be duly incorporated, and to be bodies politic under the laws of this state, and as such school districts, under their appropriate names, shall have all the rights and privileges and be subjected to all of the duties and obligations of duly incorporated school districts.

The act of March 18, 1905 (Statutes 1905, page 185), relating to the exchange of commodities between the public institutions, is codified as sections 686, 687 and 688 of the Political Code.

The new sections read as follows:

Sec. 686. It shall be the duty of the state board of examiners to arrange, so far as may be practical, for an exchange of surplus products, either manufactured or natural, between the several public institutions owned or managed and controlled by the state, or the political divisions thereof.

Sec. 687. It shall be the duty of the state board of examiners to so distribute and arrange, with the assistance of the boards of managers, directors, or trustees of the several institutions referred to in section 686 of this code, the labor and industry of their inmates that it will prove conducive to their mutual assistance, with a view of advancing the economic management of all the institutions owned or managed and controlled by the state, or the political divisions thereof; and no part of such surplus products shall not be sold or disposed of to any individual, corporation, or association not connected with the state, or any political division thereof, so long as there shall be any demand for any such products by any public institutions owned or managed and controlled by the state, or the political divisions thereof. In estimating the value of such articles for the purpose of such exchange or sale between public institutions, the cost of producing or raising such products, with ten per centum added, shall be the sale price thereof.

Sec. 688. Each institution shall notify the state board of examiners what surplus products they have to dispose of, under the two preceding sections of this code, and the state board of examiners shall notify all the other institutions owned or managed and controlled by the state, or the political divisions thereof, that such articles can be procured and where, and the state board of examiners shall allow no claims for the purchase of any products from any individual, corporation, or association, so long as the same might have been procured from a state institution after it had been duly notified of that fact.

The act of March 23, 1901 (Statutes 1901, page 666), relating to the appointment of policemen on cars or boats of railroad and steamship companies, is codified as section 728 (new) of the Penal Code.

The new section reads as follows:

Sec. 728. The governor of the State of California is hereby authorized and empowered, upon the application of any railroad, street railroad, or steamboat company, to appoint and commission, during his pleasure, one or more persons designated by such company and to serve at the expense of such company, as policeman or policemen, with the powers of peace officers, and who, after being duly sworn, may act as such policeman or policemen upon the premises, cars, or boats of such company. The company designating such person or persons shall be responsible civilly for any abuse of his or their authority. Every such policeman shall, when on duty, wear in plain view a shield bearing the words "railroad police," or "steamboat police," as the case may be, and the name of the company for which he is commissioned.

The act of March 18, 1905 (Statutes 1905, page 123), relating to the registration of bonds issued by school districts, is codified as sections 1893 and 1894 of the Political Code.

The new sections read as follows:

Sec. 1893. Whenever the owner of any coupon bond, or of any bond payable to bearer, already issued or hereafter issued by any common school, high school, or union high school districts now or hereafter existing in this state, shall present any such bond to the treasurer or other officer of the county in which such district is located, who by law performs the duties of treasurer, with a request for the conversion of such bond into a registered bond, such treasurer, or such other officer, shall cut off and cancel the coupons of any such coupon bond so presented, and shall stamp, print, or write upon such coupon bond, or such other bond payable to bearer, so presented, either upon the back or upon the face thereof, as may be convenient, a statement to the effect that the said bond is registered in the name of the owner, and that thereafter the interest and principal of said bond are payable to the registered owner. Thereafter, and from time to time any such bond may be transferred by such registered owner in person, or by attorney duly authorized on presentation of such bond to such treasurer, or such other officer, and the bond be again registered as before, a similar statement being stamped, printed, or written thereon. Such statement stamped, printed, or written upon such bond may be in substantially the following form:

(Date, giving month, year, and day.)

This bond is registered pursuant to the statute in such cases made and provided in the name of .... (here insert name of owner) and the interest and principal thereof are hereafter payable to such owner.

........................,
Treasurer (or such other officer).

After any bond shall have been registered as aforesaid, the principal and interest of such bond shall be payable to the registered owner. Such treasurer or such other officer, shall keep in his office a book or books which shall at all times show what bonds are registered and in whose names respectively.

Sec. 1894. Whenever under any statute or law of this state any bonds are issued, whether the proceedings for the issuance of such bonds have been had in whole or in part prior to the enactment of this statute, or whether the same have been had in whole or in part after the enactment of this statute, such bonds may be issued either in the form of coupon bonds, or in the form of registered bonds, or some in the form of coupon bonds and some in the form of registered bonds, as has been or hereafter may be provided in the proceedings for the issuance of such bonds and notwithstanding any language or provision to the contrary contained in any such statute authorizing the issuance of the bonds, or in any other law of the state. The provisions of section one of this act shall apply to coupon bonds, so issued, as well as to other coupon bonds, or other bonds payable to bearer.

The act of February 20, 1889 (Statutes 1889, page 32), requiring a general vaccination in the State of California, is codified as sections 2995, 2996, 2997, 2998, and 2999 of the Political Code.

The new sections read as follows:

Sec. 2995. The trustees of the several common school districts in this state, and boards of common school government in the several cities and towns, are directed to exclude from the benefits of the common schools therein any child or any person who has not been vaccinated until such time when said child or person shall have been successfully vaccinated; *provided,* that any practicing and licensed physician may certify that the child or person has used due diligence and can not be vaccinated so as to produce a successful vaccination, whereupon such child or person shall be excepted from the operation of this act.

Sec. 2996. The school trustees or local boards of education must, annually, or at such special times to be stated by the state board of health, give at least ten days' notice, by posting a notice in two or more public and conspicuous places within their jurisdiction, that provision has been made for the vaccination of any child of school age who may desire to attend the common schools, and whose parents or guardians are pecuniarily or otherwise unable to procure vaccination for such child, stating the name and address of the physician or physicians with whom such provision has been made.

Sec. 2997. The said trustees or board must every year ascertain the number of children or persons in their respective school districts or subdivisions of the city school government being of an age suitable to attend common schools who have not been already successfully vaccinated, and make a list of the names of all such children or persons. It also shall be duty of said trustees or board to provide for the vaccination of all such children or persons in their respective school districts a good and reliable vaccine virus wherewith to vaccinate such children or persons who have not been vaccinated; and when so vaccinated, to give a certificate of vaccination, which certificate shall be evidence thereof for the purpose of complying with section 2995.

Sec. 2998. The necessary expenses incurred by the provisions of this act shall be paid out of the common school moneys apportioned to the district, city, or town; and if there be not sufficient money, the trustees must notify the board of supervisors of the amount of money necessary, and the board must, at the time of levying the county tax, levy a tax upon the taxable property in the district sufficient to raise the amount needed. The rate of taxation is ascertained by deducting fifteen per cent for delinquencies from the assessment, and the rate must be based upon the remainder. The tax so levied must be computed and entered upon the assessment roll by the county auditor and collected at the same time and in the same manner as state and county taxes, and when collected shall be paid into the county treasury for the use of the district.

Sec. 2999. The trustees of the several school districts of this state must include in their annual report, and report to the secretary of the state board of health, the number in their several districts between the ages of five and seventeen years who are vaccinated, and the number unvaccinated.

The act of March 23, 1872 (Statutes 1872, page 533), relating to actions of libel and slander, is codified as sections 1040, 1041, and 1042 of the Code of Civil Procedure.

The new sections read as follows:

Sec. 1040. In an action for libel or slander the clerk shall, before issuing the summons therein, require a written undertaking on the part of the plaintiff in the sum of five hundred ($500) dollars, with at least two competent and sufficient sureties, specifying their occupations and residences, to the effect that if the action be dismissed or the defendant recover judgment, that they will pay such costs and charges as may be awarded against the plaintiff by judgment, or in the progress of the action, or on appeal, not exceeding the sum specified in the undertaking. An action brought without filing the undertaking required shall be dismissed. Each of the sureties on the undertaking mentioned in this section shall annex to the same an affidavit that he is a resident and householder or free holder within the county, and is worth double the amount specified in the undertaking over and above all his just debts and liabilities, exclusive of property exempt from execution.

Sec. 1041. Within ten days after the service of the summons the defendants, or either of them, may give to the plaintiff or his attorney notice that they or he except to the sureties and require their justification before a judge of the court at a specified time and place, the time to be not less than five nor more than ten days thereafter, except by consent of parties. The qualifications of the sureties shall be as required in their affidavits. For the purpose of justification, each of the sureties shall attend before the judge at the time and place mentioned in the notice, and may be examined on oath touching his sufficiency in such manner as the judge in his discretion shall think proper. The examination shall be reduced to writing if either party desires it. If the judge finds the undertaking sufficient, he shall annex the examination to the undertaking, and indorse his approval thereon. If the sureties fail to appear, or the judge finds the sureties or either of them insufficient, he shall order a new undertaking to be given. The judge may also at any time order a new or additional undertaking upon proof that the sureties have become insufficient. In case a new or additional undertaking is ordered, all proceedings in the case shall be stayed until such undertaking is executed and filed, with the approval of the judge, and if the undertaking be not filed in five days after the order therefor, the judge or court shall order the action to be dismissed.

Sec. 1042. In case plaintiff in an action for libel and slander recovers judgment, he shall be allowed as costs one hundred ($100) dollars, to cover counsel fees, in addition to the other costs. In case the action is dismissed, or the defendant recover judgment, he shall be allowed one hundred ($100) dollars to cover counsel fees, in addition to the other costs, and judgment therefor shall be entered accordingly.

The act of March 19, 1903 (Statutes 1903, page 210), is codified as section 2329 of the Political Code.

The new section reads as follows:

Sec. 2329. No inmate of any state institution shall be employed in the manufacture or production of any article intended for the private and personal use of any state officer, or officer or employee of any state institution; *provided*, that this act shall not prevent repairing of any kind nor the employment of such inmates in household or domestic work connected with such institution.

The act of March 20, 1905 (Statutes 1905, page 477), regulating the charges and costs of bonds of receivers and others, is codified as section 1060 (new) of the Code of Civil Procedure.

The new section reads as follows:

Sec. 1060. Any receiver, assignee, trustee, guardian, administrator, or executor, required by law or by the order of court to give a bond as such, shall be allowed as part of the lawful expense of executing his trust, the sum paid for such bond not exceeding, however, one half (½) of one (1) per centum of the amount of such bond, for each year that the same shall remain in force.

The act of March 25, 1903 (Statutes 1903, page 476), relating to the payment of premiums on bonds of officials by the state or counties, or cities, or cities and counties, of the State of California, is codified as section 988 (new) of the Political Code.

The new section reads as follows:

Sec. 988. The premium or charge for bonds given by surety companies for state officials, count officials, city officials, or city and county officials, shall be paid by the state, county, city, or city and county respectively; *provided, however,* that no premium or charge shall exceed one half of one per cent per annum on the amount of such bond; *and provided further,* that this section shall not apply to notaries public.

The act of March 18, 1905 (Statutes 1905, page 102), perpetuating the markings of the government surveys, is codified as section 4221 (new) of the Political Code.

The new section reads as follows:

Sec. 4221. When in the performance of his official duties any county surveyor shall find a government corner which has been marked by any government surveyor by placing charcoal in the ground, or by a wooden stake, earth mound, or other perishable monument, it shall be his duty to re-mark said corner by placing therein a monument of heavily galvanized iron pipe or galvanized iron stake, not less than two inches in diameter and not less than two feet long, or other monument not less in size and equally imperishable, to be furnished by the county. All such monuments located in public highways shall be placed with the top not less than twelve inches below the surface of the ground, but when not located in public highways they shall be placed with the top six inches above the surface of the ground. If the top of the monument is placed above the ground, it shall be not less than four feet long, if of metal. The surveyor shall note witness objects that are within a reasonable distance of any corner, and state distance and course from said corner, and record the same in a properly indexed record book kept in the county surveyor's office, which shall be a public record.

The act of March 18, 1905 (Statutes 1905, page 115), relating to the issuance and registration of burial and disinterment permits, is codified as sections 3074½, 3075½, 3080*a*, 3080*b*, 3080*c*, 3080*d*, 3080*e*, 3080*f*, 3080*g*, 3080*h*, 3080*i*, 3080*j*, and 3084 of the Political Code.

The new sections read as follows:

Sec. 3074½. The State of California shall be divided into registration districts as follows: Each city and county, city, and incorporated town, and each county exclusive of the portion included within cities and incorporated towns, shall constitute a primary registration district.

Sec. 3075½. That the recorder of each county and city and county, and the clerk of each city or incorporated town, shall be the local registrar in and for such primary registration district, and shall perform all such duties of local registrar as hereinafter provided; *provided, however,* that in cities having a freeholders' charter the health officer shall act as local registrar and perform all the duties thereof. Each local registrar shall immediately appoint, in writing, a deputy who shall be authorized to act in his stead in case of absence, death, illness, or disability, and when it may appear necessary for the convenience of people in any registration district, the local registrar is hereby authorized, with the approval of the state registrar of vital statistics, to appoint one or more proper and competent persons to act as subregistrars, who shall be authorized to receive certificates of death and to issue burial permits or removal permits in and for such portions of the registration district as may be designated. Each subregistrar shall note, in legible writing over his signature, the date each certificate of death was filed, and shall forthwith forward the certificate to the local registrar of the resignation district, and in all cases before the fifth day of the following month; *provided,* that all subregistrars shall be subject to the supervision and control of the state registrar of vital statistics.

Sec. 3080*a*. That the body or remains of no person whose death occurs in the state shall be interred, deposited in a vault, grave or tomb, cremated, disinterred, or otherwise disposed of, or removed from or into any registration district until a permit for burial, disinterment, or removal shall have been properly issued by the registrar of the registration district in which the death occurs, except in the case where there are two or more registration districts within the same county, or where there are two contiguous registration districts not in the same county, a body may be removed from the registration district where the death occurred to another registration district within the same county, or contiguous registration districts in different counties, for the purpose of preparing said body for burial or shipment; *provided,* that before such burial or shipment the undertaker, sexton, or other person in charge, shall have first secured a permit for the interment or removal of said body from the registrar of the registration district where the death occurred. And no such burial or removal permit shall be issued by any registrar until a complete and satisfactory certificate and return of the death has been filed with him, as hereinafter required; *provided,* that in case of any death outside of the state, where the body is accompanied by a removal or transit permit issued in accordance with the law and the health regulations in force where the death occurred, such removal or transit permit shall be accepted as of the same authority as a permit from the local registrar when such removal or transit permit shall have indorsed thereon the written approval of the state registrar of vital statistics, or when said state registrar otherwise officially notifies the local registrar of his approval.

Sec. 3080*b*. Stillborn children, or those dead at birth, shall be registered as deaths under this act, and a certificate of death and burial or removal permit in usual form shall be required. The medical certificate of cause of death shall be signed by the attending physician or midwife, and shall state the cause of death as "stillborn," with the cause of the stillbirth, if known, whether a premature birth, and, if born prematurely, the period of uterogestation in months, if known.

Sec. 3080*c*. That the certificate of death shall be of the standard form recommended by the United States census office and the American public health association, and shall contain the following items:

(1) Place of death, including state, county, township or town, city, or village. If in a city, the ward, street, and house number. If in a hospital or other institution, the name of the same to be given instead of the street and house number.

(2) Full name of decedent. If an unnamed child, the surname, preceded by "unnamed."

(3) Sex.

(4) Color or race—as white, black (negro or negro descent), Indian, Chinese, Japanese, or other.

(5) Conjugal condition—as single, married, widowed, or divorced.

(6) Date of birth, including the year, month, and day.

(7) Age in years, months, and days.

(8) Place of birth; state or foreign country.

(9) Name of father.

(10) Birthplace of father; state or foreign country.

(11) Maiden name of mother.

(12) Birthplace of mother; state or foreign country.

(13) Occupation; the occupation to be reported of any person who had any remunerative employment—women as well as men.

(14) Signature and address of informant.

(15) Date of death, including the year, month, and day.

(16) Statement of medical attendance on decedent, fact and time of death, including the time last seen alive.

(17) Cause of death, including the primary and immediate causes, and contributary causes or complications, if any, and the duration of each.

(18) Signature and address of physician or official making the medical certificate.

(19) Special information concerning deaths in hospitals and institutions, and of persons dying away from home, including the former or

usual residence, length of time at place of death, and place where the disease was contracted.

(20) Place of burial or removal.

(21) Date of burial or removal.

(22) Signature and address of undertaker.

(23) Official signature of registrar, with date when certificate was filed and registered number.

The certificate shall be written legibly in permanent black ink, typewritten or printed, and no certificate shall be held to be complete and correct that does not supply all of the items of information specified above or satisfactorily account for the omission of any of said items. The personal and statistical particulars (items 1 to 13), or such other items as shall be required by the state registrar, shall be authenticated by the signature of the informant, who may be any competent person acquainted with the facts. The statement of facts relating to the disposition of the body shall be signed by the undertaker or person acting as such. The medical certificate shall be made and signed by the physician, if any, last in attendance on the deceased, who shall specify the time in attendance, the time he last saw the deceased alive, and the hour of the day at which death occurred. He shall further state the cause of death, so as to show the cause of disease or sequence of causes resulting in death, giving the primary and immediate causes, and contributing causes, if any, and the duration of each. Indefinite and unsatisfactory terms indicating only symptoms of disease or conditions resulting from disease will not be held sufficient for issuing a burial or removal permit, and any certificate containing only such terms, as defined by the state registrar, shall be returned to the physician for correction or definition. Causes of death, which may be the result of either disease or violence, shall be carefully defined; and, if from violence, its nature shall be stated, and whether accidental, suicidal or homicidal. For cause of death in hospitals, institutions, or away from home, the physician shall furnish the information required under this head, and shall state where, in his opinion, the disease was contracted. The cause of death and all other facts required shall in all cases be stated in accordance with the instructions and directions of the state registrar.

Sec. 3080*d*. In case of any death occurring without medical attendance, it shall be the duty of the undertaker to notify the registrar of such death, and when so notified the registrar shall refer the case to the coroner for his investigation and certification; and the coroner shall within three days after the inquest furnish the local registrar where such death occurs a certificate in form and substance as required by the state registrar, and containing as many of the facts required by this act as can be ascertained. Said local registrar shall forthwith transmit such certificate to the state registrar, retaining a copy thereof on file in his office.

Sec. 3080*e*. The undertaker, or person acting as undertaker, shall be responsible for obtaining and filing the certificate of death with the registrar and securing a burial or removal permit prior to any disposition of the body. He shall obtain the personal and statistical particulars required from the person best qualified to supply them over the signature and address of his informant. He shall then present the certificate to the attending physician, if any, and if there be none, then to the health officer or coroner, as directed by the registrar, for the certificate of the cause of death and other particulars necessary to complete the record as specified in section 3080*a*. And he shall then state the facts required relative to the date and place of burial over his signature and with his address, and present the completed certificate to the registrar within the time limit, if any, designated by the local board of health for the issuance of a burial or removal permit. The undertaker shall deliver the burial permit to the sexton or person in charge of the premises before interring the body, or attach it to the box containing the corpse, when shipped by any transportation company, to accompany same to destination, when it shall be accepted by the sexton as authority for the interment of the body.

Sec. 3080*f*. It shall be the duty of each local registrar to supply to any persons, requiring them, blank forms of certificates prepared and furnished by the board of supervisors of the county. He shall carefully examine each certificate when presented for record to see that it has been made out in accordance with the provisions of this act and the instructions of the state registrar, and if any certificate is incomplete or unsatisfactory, it shall be his duty to call attention to the defects in the return and to withhold issuing the burial or removal permit until they are corrected. He shall then number them in consecutive order, beginning with number one for the first death in each calendar year, and sign his name as registrar in attest of the date of filing in his office. If the certificate is properly executed and complete, he shall then issue a burial or removal permit to the undertaker; *provided*, that in case the death occurred from some disease that it is held by the state board of health to be infectious, contagious, or communicable and dangerous to the public health, no permit for the removal or other disposition of the body shall be granted by the registrar except under such conditions as may be prescribed by the state and local boards of health. He shall also make a complete and accurate copy of each certificate registered by him, upon a form identical with the original certificate, to be filed and permanently preserved in his office as the local record of such death, in such manner as directed by the state registrar. He shall, on or before the fifth day of each month, transmit to the state registrar all original certificates registered by him during the preceding month. If no deaths occurred in any month, he shall, on or before the fifth day in any month, report that fact to the state registrar in such manner as the state registrar shall direct.

Sec. 3080*g*. If the interment or other disposition of the body is to be made in the registration district in which the death occurred, or in a contiguous registration district in the same or an adjoining county, the wording of the burial permit may be limited to a statement by the registrar and over his signature, that a satisfactory certificate of death having been filed with him as required by law, permission is granted to inter, remove, or otherwise dispose of the body of the deceased, stating the name, age, sex, and cause of death and other necessary details upon the form prescribed by the state registrar. In case the interment or other disposition of the body is to be made in some registration district not contiguous to that in which the death occurred, a complete copy of the certificate of death shall be attached to and made a part of the removal permit issued by the registrar of the district in which the death occurred.

Sec. 3080*h*. No sexton or person in charge of any premises in which interments are made shall inter or permit the interment of any body unless it is accompanied by a burial, removal, or transit permit, as herein provided. Each sexton or person in charge of any burial ground shall indorse upon the permit the date of interment, with his signature, and shall return all permits, so indorsed, to the local registrar of his district within one day from the date of interment. He shall also keep a record of all interments made in the premises under his charge, stating the name of the deceased person, place of death, date of burial, and name and address of the undertaker, if any, which record shall at all times be open to public inspection.

Sec. 3080*i*. The state registrar shall prepare a sample form and blank for all registrars for use in registering, recording, and preserving the returns, or in otherwise carrying out the purposes of this act, and shall prepare and issue such detailed instructions as may be required to secure the uniform observance of its provisions and the maintenance of a perfect system of registration. No other forms of blanks shall be used than those prescribed by the state registrar. He shall carefully examine the certificates received monthly from the local registrars, and if any such are incomplete or unsatisfactory, he shall require such further information to be furnished as may be necessary to make the record satisfactory. All physicians, informants, or undertakers connected with any case, and all other persons having knowledge of the facts, are hereby required to furnish such information as they may possess regarding any death, upon demand of the state registrar in person, by mail or through the local registrar, who shall further arrange, bind, and permanently preserve the certificates in a systematic manner; and shall prepare and maintain a complete index of all deaths registered, showing the name of the deceased, place and date of death, number of certificate, and the volume in which it is contained. He shall inform all registrars what diseases are to be considered as infectious, contagious, or communicable, and dangerous to the public health, as decided by the state board of health, in order that when deaths occur from such diseases proper precautions may be taken to prevent the spreading of dangerous diseases; and all rules and regulations made by him for carrying out and enforcing the purposes of this act shall, when promulgated, have the same force and effect as if enacted by law.

Sec. 3080*j*. Whenever it may be alleged that the facts are not correctly stated in any certificate of death theretofore registered, the local registrar shall require an affidavit under oath to be made by the person asserting the fact, to be supported by the affidavit of one other credible person having knowledge of the facts, setting forth the changes necessary to make the record correct. Having received such affidavits, the local registrar shall file them, and shall then draw a line through the incorrect statement or statements in the certificate, without erasing them, and make the necessary corrections, noting on the margin of the certificate his authority for so doing, and transmit the affidavits, attached to the original certificate, when making his regular monthly returns to the state registrar. If the correction relates to a certificate previously returned to the state registrar, the local registrar shall transmit the affidavit forthwith to the state registrar. If the correction is first made upon the original certificate on file in the state bureau of vital statistics, the state registrar shall transmit a certified copy of the original certificate, corrected as above, to the local registrar, who shall thereupon substitute such certified copy for the copy of the certificate in his records. All such corrections and marginal notes referring to them shall be legibly written in ink, typewritten, or printed.

Sec. 3084. Each local registrar shall be entitled to be paid the sum of not exceeding twenty-five cents for each death certificate properly and completely made out and registered with him, and by him returned to the state registrar on or before the fifth day of the following month, which sum shall cover and include the making out of the burial permit and the copy of the certificate to be filed and preserved in his office; and in case no deaths were registered during any month, the local registrar shall be entitled to a sum not exceeding twenty-five cents for each report to that effect, promptly made in accordance with the directions of the state registrar; *provided, however,* that all such compensation for such services shall be fixed by the board of supervisors, city council, trustees, or other governing body of such county, city and county, city or town, constituting such registration district. All amounts payable to registrars under the provisions of this act shall be paid out of the funds provided by the supervisors, council, trustees, or other governing body of such county, city and county, city or town, constituting a primary registration district, upon warrants drawn by the local auditor or other proper local officer of such county, city and county, city or town, which warrants shall specify the number of certicates properly registered and also the number of reports promptly returned where no deaths are registered, with the amount claimed to be due for each; *provided, however,* that a warrant shall not be issued to any local registrar, or if issued shall not be paid, where notice is previously given by the state registrar to the auditor, treasurer, or other proper officer of such county, city and county, city or town constituting such registration district, that the local registrar claiming any fee has failed to comply with the rules and regulations of the state bureau of vital statistics and the instructions of the state registrar. Each subregistrar shall be entitled to be paid the sum of not exceeding fifteen cents for each death certificate properly and completely registered with him, and by him returned to the local registrar before the fifth day of the following month. All amounts payable to subregistrars shall be paid to them by the local registrars appointing them from the amounts received by the local registrars as hereinbefore provided.

The act of February 26, 1903 (Statutes 1903, page 41), relating to license taxes on the business of sheep raising, is codified as section 3367 (new) of the Political Code.

The new section reads as follows:

Sec. 3367. No license or licenses greater than five cents per head shall be imposed by the board of supervisors of any county on the business of raising, herding or pasturing sheep, and any and all licenses imposed by the board of supervisors of any county on the business of raising, herding or pasturing sheep, in excess of five cents per head, shall be and are hereby declared invalid; *provided,* the provision of this act shall not apply to any license tax the validity of which is involved in any suit now pending, or to any such license tax due when this act takes effect.

The act of March 15, 1883 (Statutes 1883, page 376), relating to the prevention of contagious and infectious diseases, is codified as sections 2985, 2986, and 2987 of the Political Code.

The new sections read as follows:

Sec. 2985. Whenever there shall exist, in the opinion of the state board of health, imminent danger of the introduction of contagious or infectious diseases into the State of California, by means of railroad communication with other states, it shall be the duty of the said state board of health to make or cause to be made, by an accredited agent or inspector, an inspection of all railroad cars coming into this state at such point, or between such points within the state limits as may be selected for the purpose.

Sec. 2986. Such inspection shall be made, where practicable, during the ordinary detention of a train at a station, or while in transit between stations, and in all cases shall be so conducted as to occasion the least possible detention or interruption of travel or inconvenience to the railroad companies, so far as consistent with the purposes hereof.

Sec. 2987. Should the discovery be made of the existence among the passengers of any case or cases of dangerous contagious or infectious disease, the said Board of Health, or their agent or inspector, under rules and conditions prescribed by them as being applicable to the nature of the disease, shall have power to cause the sidetracking or detention of any car or cars so infected, to isolate the sick or remove them to a suitable place of treatment, to establish a suitable refuge station, to cause the passengers and materials in such infected car to be subjected to disinfection and cleansing before proceeding farther into the State, in the case of smallpox, to offer free vaccination to all persons exposed in any car or at any station.

It is recommended that the collateral inheritance tax law be codified under the head of taxes in the Political Code as sections 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3384, 3385, 3386, 3387, and 3388.

As no changes are suggested the new sections are omitted from this report.

The act of 1893, page 46, fixing the salary of the janitor of the state capitol, defining his duties, approved February 27, 1893, is codified as section 422 (new) of the Political Code.

The new section reads as follows:

Sec. 422. It shall be the duty of the janitor to take general charge of the state capitol building, and to secure and preserve the furniture, carpets, curtains, and all other property therein. He shall superintend the lighting of the building, note the gas meter and the electric meter, and the correctness of the bills for gas and electric lighting for each month, before the same is presented for payment. He shall check the delivery of supplies of wood and coal, and become satisfied that the quantity delivered corresponds with the amount ordered by the superintendent, and certify to the correctness thereof to the superintendent. He shall check the delivery of supplies of stationery and blank books received from contractors, by schedules furnished him by the state board of examiners. He shall have the charge and custody of all stationery and blank books purchased by the state for the use of state officers and members of the legislature, and shall keep a strict and accurate account of all supplies drawn by each, and also an account of all supplies on hand. He shall exercise general supervision of the porters and watchman, have full power to make arrests for disorderly conduct about the building or grounds, and do and perform such other duties as may be required of him by the superintendent.

Section 1. An act entitled "An act fixing the salary of the janitor of the state capitol building, defining his duties, and making an appropriation therefor," approved February 27, 1893, is hereby repealed.

The act of April 6, 1891 (Statutes 1891, page 490), authorizing certain corporations to act as executors and trustees. is codified as sections 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, and 565 of the Civil Code.

Sections 557 to 566 of the same code as they now stand, are recommended for repeal, as they relate to homestead corporations, and are obsolete.

There being no changes recommended in the law the new sections are omitted from this report.

It is suggested that section 1670 of the Political Code, relating to the management and conduct of schools authorizing the withholding of moneys from school districts for certain reasons be amended by omitting therefrom subdivision 17, which violates section 12 of article XI of the constitution.

See *McCabe* vs. *Carpenter,* 102 Cal. 469.

The act of March 8, 1901, (Statutes 1901, page 110), is codified as sections 1987 and 1988 (new) of the Political Code.

The new sections read as follows:

Sec. 1987. Any military organization composed of veterans of the civil war, and having the minimum number required to constitute a company, if, upon the required examination they be found capable of efficient service to the state in the performance of active, garrison, or other military duty, may be organized and mustered into the military service of the state notwithstanding the members thereof may be over the age of forty-five years; and such companies or organizations, when so constituted shall be mustered into, and become a part of, the national guard of the state, and shall be subject to all the laws regulating and governing the national guard, except that they shall be deemed and considered independent, unattached companies, acting under the direct orders of the commander-in-chief.

Sec. 1988. Such companies shall receive such allowances as may be approved and allowed by the state board of military auditors out of any moneys appropriated for the use of such companies; *provided, however*, that such allowances shall in no case exceed the sum of five hundred dollars for any one of such companies for any one fiscal year.

Section 1. An act entitled "An act to provide for independent and unattached companies of the national guard of the State of California, and to provide for the manner of making allowances for the use and support of such companies," approved March 8, 1901, is hereby repealed.

Respectfully submitted.

J. W. WILEY.

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DEPARTMENT OF ENGINEERING

REPORT

OF THE

STATE ENGINEER

OF THE

STATE OF CALIFORNIA

May 11, 1907, to November 30, 1908

SACRAMENTO:
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1908.

Sacramento, California,
Office of the Department of Engineering,

November 30, 1908.

To His Excellency, James N. Gillett,
Governor of the State of California,

Sir: I herewith submit for your consideration the report of the Department of Engineering, covering the period from May 11, 1907, to November 30, 1908, as provided for in Chapter 183 of Statutes and Amendments, 1907.

Very respectfully,

NATHANIEL ELLERY,
State Engineer.

Attest:
H. S. MORROW, Secretary.

OFFICIAL DIRECTORY OF THE DEPARTMENT.

ADVISORY BOARD.

J. N. GILLET, *Governor*	Chairman.
W. V. STAFFORD	President, State Board of Harbor Commissioners.
F. W. HATCH	General Superintendent of State Hospitals.
NATHANIEL ELLERY	State Engineer.

RIVER CONSULTING BOARD.

ALEX. GORDON, *President*.

G. W. TATTERSON.
W. J. SMITH.
M. J. BOGGS.
E. S. BROWN.

OFFICE FORCE.

State Engineer	NATHANIEL ELLERY.
State Architect	GEORGE C. SELLON.
Assistant State Engineer	RALPH BARKER.
Assistant State Engineer	P. M. NORBOE.
Engineer's Draftsman	F. H. PERKINS.
Engineer's Draftsman	E. GOODWIN.
Architectural Draftsman	W. J. YOUNG.
Secretary and Stenographer	H. S. MORROW.
Porter	CHAS. PRINCE.

REPORT OF THE DEPARTMENT OF ENGINEERING.

The consolidation of the several engineering departments of the State and the addition of all the architectural work created an office, or department, the scope and value of which has scarcely been recognized. The legislature has enacted no plan that had a greater economic bearing than the one placing the State's technical work under one central control. There has been effected a saving of official salaries, a substantial saving of percentage on architectural fees, a considerable reduction in cost of material through large purchases applicable to various lines of work, and good fair prices on contract work obtained through the great amount of construction, and the proper application of the day's labor job to hold in check any tendency to excessive price. The monetary saving is very important, yet there are other matters connected with the inauguration of this Department that are as vitally important. The work can be specialized under experts of the various technical lines, thus giving the efficiency that a properly conducted business should have. The itemization of unit costs on work for the proper guidance of future expenditures and estimates of the State work, and a better class of inspection through the systemizing of reports and clerks who can check these reports from one inspector against another, places a State office under business methods.

There is no reason why the State should not handle its affairs on the same basis that an individual or concern would employ in their dealings. With the proper application of sufficient powers, and the upholding of the Department to attain this standard, there must result economies that under diversified management were lost sight of.

The Department was organized under adverse conditions, which has made the task of getting it into shape and in reliable working order a difficult one.

Owing to repairs on the Capitol, the office was separated on account of the lack of room into three divisions; one, the head office was in the Odd Fellows' Temple, Sacramento; another, an engineering branch, was located in the Elks' Building, Sacramento, and the third, or architectural branch, was located at No. 522 "K" street, Sacramento. This condition obtained from May 11, 1907, to December 1st of the same year, when we moved two of the offices and a part of the third one into the State Capitol. Some time later, about three months, the whole force was brought together. Five rooms on the third floor of the Capitol are wholly inadequate for the work of the Department, so the office has occupied three or four rooms on the fourth floor of the building, but was compelled to vacate these, except one used as a blue-print room, for use by the incoming legislature. The crowded condition of the office makes efficient operation decidedly difficult. This, with the fact that during a considerable period after entering the Capitol finishing work was progressing on the building, greatly interfered with our work. Thousands of sheets of drawings for building and engineering work are filed in the Department, as are numerous documents. No adequate furniture or space for office work or documentary files is now available. This situation should be relieved at an early date in order to fit the Department for its great amount of varied work.

In the commencement of a new department it is difficult to calculate exactly, or nearly, its needs. Since its beginning the lack of sufficient contingent appropriation and statutory office help has been very apparent. I wish to draw attention to the need of other statutory help and the reasons therefor. In grouping or segregating the employees it is necessary to make the following divisions: Engineering proper, general department, highway department, hydraulic department, and structural department.

Architectural department proper, composing three subdivisions; architectural draftsmen, mechanical men for heating, ventilating, plumbing, etc.; and the structural engineers. In devising and drafting the plans for the state building work, the Department has had but one architect and one statutory architectural draftsman. Other architectural draftsmen and designers, engineers and mechanical men of this division of the office, have been employed upon an hourly basis, *i. e.*, paid by the hour for their work. This method has proven very unsatisfactory, and should be remedied. There was no fund established for the drafting work of the buildings, except that under the appropriation to the particular institution where the erection was to take place. Here is a defect that should receive attention, and an appropriation should be made payable to the Department of Engineering for the purpose in order that we may pay the men promptly and thus avoid much discord. At the present time it is necessary to get out bills to each institution for which we are doing work, present the same for consideration at their regular board meetings, then properly pass through the State Board of Examiners, for audit, and finally reach the Department for distribution. In some instances money for salaries on this plan has been delayed three or four months. With the enormous business of this office one could not personally visit each State board and discuss to what extent the plans had advanced. These Boards naturally requested information in the matter. Further considerations of the duties devolving upon us makes it obligatory to have the office force rearranged to meet the great demand made. No statutory clerk is provided for compiling reports. This alone requires an efficient man. No person for blue printing is allowed; no cement tester is allowed, and the position of secretary and stenographer should be divided into two positions. To give some idea of the work handled by these people it is necessary to state their labors. Daily reports for segregation are received from every piece of the State's work, except that of the University of California, which, as yet, has not been brought under the Engineering Department. This information must be worked up in segregation sheets, some of which are published later in this report, and all estimates on contracts compiled from inspectors' reports. This information will prove of inestimable value to our State later, and should be profoundly carried on. A check can be had on each inspector, prices at various places may be compared, unit costs of various sorts of labor are immediately at hand, and fair estimating for and by the State is obtainable. We have established an electric blue printing machine at the office, and, in consequence, are saving to the State at least forty per cent on the cost of this work. It requires the continuous service of one man, and sometimes, as in the case of the San Jose Normal School plans, runs night and day. The extent of the work may be gleaned from a calculation of printing connected with those plans. There are 129 sheets of plans, about 32 inches by 45 inches, and we had demands for thirty-five sets of them, or 4,500 prints, or approximately 45,000 square feet of printing. I do not take up the very great task of printing for the Agnews Hospital reconstruction work, but shall endeavor to give a fair estimate for the need of such a man. At present, all San Francisco harbor front work does not come to our office. This, however, as soon as the Agnews office work is completed, can be taken over and money saved the State.

One of the most vital and important branches under our direction is the cement testing laboratory, with some facilities for testing plasters and measuring voids in the aggregates of sand and rock and gravel for concrete work. Should a bad carload of cement get into a reinforced concrete structure it might endanger a great amount of money, and what is more important, many lives. With so general an application of cement for all kinds of construction it creates a positive demand for testing every batch used. The State can ill afford to pass this matter lightly, and should provide for the services of a man by statute. We have installed a complete cement testing plant, have samples taken promiscuously from each carload of cement sent to us, and before such cement is allowed in the structure it must pass the required specifications. I might here add, we have found some cement unfit for certain purposes we need it for, and we have therefore prevented its use. This alone has more than repaid for such a position. Every test made is recorded and filed away for reference, properly indexed. The far-reaching effect of this plant may be seen when it is suggested that manufacturers and sellers will use due care in selling these articles to the State and furnish nothing but what is up to standard. Our present testing laboratory has made *enough* cement tests to date to cover 50,000 barrels.

The position of secretary and stenographer is so totally inadequate for our needs that a glance will prove the necessity of a separation of the office, and the statutory office of a secretary be provided, also a stenographer. The present secretary and stenographer looks over practically all the construction claims of the State, besides keeping a set of books, paying all help which is on an hourly basis, makes out all Department claims, and performs numerous other duties. In addition to his services, we have had employed three stenographers, and at times were then in need of more.

Later will be given the costs of fees for architectural work of the department, when it must be noted that the costs of plans include stenographers services, clerk help, and all office work incidental thereto. It is, therefore, earnestly recommended and respectfully presented to the coming legislature for action that the Department of Engineering be provided with the following statutory officers : Two architectural draftsmen, one architectural designer, one mechanical engineer for plumbing, heating, and ventilating; one cement engineer, one blue printer, and two stenographers. It is further recommended that the State Architect have an increased salary, and his services be confined to the State work.

In connection with the request for a plumbing, heating, and ventilation engineer, it is fair to say that the State needs the services of such a man as much as any one employed by the department. The proper installation of these branches of work, as well as the steam and electric plants, is a most necessary thing. Through the improper installation of these the State may lose thousands upon thousands of dollars in construction, and then have an exorbitant maintenance expense. The operating expenses of the institutional work should be minimized, and it can be positively asserted that the foregoing work is one of the greatest factors in such expenditures.

The law creating the Department of Engineering, the same as all new laws of its scope, has some contradictions and defects which should at this session of the legislature be remedied. It is also suggested and recommended that the contract law enacted in 1876, and amended several different times, be stricken from the statute books and the salient points be incorporated in the Department of Engineering law. I therefore present the contract law as now constituted, and also the law creating the Department of Engineering, including the amendments thereto.

BUILDING LAW OF 1876, AS AMENDED TO DATE.

SECTION 1. That in all cases where the commissioners, directors, trustees, or other officer or officers, to whom is confided by law the duty of devising and superintending the erection, alteration, addition to, or improvement of any state institution, asylum or other improvement, erected, or now being erected, or to be erected, by the State, such commissioners, directors, trustees, or other officer or officers, before entering into any contract for the erection, alteration, addition to, or improvement of such institution, asylum, or other improvement, or for the supply of materials therefor, the aggregate cost of which erection, alteration or improvement, and materials therefor, exceed the sum of one thousand dollars, shall procure of the department of engineering a full, complete, and accurate plan or plans of such institution, asylum or other improvement, or of any addition to, or alteration or improvement thereof, in all its parts, showing all the necessary details of the work, together with working plans suitable for the use of the mechanics or other builders during the construction thereof, so drawn and represented as to be plain and easily understood; and also accurate bills, showing the exact amount of all the different kinds of materials necessary in the erection thereof, addition thereto, or in the alteration or improvement thereof, to accompany said plan or plans; and also full and complete specifications of the work to be done, showing the manner and style in which the same will be required to be done, giving such directions for the same as will enable any competent mechanic or other builder to carry them out, and afford the bidders all needful information to enable them to understand what will be required in the erection, addition to, alteration, or improvement of such institution, asylum, or other improvement; and to make, or cause to be made, a full, accurate, and complete estimate of each item of expense, and the entire aggregate cost of such institution, asylum, or other improvement, or of any addition to, alteration or improvement thereof, when completed.

SEC. 2. That such plans, drawings, representations, bills of materials and specifications of work, and estimates of the cost thereof, in detail and in the aggregate as required in the first section of this act to be obtained shall be, when made, submitted to the commissioners, directors, trustees, or other officer or officers of the institution for which said plans, drawings, representations, bills of material, and specifications of work are made and by him or them submitted to the Advisory Board of the Department of Engineering for their approval, and if approved by them, a copy thereof shall be filed and kept in the office of the Department of Engineering, and a copy thereof shall be deposited and safely kept in the office of the Controller of State.

SEC. 3. That after such plans, descriptions, bills of materials and specifications and estimates as are in this act required are made and approved, in accordance with the requirements of this act, it shall be and is hereby made the duty of such commissioners, directors, trustees or other officer or officers to whom the duty of devising and superintending the erection, addition to, alteration, or improvement of such institution, asylum, or other improvement as in this act provided, to give or cause to be given public notice of the time and place when and where sealed proposals will be received for performing the labor and furnishing the materials necessary to the erection of such institution, asylum, or other improvement, or for the adding to, altering, or improvement thereof, and a contract or contracts based on such sealed proposals will be made, which notice shall be published weekly for four consecutive weeks next preceding the day named for the making of such contract or contracts, in the paper having a general circulation in the county where the work is to be let, and in three papers specially representing the building trades, and having the largest circulation and published each in the cities of San Francisco, Los Angeles, and Sacramento, and shall state when and where such plan or plans, descriptions, bills, and specifications can be seen, and which shall be open to the public inspection at all business hours between the date of such notice and the making of such contract or contracts; *provided, however*, that the rates of said advertisements shall not exceed the regular advertising rates for similar matter, whether public or private, in such paper or papers. The aforesaid notice must state that bids will be received for the entire work and that bids will also be received for the performance of each of the following parts of said erection, addition, alteration or improvement, including the furnishing of materials and labor necessary therefor, viz.:

first, for the masonry work, including all brick, stone, terra cotta, and concrete work, and all necessary excavations, and filling; second, for the iron work; third, for the carpenter, electric, and glazing work; fourth, for the plastering work; fifth, for the plumbing and gas fitting work; sixth, for the heating work; seventh, for the tinning, galvanized iron, and slating work; eighth, for the painting and graining work.

Sec. 4. That on the day named in said public notice, said commissioners, directors, trustees, or officer or officers, as aforesaid, shall proceed to publicly open said sealed proposals, and shall award such contract or contracts for doing the work and furnishing the materials for the same to the lowest bidder, giving responsible bonds; *provided, always*, that no proposals shall be considered unless accompanied with a bond of said proposer, equal to ten per cent of his proposal, with sufficient sureties, conditioned that if said proposal shall be accepted the party proposing will duly enter into a proper contract, and faithfully perform his or their contract or contracts, in accordance with said proposal, and the plan or plans, specifications, and descriptions, which shall be and are hereby made a part of such contract or contracts; *and provided further*, that such contract or contracts shall not be binding on the State until they are submitted to the Attorney General, and by him found to be in accordance with the provisions of this act, and his certificate thereon to that effect made; *and provided further*, that if in the opinion of such commissioners, directors, trustees, or other officer or officers the acceptance of the lowest bid or bids shall not be for the best interests of the State, it may be lawful for them, with the written advice and consent of the Advisory Board of the Department of Engineering to accept such proposal or proposals opened, as in their opinion may be better for the interests of the State, or reject all proposals and advertise for others in the manner aforesaid. All contracts shall provide that such commissioners, directors, trustees, or other officer or officers may, as hereinafter provided, and on the conditions stated, make any change in the work or materials.

Sec. 5. That no change of the plan or plans, descriptions, bills of materials, or specifications which shall either increase or decrease the cost of said institution, asylum, building, or improvement, exceeding the sum of one thousand dollars, shall be made or allowed after they are once approved and filed with the Controller of State and in the office of the Department of Engineering, until such proposed change shall have received the approval of the Advisory Board of the Department of Engineering; and when so approved, the plan or plans of such change, with the description thereof, and the specifications of the work and bills of material, shall be filed with the Controller of State and in the office of the Department of Engineering, in the same manner as required before such change was made; and no allowance whatever shall be made for work performed or materials furnished under such change of plan or plans, or descriptions, or specifications, or bills of materials, unless, before such labor is performed and materials furnished, a contract or contracts therefor is made in writing, which contract or contracts shall show distinctly the nature of such change, and shall be subject to all the conditions and provisions herein imposed upon the original contracts, and be subject also to the approval of the Attorney General as hereinbefore provided; *provided*, that all changes in the contract exceeding five hundred dollars shall be by contracts in writing, with full specifications and estimates, and shall become a part of the original contract, and shall be filed with the Controller of State and in the office of the Department of Engineering, with the original contract; *and provided further*, that the amount of such change in the contract, plans, descriptions, bills of materials, or specifications shall not, in aggregate, increase the cost of construction of said institution, asylum, building, or improvement more than three per centum of the original contract price of cost.

Sec. 6. That no contract or contracts shall be made for the labor or material herein provided for at a price in excess of the entire estimate thereof in this act required to be made, and the entire contract or contracts shall not, including estimates of expenses for inspectors and otherwise, exceed in the aggregate the amount authorized by law for such institution, asylum, building, or other improvement, or such addition to, or alteration or improvement thereof, under the penalties of section ten of this act hereinafter provided.

Sec. 7. At the time or times named in the contract or contracts made and filed with the Controller of State, or which has been previously made and filed with him, in accordance with the provisions of this act, for payment to the person or persons with whom such contract or contracts had been made, it shall be and is hereby made the duty of the commissioners, directors, trustees, or other officer or officers, to whom is confided the duty of superintending the erection of such institution, asylum, building, or improvement. or adding to, altering, or improving the same, to make or cause to be made a full, accurate, and detailed estimate of the various kinds of labor performed and materials furnished under such contract or contracts, with the amount due for each kind of labor and materials, and the amount due in the aggregate, which estimate shall be based upon as actual measurement of the labor so performed and materials so furnished, which estimate shall, in all cases, give the amounts of the preceding estimate or estimates, and the amount of labor performed and materials furnished since the last estimate, which estimate or estimates so made, as in this act required, a copy of which shall be filed in the office of the Department of Engineering, shall be recorded in a book for that purpose to be provided and kept, or caused to be kept, by the said commissioners, directors, trustees, or other officer or officers, and a certified copy thereof, addressed to the Controller of State by the said commissioners, directors, trustees, or other officer or officers, or by such person as they may designate for that purpose, be delivered to the contractor or contractors, entitled thereto; *provided*, that upon all estimates or materials furnished and delivered, and not actually having entered into and become part of said institution, building, or other improvement, there shall not be paid, until the same shall be incorporated into and become a part of said institution, building, or other improvement, exceeding fifty per centum of such estimated value.

Sec. 8. It shall be the duty of the Controller of State, on the receipt of such estimate so certified and approved, to compare carefully the same with the contract or contracts under which labor was done or materials furnished, and if there had been any previous estimates, then with such estimates; and if, upon such comparison, he shall find such last-named estimate in all respects correct, he shall number the same, place it on file, and have a record thereof made, and give to the person or persons entitled thereto, taking his or their receipt therefor, a warrant on the Treasurer of State for the amount shown by such estimate or estimates to be due, less the amount of ten per centum thereon, which shall be retained as an additional security for the faithful performance of his or their contract or contracts, and shall be forfeited to the State in the event of a failure of such contractor or contractors to conform in good faith to the terms and conditions of such contract or contracts; but when the labor to be performed and materials furnished, under such contract or contracts, is performed and furnished, and a final estimate thereof made, the Controller of State shall include in the warrant or warrants for the amount of such last estimate the percentage retained on former estimates.

Sec. 9. The Treasurer of State shall pay the warrants issued by the Controller of State, under and by virtue of the provisions of this act, placing the same on file, and keeping a register of the names of the person or persons to whom such warrants are paid.

Sec. 10. Any commissioner, director, trustee, or other officer or person otherwise appointed, whose duty it is to superintend, in whole or in part, the erection of such institution, asylum, building, or improvement, or of adding to, altering, or the improvement thereof, or the making of the plans, descriptions, and specifications of the labor to be performed and materials to be furnished, as provided in this act, and the estimates of the cost thereof, or the estimates of the amount of labor done and materials furnished from time to time, under and in accordance with the terms and conditions of the contracts in this act authorized to be made, and the provisions of this act, who shall, in the performance of the duty herein imposed upon him or upon them, knowingly make, incomplete or fraudulent plans, drawings, bills of materials, specifications of work, or estimates of the cost thereof, or permit the work in any other manner than is prescribed in such plans, descriptions, and specifications, or with materials inferior to that required by such bills of materials, to the injury of the State; or shall knowingly make false estimates of the labor done or materials furnished, either in the quantity or price thereof, to the injury of the State; or any contractor, or any agent of any contractor or contractors, who shall knowingly permit materials to be used or work to be done inferior to, or in violation of, the contract of such contractor or contractors, to the injury of the State, shall be deemed and held guilty of a felony, and, upon conviction thereof, shall be confined in the State prison for not less than one year nor more than five years, and be liable to the State for double the amount the State may have lost, or be liable to lose, by reason thereof.

Sec. 11. It shall be the duty of the Attorney General to have charge of and direct all proceedings necessary to enforce the contracts authorized by this act and provisions of this act, against such person or persons as become liable to the penalties herein prescribed.

Sec. 12. Whenever, in the opinion of the commissioners. directors, trustees, or other officers charged with the duty of devising and superintending the erection, alteration, addition to, or improvement of any State institution, asylum, building, or other improvement under this act, or any law of this State, the work under any contract made in pursuance of this act, or any such law, is neglected by the contractor or contractors, or that the same is not prosecuted with diligence and force specified, meant, or intended in and by the terms of the contract, it shall be lawful for such commissioners, directors, trustees, or other officers to make a requisition upon such contractor or contractors for such additional specific force, or for such additional specific material, to be brought into the work under such contract, or to remove improper materials from the grounds, or in the judgment of such commissioners, directors, trustees, or other officers, such contract and its due and faithful fulfillment required; of which action of said board or other officers, due notice in writing of not less than five days, shall be served upon such contractor, or his or their agent having charge of the work. And if such contractor or contractors fail to comply with such requisition within fifteen days. it shall be lawful for said commissioners, directors, trustees, or other officers, with the consent, in writing, of the Advisory Board of the Department of Engineering, to employ upon such work the additional force, or supply the materials so specifically required as aforesaid, or such part of either as they may deem proper, and to remove improper materials from the grounds; and it shall be the duty of such commissioners, directors, trustees, or other officers, to make separate estimates of all such additional force or materials so employed or supplied as aforesaid, and which, being certified to by said commissioners, directors, trustees, or other officers, shall be paid by the Controller of State the same as is made out agreeably to section seven of this act, and the amount so paid shall be charged against said contractor or contractors, and deducted from his or their next, or any subsequent, estimate; or the same, or any part thereof, not paid as aforesaid, may be recovered by action from such contractor or contractors, and their sureties.

Sec. 13. In all contracts made under the provisions of this act, there shall be a provision in regard to the time when the whole, or any specified portion, of the work contemplated in said contract shall be completed, and also providing that for each and every day the same shall be delayed beyond such time or times so named, the said contractor or contractors shall forfeit and pay to the State a sum of money, to be fixed and determined in said contract, to be deducted from any payment or payments due, or to become due, to said contractor or contractors.

Sec. 14. All contracts now made, and not performed, for the erection, alteration, addition to, or improvement of, any State institution, asylum, building, or other improvement, shall, as far as practicable, be performed, completed, and enforced and settled for under this act, or may, by the consent of the contracting parties, be made to conform to, and proceed under, the provisions of this act.

Sec. 15. All acts and parts of acts in conflict with the provisions of this act are hereby repealed.

Sec. 16. This act shall take effect from and after its passage.

DEPARTMENT OF ENGINEERING LAW.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Section 1. A department of and for the State of California, to be known as the Department of Engineering, is hereby created, to consist of an advisory board, composed of the Governor, as an ex officio member and chairman of said board, and a State Engineer, who shall be the chief executive officer of the department, the general Superintendent of State Hospitals, and the chairman of the State Board of Harbor Commissioners of San Francisco. The said department, its officers and employees, shall have and exercise the powers and duties hereinafter set forth and specified, and such as are or may be hereafter provided by law.

Sec. 1½. Upon this act becoming effective, the Governor, by and with the advice and consent of the Senate, shall appoint five persons, who shall be known as a Consulting Board to the Department of State Engineering upon all matters that affect irrigation, drainage, and river improvement. Such board shall be appointed from citizens of either the Sacramento or San Joaquin valleys. Such board shall meet at such times as the work requires, and shall meet at least once in two months. They may report to the advisory board upon all matters relating to irrigation, drainage, and river improvement, together with their conclusions thereon, and may render a report to the advisory board upon all plans for river improvements.

Sec. 2. Upon this act becoming effective the Governor, by and with the advice and consent of the Senate, shall appoint a competent civil engineer as the head of the Department of Engineering, and such person shall be known as the State Engineer. The State Engineer shall devote his entire time to the services of the State and shall not actively engage in any other pursuit while serving as such State official. He shall have charge of all the engineering and structural work of the department, and may receive by and through the approval of the Advisory Board such special assistance of a technical character, beyond the employees, hereinafter specified, as they shall allow for the proper conduct of the business of the department.

Sec 3. The State Engineer shall hold office for the term of four years from and after the date of qualification; *provided, however*, when a vacancy occurs in the office of State Engineer from whatever cause, the Governor shall fill, by appointment, said term for the unexpired part thereof only. Immediately after qualifying, the Advisory Board shall meet and organize and shall adopt a seal for the authentication of its acts and records.

Sec. 4. Within twenty days after receiving notice of appointment, the person appointed as State Engineer shall file a bond in the sum of twenty thousand dollars ($20,000) with at least two sufficient sureties thereon, or with a surety company of recognized standing for the faithful performance of his duties, which bond must be approved by the Governor and filed with the Secretary of State and he shall qualify by taking the oath of office as prescribed for other State officers.

Sec. 5. The office of the Department of Engineering shall be in the State capitol; and the Secretary of State shall assign to the department, for its use, such rooms as may be necessary for its accommodation. All of the regular meetings of the Advisory Board shall be held at such office. The said board may, however, hold such special meetings at such places as the duties of the Department, or the best interests of the State may require. The State Board of Harbor Commissioners for the port of San Francisco shall assign to the Department of Engineering proper rooms in the Ferry Building at San Francisco for the use of the State Engineer, one Assistant State Engineer, and the necessary office help.

Sec. 6. The Department of Engineering through and by the State Engineer shall have the power to appoint two assistant engineers, one State architect, three architectural draughtsmen, one architectural designer, two engineer's draughtsmen, one testing engineer, one mechanical engineer, one filing clerk, one blue printer, a secretary, two stenographers, and one porter, and such additional technical assistants and help as the Advisory Board may, in their judgment deem necessary, and to fix their salaries and compensation, who shall hold office at the pleasure of the appointive power, and who must be confirmed by the Advisory Board before proceeding with their duties. Such officers and employees shall not be eligible for appointment unless they possess special qualifications for and are competent to perform the duties devolving upon them, and they shall devote their entire time to the service of the Department.

Sec. 7. The Advisory Board shall meet at such times as the work of the Department may require and shall meet at least once in two months. Such board shall advise with the State Engineer and State Architect as necessity requires and may advise with the boards of managers or trustees of the various State institutions requiring engineering or structural work and with any State commission regarding all works wherein such commission may be interested. The Advisory Board shall approve all plans and specifications for all public work, and shall determine the kind, quality, and extent of all public work of the State. All boards of managers, trustees, and State commissions of State institutions shall apply to the Department of Engineering for plans and specifications for all public works coming under their charge, and before accepting any work done under contract shall have a certificate from the State Engineer, who shall examine and certify to its completion. All public work coming under the full control of the Department of Engineering may, upon the discretion of the Advisory Board, be either contracted for or done by day's labor. The Advisory Board shall have the power, on the approval of plans and specifications by the State Engineer, to direct whether any building or structure at any State institution shall be let by contract in part or in whole, or whether said building or structure shall be built by day's labor in part or in whole Whenever any public work to be done by the State is placed upon a day's labor basis, it is especially exempted from any law on or relating to contracts of the State. The full control of such day's labor work is placed under the Department of Engineering and said department shall do all things necessary to properly carry out the work. The Department of Engineering shall have the power to receive informal bids upon any subdivision of the day's labor work, and the State Engineer may, upon the approval of the Advisory Board, enter into an agreement for any such subdivisional work of the day's labor work.

Sec. 8. The full control of all public work being done or now completed by the Board of Public Works shall be assumed by the Department of Engineering, and all public work done by the State, except as otherwise expressly provided for by law, shall be under the full control of the said Department. It shall be the duty of the Department of Engineering, whenever required by the Advisory Board, to make examinations of lands subject to inundation and overflow by flood waters and of the waters causing such inundation or overflow and plans and estimates of the cost for works to regulate and control such flood waters. All matters of drainage, and improving and rectifying river channels, and other work on any river or slough flowing into San Francisco Bay, San Pablo Bay, and Suisun Bay, and also the tide waters flowing into said bays, shall be placed under the management and control of the Department of Engineering whenever the law provides therefor. The Department of Engineering shall have charge of all expenditures, unless otherwise provided by law, for all public works relating to general river and harbor improvements, including reclamation and drainage of lands. It may purchase, construct, and operate one or more dredges, or any other needed appliances to promote or properly carry out the work of the Department. The State Engineer, in the name of the State of California, may obtain or condemn any right of way necessary for any construction herein named, and shall proceed, if necessary, to condemn under the terms of the Code of Civil Procedure relating to such proceedings. The Department shall have the power to employ such additional help for the performance of the work of this section as the Advisory Board shall order, and all money now appropriated to the Board of Public Works and remaining unexpended shall be used for the purposes intended by the law, by the Department of Engineering, and the State Controller shall transfer said funds to the credit of the Department of Engineering. Wherever under any statutes of this State any duty or obligation, the performance of which is imposed upon the Commissioner of Public Works or the Auditing Board to the Commissioner of Public Works, the same shall be assumed and the performance of the same shall devolve upon the Department of Engineering.

Sec. 9. The Department of Engineering shall take full possession and control of all roads which have been declared State highways, enumerated as follows: The Lake Tahoe wagon road, the Sonora and Mono road, the Mono Lake Basin road, and all other State highways which may hereafter be constructed, and all public work being done or now completed by the Department of Highways. All expenditures by the State for highway purposes, except as otherwise hereafter provided by law, shall be under the full charge of the Department of Engineering, and all moneys appropriated for such purpose shall be made payable upon the proper order of said Department and shall be audited by the State Board of Examiners. The Department of Engineering, through its State Engineer, shall have the power to obtain or condemn necessary rights of way for the hange of any existing State highway or for any road placed under the Department's charge by law unless otherwise provided. It shall have power to alter or change the route of a road, and shall do all things necessary, and obtain all tools and implements required to properly care for and manage the roads under the charge of the Department. The Department may, in its discretion, appoint superintendents of the State highways, who shall hold office at the pleasure of the appointive power. They shall, however, be confirmed by the Advisory Board, and shall be specially qualified in road work. All unexpended balances of money now existing by law for improvements or maintenance of whatever kind under the Department of Highways, and the Lake Tahoe Wagon Road Commissioner, shall be placed under the control of the Department of Engineering, and the State Controller shall transfer said funds to the credit of the Department of Engineering. Wherever under any statutes of this State any duty or obligation, the performance of which is imposed upon the Department of Highways, the same shall be assumed, and the performance of the same shall devolve, upon the the Department of Engineering.

Sec. 10. The Department of Engineering shall make examination into existing highway conditions in the State of California, and shall, furthermore, make such investigations within the State as will put at the service of the State the most approved methods of highway improvement. It shall supply, on request, without charge, any information relative to highways required by any county or district official having care of and authority over highways within this State. It shall collect and collate data relating to the geological formation of the State in so far as it relates to material suitable for highway construction, and make analyses and tests of such material as it may deem suitable for highway uses, with the view of determining the value of the same for such purposes. All data so collected, together with such other matters of value or interest to the people of the State, shall be published in bulletins, or upon maps or diagrams, or in other proper form, or in the biennial report of the Department, as in its discretion shall determine. The department shall prepare and adopt styles and forms of books for use by officials, in which to keep account of the expenditure of highway money and all other records or proceedings relating to highways. It shall prepare such forms as may be necessary for use in connection with opening, abandoning, altering, locating, constructing, maintaining, obtaining title to, or otherwise relating to proposed State highways; and such books and forms, when so adopted, shall be the standard for use in the State. Copies of them shall be forwarded to the various officials who are charged with keeping or using the same, and such officials shall immediately prepare books and forms after the style shown by such standard, and shall thereafter use them exclusively for the purposes for which they are intended. It shall be the duty of the Department to adopt such general forms for the surveying of State highways, mapping, and keeping of the notes thereof, and the permanent marking of the same on the ground, as it shall deem necessary, and shall issue instructions defining such general forms and markings to the person having charge of the making of such surveys; and it shall thereafter be the duty of such persons to follow the methods prescribed in such instructions. The Department of Engineering, in performance of its duties, shall have the power to call upon any State, county, or district official to furnish it with any information contained in his office which relates to or is in any way necessary to the proper performance of the work of said Department; and it is hereby made the duty of such officials to furnish such information without cost.

Sec. 11. All architectural work of the Department shall be under the charge of the State Architect, and it shall be the duty of the Department of Engineering to make plans and specifications and estimates for all State building work. The State Architect shall, in company with the State Engineer, visit and inspect all completed work and shall certify to the State Engineer its proper or improper completion. The State Architect shall have general charge, under the State Engineer, of the erection of all buildings and the Department of Engineering must have an inspector at each building during the whole time of its construction.

Sec. 12. One Assistant State Engineer shall be assigned to the State Board of Harbor Commissioners at San Francisco, where he shall have an office. He shall prepare such engineering plans and specifications as said board may direct, and if adopted and the work ordered to be done, must superintend its construceion. He must give constant attention to the condition of the seawall and thoroughfare, of the sheds, wharves, piers, and landings, of the streets or parts thereof under the jurisdiction of the board and when repairs are needed, must forthwith report to the board in writing their nature and extent, and if ordered by the board, must have the same done at once. He must keep himself informed as to the depth of water in the various docks and slips, and report to the board from to time what dredging is required. He must keep a register properly indexed, showing the date, place, and character of every piece of work done and dock dredged, when begun and finished, with proper descriptions and drawings. He shall do all engineering work, under the direct supervision of the State Engineer, required by the said Board of Harbor Commissioners. Said Assistant Engineer shall be subject to the full control, at all times, of the State Engineer, and a copy of all work under his charge as Assistant Engineer shall be filed in the office of the Department of Engineering at Sacramento. A complete record of cost, in detail, of all work done under the supervision of this assistant engineer shall be filed with the Department of Engineering upon the completion thereof. One engineer's draughtsman shall be assigned to the said harbor board by the State Engineer, and the Advisory Board of the Department of Engineering shall employ such field and other assistants to the foregoing Assistant State Engineer as may be necessary and such field and other assistants shall be paid from the San Francisco harbor improvement fund.

Sec. 13. All coöperative engineering work now existing or to be engaged in by the State with the United States Government shall be placed under the Department of Engineering. All plans, estimates, and specifications shall be approved by the State Engineer, and the Advisory Board shall have full power to determine the kind, quality, and extent of such work under coöperation with said Government before entering into agreement with said Government for such work. All unexpended moneys provided for by law on the aforesaid coöperative bases shall be expressly placed under the full control of the Department of Engineering, and the State Controller shall transfer such funds to the credit of the said Department. Hereafter plans, estimates, and specifications for such work shall be filed in the office of the said Department.

Sec. 14. It shall be the duty of the State Engineer to consult and advise with the members of the Corps of Engineers of the United States Army comprising the California Débris Commission (created by act of Congress approved March first, eighteen hundred and ninety-three), in relation to the construction of works for the restraining and impounding of débris resulting from mining operations, natural erosion, or other causes; and it shall be his duty to examine such works and to report the result of such examination to the Advisory Board. Said State Engineer is further authorized and directed to consult and advise with said "California Débris Commission" in relation to any and all plans and specifications that may have been or may hereafter be prepared or adopted by said "California Débris Commission," for the construction of such restraining or impounding works, and said State Engineer shall file a copy of all such plans and specifications in the office of the Department. Whenever the Advisory Board approves said plans and specifications, the State Engineer shall notify the "California Débris Commission." Whenever said "California Débris Commission" or the Government of the United States shall have entered into any contract for the construction of works for the purposes described in this act, in pursuance of plans and specifications that have been theretofore approved by the Advisory Board as in this act provided, it shall then be the duty of the State Engineer to cause such work to be carefully inspected during the progress of their construction and to keep a record of the result of such inspection. Said State Engineer shall also from time to time, during the progress of the construction of such works, when requested so to do by the said "California Débris Commission," present his claims to the State Board of Examiners for an amount equal to one half the purchase price of any site or sites necessary for the construction of said works; *provided*, that the purchase of said site or sites shall have been first approved by the Advisory Board. All unexpended balances of money provided by law for the work under the Débris Commissioner shall be placed to the credit of the Department of Engineering by the State Controller. Whenever under any statutes of the State any duty or obligation the performance of which is imposed upon the Débris Commissioner, the same shall be assumed and the performance of the same shall devolve upon the Department of Engineering.

SEC. 15. When in his judgment it is deemed necessary, the State Engineer, subject to the approval of the Advisory Board, shall employ such assistance on the public work of the State or on public work at any State institution as may be necessary for the proper discharge of his duties, and shall under like restrictions, have the authority to purchase such supplies, instruments, tools, and conveniences as may be necessary for the proper discharge of the duties of the Department of Engineering. All employees of the Department of Engineering, when employed upon public work at or for any State institution in this State shall be paid, unless otherwise provided, from the funds of the State institution at or for which such work is performed. In all other cases, such employees shall be paid by the Department of Engineering. All inspectors employed by the State Engineer on any public work shall render to the State Engineer a full, true, and correct report of the kind, manner and progress of all work upon which he is such inspector. Any inspector who renders a false report, knowing the same to be false, shall be guilty of a felony. It shall be the duty of the State Engineer to keep a full, true, and correct detailed account of the cost of all work done under the control of the department of Engineering, and with the consent of the Advisory Board may employ a clerk for the proper compiling thereof. Such account shall be always open to the inspection of the public.

SEC. 16. The State Engineer shall prepare biennial reports which shall be submitted to the Governor at least thirty days before each session of the Legislature. Said report shall embrace the work and investigations of the Department under his charge for the previous two years, together with such recommendations for changes in the laws affecting the Department as he may deem advisable, and shall suggest and recommend changes relating to the road systems or administration within the State. It shall be the duty of the State Printer to print all reports, bulletins, or other matter, and furnish any other necessary illustrations or diagram therefor as the Department may deem necessary, all of which shall, however, be subject to the approval of the State Board of Examiners.

SEC. 17. The State Engineer shall receive the sum of four thousand eight hundred dollars ($4,800) per annum; each Assistant State Engineer shall receive three thousand six hundred dollars ($3,600) per annum; the State Architect shall receive four thousand eight hundred dollars ($4,800) per annum; each draughtsman shall receive two thousand dollars ($2,000) per annum; the architectural designer shall receive two thousand four hundred dollars ($2,400) per annum; the mechanical engineer shall receive two thousand four hundred ($2,400) dollars per annum; the testing engineer twenty-one hundred dollars ($2,100) per annum; the filing clerk eighteen hundred dollars ($1,800) per annum; the secretary twenty-one hundred dollars ($2,100) per annum; the printer nine hundred dollars ($900) per annum; each stenographer twelve hundred ($1,200) dollars per annum; and the porter shall receive four hundred and eighty dollars ($480) per annum. Such salaries shall be paid at the same time and in the same manner as are the salaries of other State officers. The two Assistant State Engineers and the State Architect shall each furnish the State with a bond in the sum of ten thousand dollars ($10,000) for the faithful performance of their duties. Said bonds must be approved by the Governor of the State of California and filed in the office of the Secretary of State. Each and every one of the above mentioned officers shall take the oath of office as prescribed for other State officers. The members of the Advisory Board, the State Engineer and the officers and employees of the Department of Engineering shall be allowed their necessary traveling expenses while engaged in the discharge of their duties within the State.

SEC. 18. The State Board of Examiners shall audit all bills or claims incurred by the Department of Engineering and the State Engineer shall present claims to said board for all expenditures directly under his charge. The Attorney General of the State shall be the legal adviser of the Department of Engineering and the said Department shall call upon the Attorney General of the State for all such legal advice and services as the discharge of its duties may require.

SEC. 19. For the purpose of carrying out the provisions of this act, the sum of ten thousand dollars ($10,000) is hereby appropriated to pay the salaries of the officers and employees and the other expenses of said Department for the remainder of the fifty-eighth fiscal year.

Sec. 20. It shall be the duty of the Auditing Board to the Commissioner of Public Works, the Commissioner of Public Works, the State Highway Commissioner, the Débris Commissioner, and the Lake Tahoe Wagon Road Commissioner to transfer to the State Controller all of the property, books, reports, and papers and maps of every description which is State property, and the said Controller shall transfer all of said things and property to the Department of Engineering.

Sec. 21. An act entitled "An act creating a Commissioner of Public Works, defining his duties and powers and fixing his compensation," approved February ninth, nineteen hundred, and all acts or parts of acts amendatory thereof are hereby expressly repealed.

Sec. 22. An act entitled "An act to create a Department of Highways for the State of California, to define its duties and powers, to provide for the appointment of officers and employees thereof, and to provide for the compensation of said officers and employees, and for the additional expenses of said Department, and to make an appropriation therefor for the remainder of the forty-eighth fiscal year," approved April first, eighteen hundred and ninety-seven, is hereby expressly repealed.

Sec. 23. An act entitled "An act providing for the appointment of an Auditing Board to the Commissioner of Public Works, authorizing and directing him and them to perform certain duties relating to drainage, to purchase machinery, tools, dredges, and appliances therefor, to improve and rectify water channels, to erect works necessary and incident to said drainage, to condemn land and property for the purpose aforesaid, making certain acts a felony, and making an appropriation of money for the purposes of this act," approved March seventeenth, eighteen hundred and ninety-seven, and all acts or parts of acts amendatory thereof are hereby expressly repealed.

Sec. 24. An act entitled "An act to provide for the appointment, duties, and compensation of a Débris Commissioner, and to make an appropriation to be expended under his directions in the discharge of his duties as such commissioner," approved March twenty-fourth, eighteen hundred and ninety-three, and all acts or parts of acts amendatory thereof are hereby expressly repealed.

Sec. 25. An act entitled "An act to create the office of Lake Tahoe Wagon Road Commission, providing the term of office and compensation of such commissioner, defining his duties, and making an appropriation for the salary and expenditures provided for and authorized by this act," approved April first, eighteen hundred and ninety-seven, and all acts or parts of acts amendatory thereof are hereby expressly repealed.

Sec. 26. All acts or parts of acts in conflict with the provisions of this act are hereby repealed.

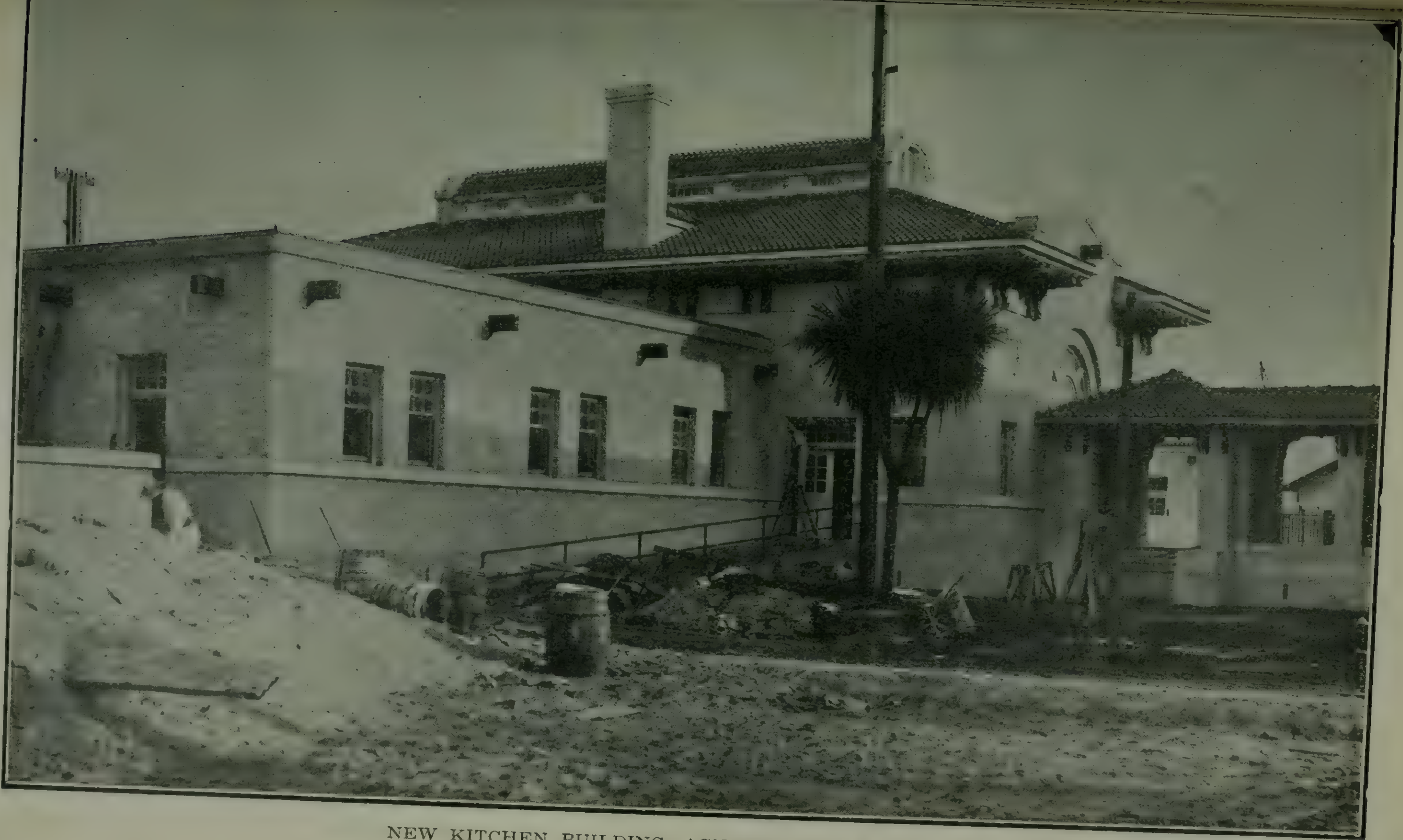
I firmly believe the abolition of the contract law of 1876, and its amendments, and the enactments of the features of it included under the Engineering Department will greatly facilitate the transaction of the work of construction and amply safeguard all the interests of the State. In the advocacy of the increased number of statutory offices, it will suffice to say their pay now comes from special appropriations and would, if enacted into law, come under the general salary fund. The cost of the services of these men, except the cement tester, is now charged to the cost of the plans, bills of materials, estimates, and specification for the particular work they handle. The cost to the State is the same either way the men are employed, but the business of the office can be greatly facilitated by regular employment of this additional help, without any extra cost.

AGNEWS STATE HOSPITAL.

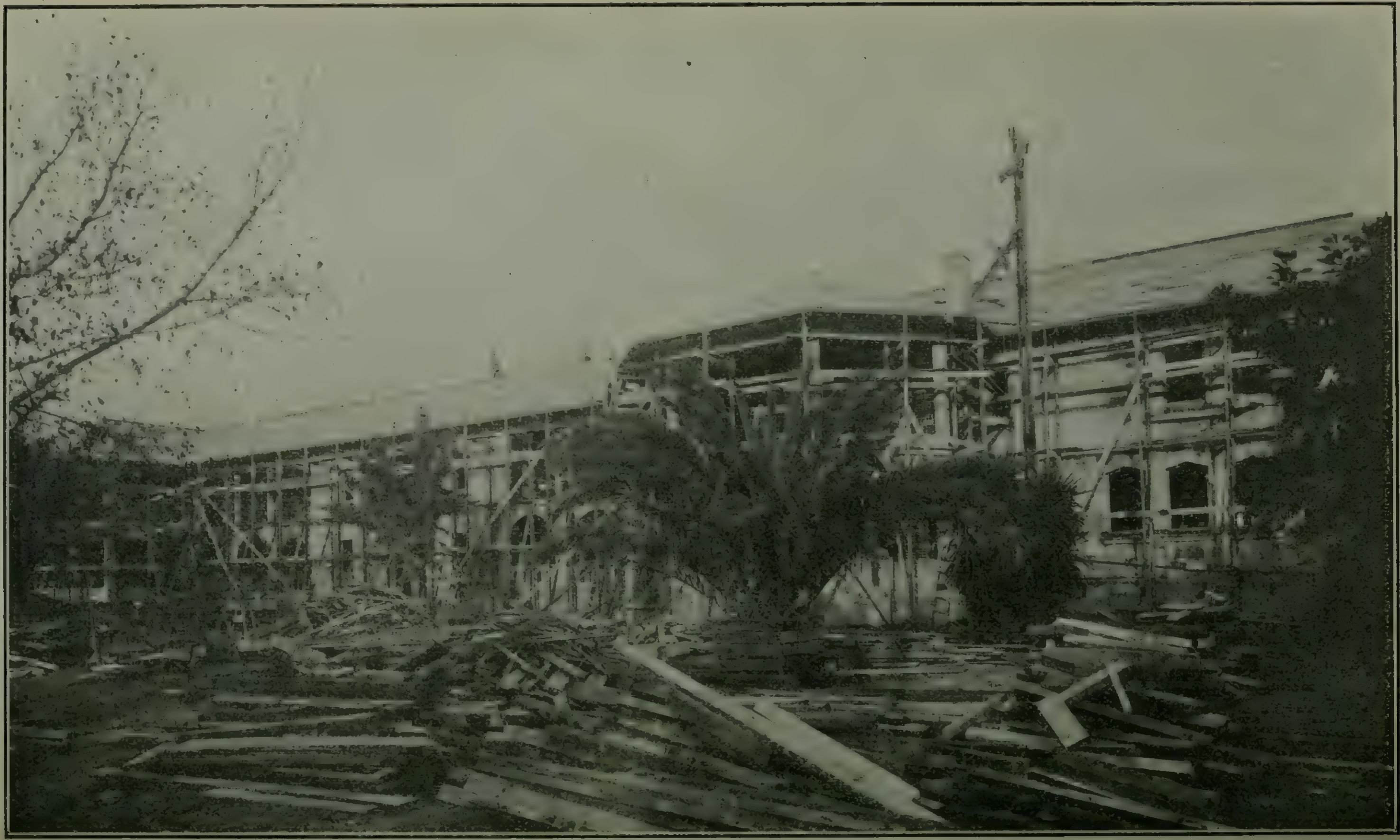
At the Agnews State Hospital the old buildings were destroyed by the earthquake, the mechanical plant and the water tower being about the only structures that remained standing of any value. After many

NEW COMMISSARY BUILDING, AGNEWS STATE HOSPITAL.

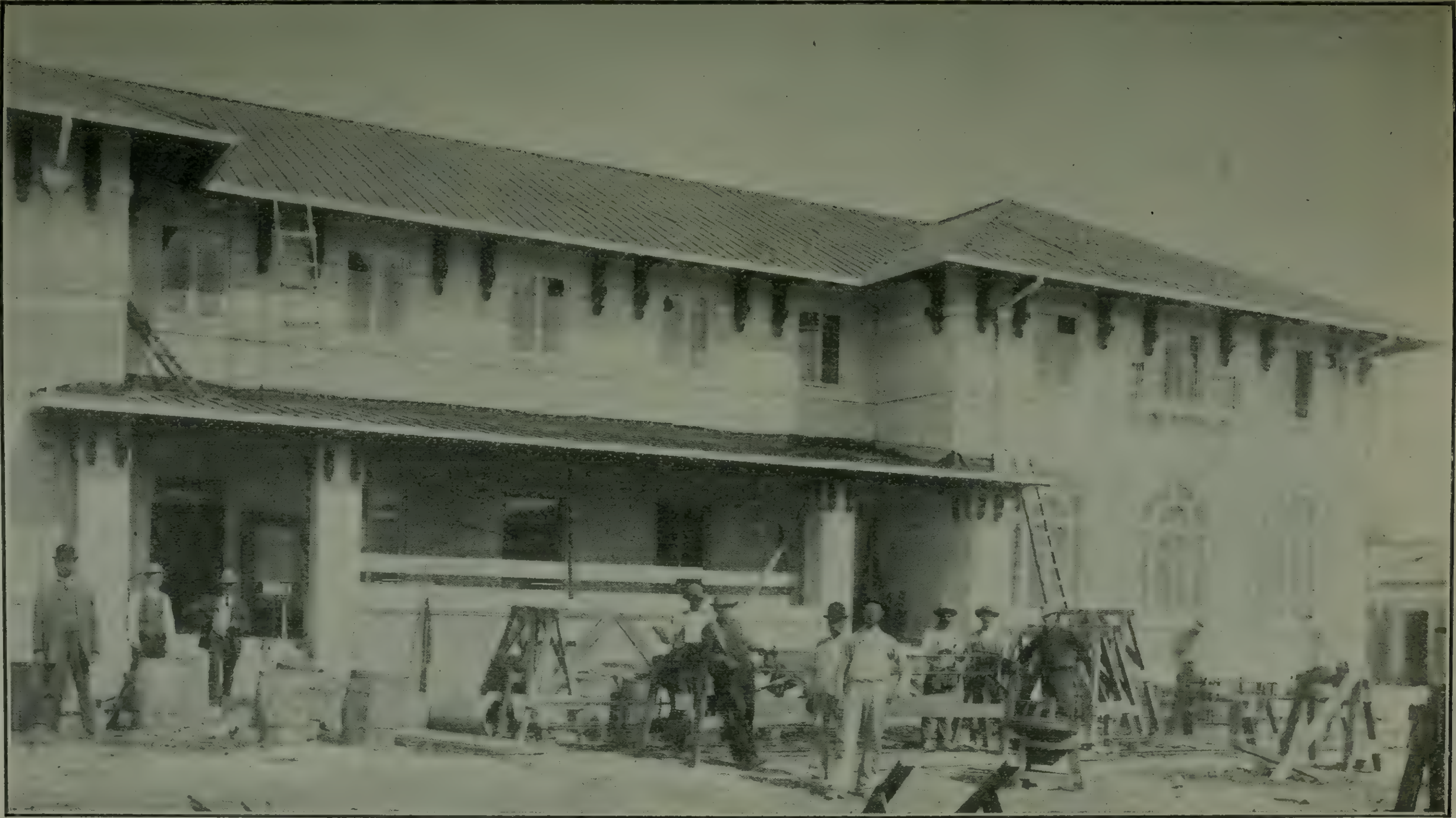
consultations with the Board of Managers and the superintendent it was decided to rebuild the institution on what is known as the cottage plan. A complete mechanical layout has been designed for sewers, underground concrete conduits, including gas pipes, steam pipes, wiring, water pipes, etc., the installation of a new power plant, including steam boilers, engines, and electric generators. This plan included a complete arrangement for a system of underground piping, etc. The buildings have been arranged with the power plant in the central and rear part of the group. Extending on either side of the power plant are two two-story reinforced concrete buildings; one for the violent and disturbed patients, and the other for the demented patients. Taking the boiler plant and drawing an axial line to the main avenue of the grounds divides the buildings as to male and female occupancy. Directly in front of the power house is a group of three buildings, the kitchen, the commissary, and the bakery buildings, all made of reinforced brick construction. In front of these one-story buildings is placed the main dining building of two stories, built of reinforced concrete. Continuing to the front, next comes the treatment building, in the center of a group of three and a two-story reinforced concrete building on either side known as the receiving building. This group forms the rear end of the minor axis of the ellipse and is composed of the largest buildings at the institution. From these buildings toward the front on one side the male and on the other side the female patients—the other structures come in the order mentioned. Two buildings for infirm, one story in height, two buildings for quiet and medium, two buildings for workers, two for convalescent patients, two nurses' home buildings, one administration building and opposite it, enclosing the ellipse, an assembly hall. All of these, unless otherwise stated, are two stories in height, constructed of reinforced concrete. Up the avenue will be the superintendent's house, and opposite it, on the avenue, the assistant physician's house. These last two buildings will probably be frame structures. In all, the Agnews State Hospital will be finely equipped with twenty-five modern, well-constructed buildings, housing between 1,100 and 1,200 patients, and a mechanical plant worked out for maximum economy of operation. The work is progressing very well and very nearly all of the $800,000 appropriated by the last legislature has been used or is under contract. At the date of this writing, the bakery building and the commissary building are completed, and the dining building and the kitchen are very nearly completed. In the two receiving buildings, all concrete is poured, as is also the case of the two buildings for demented patients. The buildings for the infirm are nearly completed, and the two buildings for the quiet and medium patients and the two for the violent and disturbed patients are under very good headway. This list includes fourteen buildings under con-



NEW KITCHEN BUILDING, AGNEWS STATE HOSPITAL.



NEW RECEIVING BUILDING, AGNEWS STATE HOSPITAL.



DINING HALL, AGNEWS STATE HOSPITAL, DURING CONSTRUCTION.

struction or constructed. For a list of the buildings, giving cost and other information, see the following table of building work. In addition to the work outlined above, the department erected a self-supporting steel smokestack and two 20,000-gallons steel oil tanks on the grounds. The two tanks complete with concrete foundations and pump cost by contract $2,800, while the stack which is lined with vitrobestos, a non-corrosive substance, cost by contract $2,536. There were also two iron stairways erected on the ends of the laundry building at a cost of $1,079. The estimate for the construction of the complete work as outlined by the plans is for $1,300,000. Through the intervention of the Governor, as chairman of the Advisory Board, about $200,000 was saved in the construction of two-story buildings instead of one-story heights as at first presented.

HOME FOR THE CARE AND TRAINING OF FEEBLE-MINDED CHILDREN.

During 1907 there was appropriated $75,000 for a new administration building, $20,000 for two cottages for epileptics, and $5,000 for a dairy barn. The design for a new manor house and nursery barracks came up to the department with the designs covering the appropriations. In some instances, we handled work started before the department was organized, but in such cases our record is incomplete. This was so with the cottage for girls. The administration building is to be three stories of reinforced brick construction, to correspond in outward appearance with the remainder of the main institutional building, with which it is directly connected. The two cottages and dairy barn are frame buildings, with concrete foundations. These structures are about completed, and the administration building is about one half complete. At this institution there are many small detail matters that have been cared for. All work on the structures given has been by day's labor, and is outlined for cost by the table given for all buildings.

SAN JOSE NORMAL SCHOOL BUILDING.

After being condemned, the old structure has been completly wrecked and the design for a handsome new building, quadrangular in shape, made of reinforced concrete, has been made. The lack of sufficient funds to obtain the class and size of building desired by the Board of Trustees delayed very materially in the final completion of the plans. Different sketches were submitted for their approval, but the first scheme, which is the one now adopted, received their sanction, with the understanding we so design the structure that the auditorium could be left off temporarily, if necessary, without damage to the appearance of the building as a whole. Immediately after getting the final expression from the board the Department proceeded on the drawings. They were finished complete with and without an auditorium, and also a new power

STACK AND TANKS ERECTED BY DEPARTMENT. AGNEWS STATE HOSPITAL.

plant, which is demanded by the new building. In no case is the structure, except the tower, which is heavily reinforced, to be over two stories in height. A detailed estimate of cost is being now made by the Department, and will when finished give complete figures.

THE STATE HOSPITALS—MENDOCINO, NAPA, STOCKTON, AND SOUTHERN CALIFORNIA.

For each of these four institutions there has been designed a receiving building for the treatment of the insane. These, in all instances, are one story in height, made of reinforced concrete, and with the exception of Southern California Hospital, are under construction on a day's labor basis. By this method at Napa, Stockton, and Mendocino we are using many patients, thus cutting the cost to the State down nearly one half. At the Napa Hospital we are constructing one wing and the central part of the building, thus leaving another wing. The complete design of this structure we have ready for some future time.

At the Stockton Hospital, we have well under way a one-story reinforced concrete structure, built largely by patients. This is also the case at the Mendocino Hospital, but the building here is much smaller and of cheaper construction. The appropriation for this cottage was $30,000.

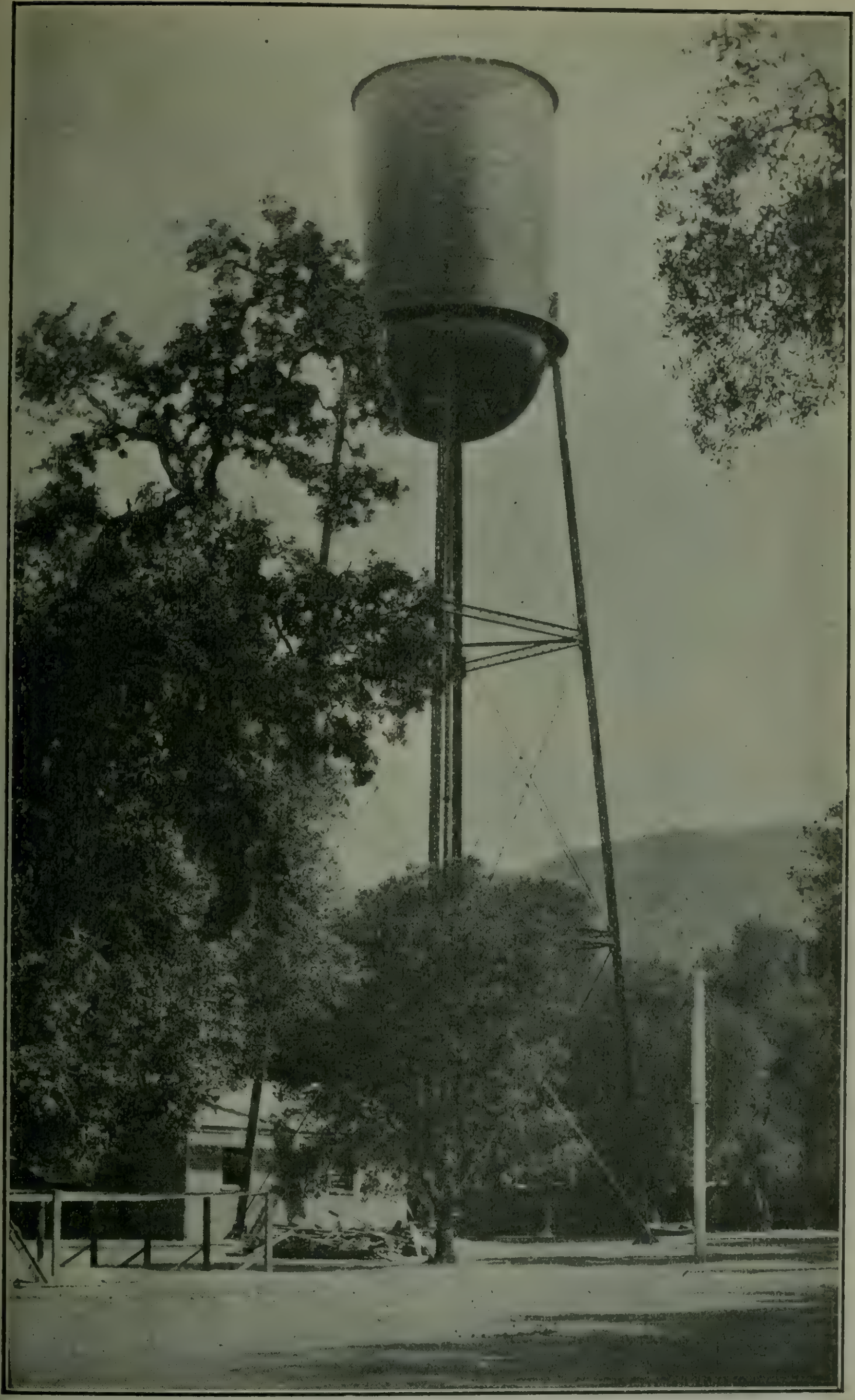
The receiving building for the Southern California State Hospital has not yet been started. The plans have undergone revision several times in order to get the cost of this building within the appropriation of $43,000. The interior work has been materially cheapened, that this building may be done by contract. The walls and floors are now designed of concrete and the interior walls are wood studding.

MENDOCINO STATE HOSPITAL.

Besides the receiving building being erected at this institution by day's labor, three small pavilions for patients were designed by this Department and built by the institution. On November 4, 1907, a contract was entered into with the Chicago Bridge and Iron Works for the erection of a steel water tower and steel tank. The tower of this structure is 139 feet above the ground and the tank's capacity is 100,000 gallons. This tank was built to replace the water tanks in the main building. This is a modern and well-built structure, after plans designed by the Department, thoroughly stayed latterally against horizontal forces.

NAPA STATE HOSPITAL.

A group of detached cottages, to accommodate the great overflow of population at this institution, was designed, containing four dormitories and a central day room building. These structures are made one story in height and constructed of brick. Three of them have been almost entirely built by patient labor, thus saving a considerable sum of money



STEEL TOWER AND TANK, MENDOCINO STATE HOSPITAL. CAPACITY 100,000 GALLONS; HEIGHT, TOP 139 FEET.

for the State. There has also been in progress on a day's labor basis, the completion of the earth dam, with a concrete core wall. This structure is now complete and makes an excellent dam, with a storage capacity of about 110,000,000 gallons of water. Some changes in the original plans were necessitated by the inability of the original soil to sustain the weight of earth fill on either side of the core wall. The original location of the pipe line being about on the central lines of the dam was piled thoroughly at the pipe joints in excess of original plans, but even then could not sustain the pressure from above. This plan was abandoned and a tunnel was dug through solid rock for 200 feet and then through earth and boulders for 237 feet. In the solid rock part of the tunnel was erected a solid concrete bulkhead and pipe intake. From here a double line of ten-inch pipe ran through the tunnel to its exit. The earth and boulder line of tunnel was lined with reinforced concrete, making the outlet to the dam one of the most substantial pieces of work in California. The work on this structure under the last appropriation was done by day's labor at a saving over the first work done on it by contract before this department was in existence.

There has been a new floor of steel and concrete with new layout for the Napa Hospital kitchen designed. Nothing has yet been done on this on account of the lack of funds.

STOCKTON STATE HOSPITAL.

There was designed and installed a new heating arrangement for a part of the buildings. This work was done by contract for $5,740. The Department also designed a new plumbing layout for this institution, but it has not yet been started. In these older institutional buildings the plumbing is very poor and deficient. It is of the old type, badly worn and racked, and should be replaced with good, first class fixtures and work. Specifications for the concrete sidewalks were gotten out and the work done by day's labor.

SOUTHERN CALIFORNIA STATE HOSPITAL.

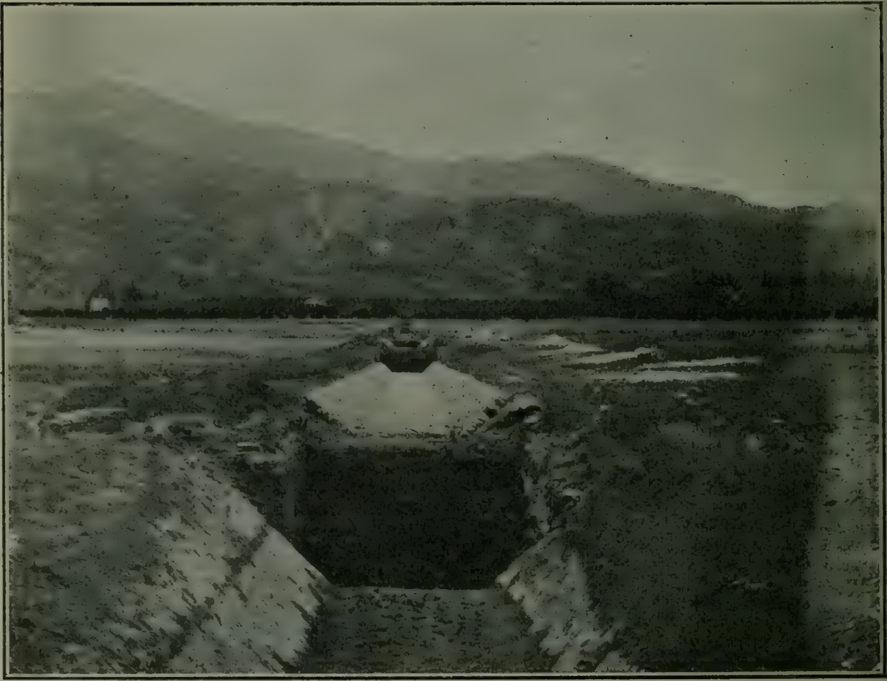
In addition to the receiving building, which the Board of Managers desire to erect by contract, there has been erected and finished a fine dairy barn 269 feet long with concrete foundations and stalls. This structure was contracted for at $10,430, without the painting and stalls, which was done afterward by the institution.

The repairs to roofs have been completed. Our plans called for new trusses and timbers, and a covering of slate to replace the old tin shingle roofs. This improvement was badly needed, as is the roof on the west wing of the building. This part of the main building is very poorly constructed and was cracking lengthwise and apparently falling apart. During 1907 this department advocated, and was instrumental

INSIDE VIEW NAPA STATE HOSPITAL EARTH DAM.

EXTERIOR VIEW, NAPA DAM.

STORM DRAINS, SHOWING WATER FALLS AND WATER CUSHIONS, SOUTHERN CALIFORNIA STATE HOSPITAL.



STORM DRAINS DURING CONSTRUCTION, SOUTHERN CALIFORNIA STATE HOSPITAL.

NEW DORMITORY, CALIFORNIA POLYTECHNIC SCHOOL.

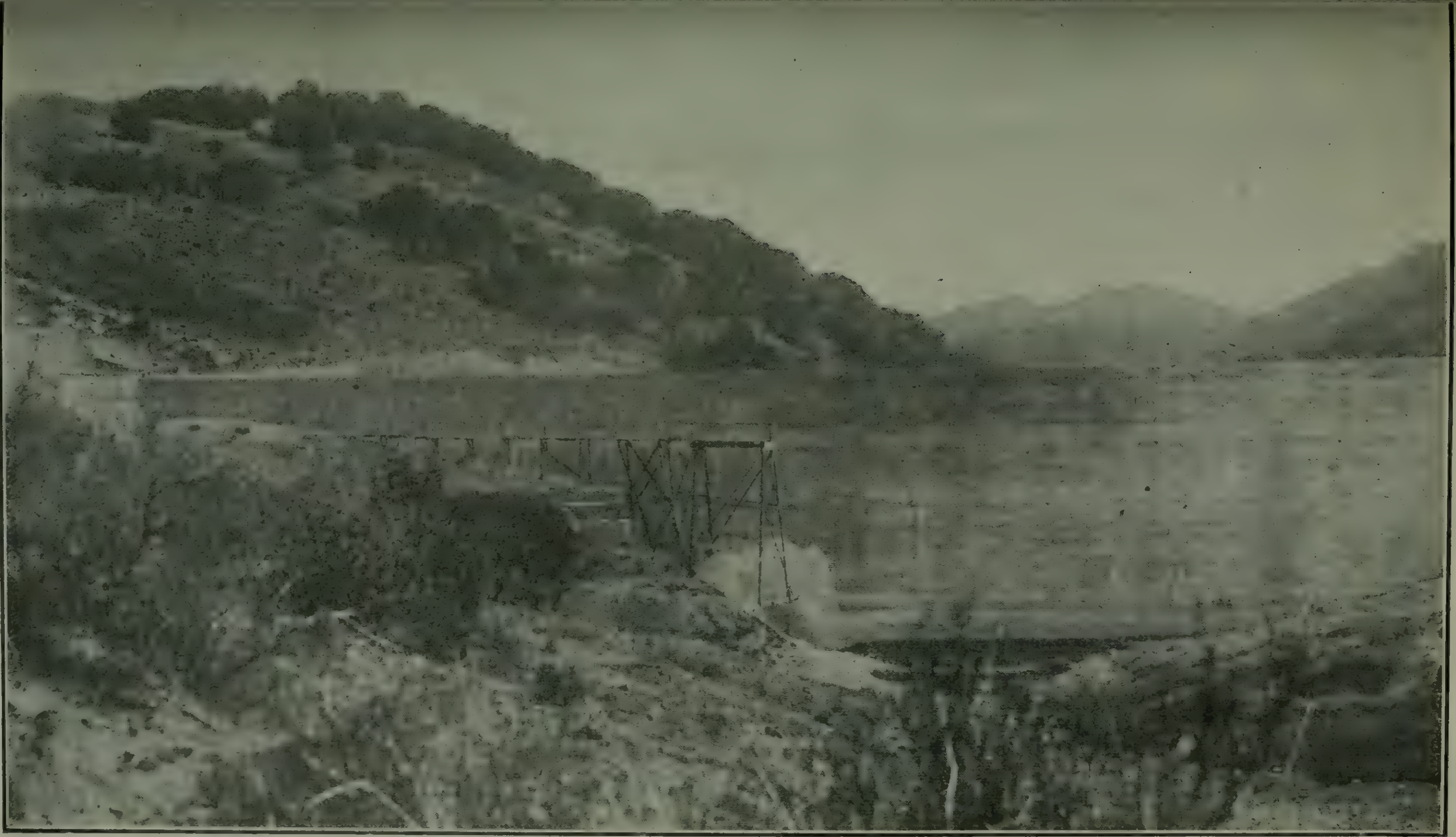
in, having this wing rodded from wall to wall, then with turnbuckles drawn together as nearly as possible by this means. Its foundation is in bad condition, and we were watching the structure for more defects before beginning to replace the tin roof. An appropriation should be made for the purpose of slating this wing, that the old leaking roof may be improved to correspond to the remainder of the building. One important plan laid out for this institution was the storm drains, to avoid the gullying out of the land adjacent to the buildings. The soil in this section of California erodes with the greatest rapidity and ease. No system can be devised that will not require good care and maintenance on account of such soil. The money appropriated by the 1907 legislature was totally insufficient to construct the complete drainage scheme, but a part of it has been satisfactorily completed after much delay in an endeavor to get a fair contract price. Our estimate of a section of the work to be contracted was $14,012; the actual cost to the contractor was $11,593. Under this contract there was constructed 3,300 feet of ten-foot ditches and much grading and filling. A new idea in hydraulic engineering was applied to this work. Water cushions were supplied the ditches to take out the grade and relieve the tendency to wear on the work and material of the ditch. This principle was begun in the State by this Department, and I think will prove very effective in certain classes of work. The construction consists of ditches paved with rocks, with crevices grouted and with waterfalls and water cushions of reinforced concrete. It is estimated the completion of this important work will cost about $13,000, and it is recommended that such an appropriation be made.

SAN LUIS OBISPO POLYTECHNIC SCHOOL.

Considerable work has been accomplished at this school during the past one and one half years. A forge shop, machine shop, and propagation house, all frame buildings, have been completed on the day's labor basis. A creamery building, two cottages for help, and a dormitory building are about completed. These last three structures were let by contract. The two cottages are frame, upon concrete foundations, as is also the creamery building. The dormitory, which will have a capacity of 60 students, is a frame structure with wire lath and plaster, and a concrete foundation. See the table of buildings for the cost, estimate, etc.

VETERANS' HOME.

This institution is made of the very cheapest frame buildings, and naturally must receive considerable maintenance expenditure. The full result of cheap building can be realized here upon a thorough examination of the structures. From now on the State will be put to heavy expense for repairs, which will be interminable, so long as these build-



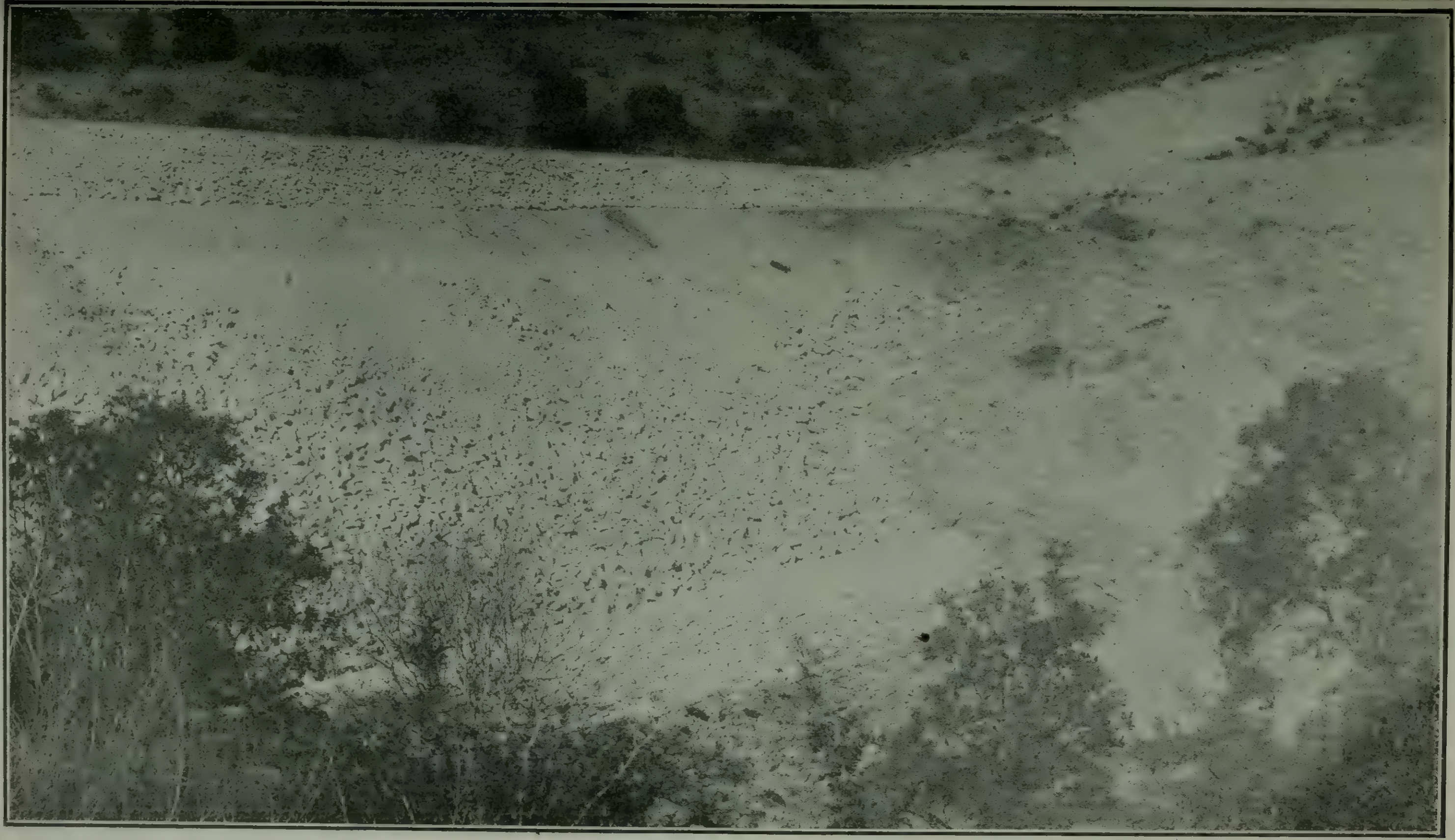
VETERANS' HOME DAM, 50 FEET HIGH, 400 FEET LONG, REINFORCED CONCRETE FACING ONE SLAB.

ings remain in use. If the institution were upon a permanent basis these buildings could well be replaced with permanent work, and be a paying investment to the State. Many repairs are now needed and should be made without further delay—and then greater expense. The work done at the Veterans' Home was all by day's labor. The repairs to roofs was made, but the money was insufficient to paint the shingles as should have been done. In the plumbing, too, a considerable portion of the plumbing fixtures were unused on account of the lack of funds. The appropriation of $5,000 for the commissary building was totally inadequate to meet the desires of the Board of Directors. The appropriation of $5,500 for the septic tank for the sewage disposal plant was too small to permit of the construction of a complete plant, so the equalizer tank and septic tank proper were erected for a daily capacity of 120,000 gallons. The contact beds were left untouched, as was also the fittings for the other two divisions of the plant. The completion of this work should be undertaken at the earliest date possible, and I would therefore recommend for its completion $3,500.

For water supply $24,000 was appropriated. After fully considering the old dam in the hills above the buildings, it was decided to utilize the old fill and face it with reinforced concrete, and drill a tunnel through the lava rock for the outlet. The concrete slab facing is 12 inches thick at the bottom, is set in a trench in the lava rock, then decreases in thickness until at the top it is 6 inches thick. This single slab is 56 feet high and about 400 feet long. The tunnel is 130 feet long and contains a solid bulkhead of concrete and a double pipe line. The idea of such a facing of concrete has, to my knowledge, never before been attempted in this character of construction. The height of the old structure was increased 10 feet, a new spillway was built, and the work was as substantially done as any construction the State has undertaken. Its capacity is 22,000,000 gallons, and the cost of the work was $22,439.17.

STATE FAIR BUILDINGS.

Since the Department's existence there has been constructed under its charge a poultry building and stock barn on the grounds of the Agricultural Society, near Oak Park, Sacramento County. These two wooden buildings were some of the first constructed by this Department, and your attention is directed to their cost in the table of costs of buildings. There has also been designed an agricultural pavilion and a manufacturers' pavilion for the same grounds, but the appropriation of $50,000 is insufficient to build both buildings. They will cost about $66,000, and the balance of this cost should be appropriated at this session of the legislature. While making these designs we sketched a layout for a complete exposition ground to fit the surroundings, with a view of working to it. The present grand stand should be torn down and a



VETERANS' HOME DAM, SHOWING BACK FILL OF BROKEN ROCK.

new one erected. It is an unsightly building and has a great excess of bracing, unreasonably placed for its strength. I specially recommend its removal, and a more pleasing stand built.

SAN DIEGO NORMAL SCHOOL.

The appropriation of $40,000 for the training school building was inadequate for the necessary room the Board of Trustees wanted provided. For this reason the hope of building this structure was abandoned until some legislative action could be taken in an endeavor to increase the appropriation to $62,000. This new building should harmonize in architecture with the other buildings, and should be built of either reinforced brick or reinforced concrete.

OAKLAND HOME FOR ADULT BLIND.

The dormitory building made possible by the appropriation during 1907 is well under way, practically all the concrete is poured, and the framing for the roof trusses is begun. This building is under contract for approximately $46,000, and will be the first substantial structure on the grounds of this institution. It is two stories in height, with a partial basement, and of reinforced concrete walls and floors. Undoubtedly when finished it will add greatly to the general appearance of the grounds. There should be an appropriation for the construction of a concrete sidewalk on Thirty-sixth street, Oakland, and for walks in the grounds of about $3,500.

STATE PRINTING BUILDING.

The old residential building used as a printing office and the storerooms used in connection therewith detracts from the beauties of the Capitol Park. During last year we designed some strengthening timbers and rods for the main building, as it was in a dangerous condition for people to work in. This work was done with the intention of bracing the building temporarily, and cost about $1,100. There should be some provision made for a new printing structure, for the present old shell can not last but a few years without heavy expense of repair, and then to no advantage.

INSECTARY.

On the Capitol grounds we erected for the Horticultural Commissioner a building for the propagation of insects. The location of this structure made it necessary to have it sufficiently decorative and suitable so that it would not mar the grounds. It therefore was designed with this in view. Both the design and construction were difficult because it closely resembles cabinetmaker's work, there being so much small detail. A photograph is presented herewith giving a splendid idea of it.

INSECTARY, CAPITOL GROUNDS.

EXPOSITION BUILDING, SEATTLE.

One of the most decorative buildings under construction on the Alaska-Yukon-Pacific Fair grounds at Seattle is the California Building. It is also among the largest there, measuring 232 feet in length and equal to two stories in height. The main body of the building is 138 feet by 138 feet, with wings on either side. This structure, which is nearing completion, is being done by day's labor, and I might add at a cost far below our estimate and at a vast saving to the State. The cost will be about $35,000, or $10,000 below the estimate made for it. The building has been almost entirely under the charge of this department through our superintendent of construction, Mr. B. Thomas.

FERRY BUILDING, SAN FRANCISCO.

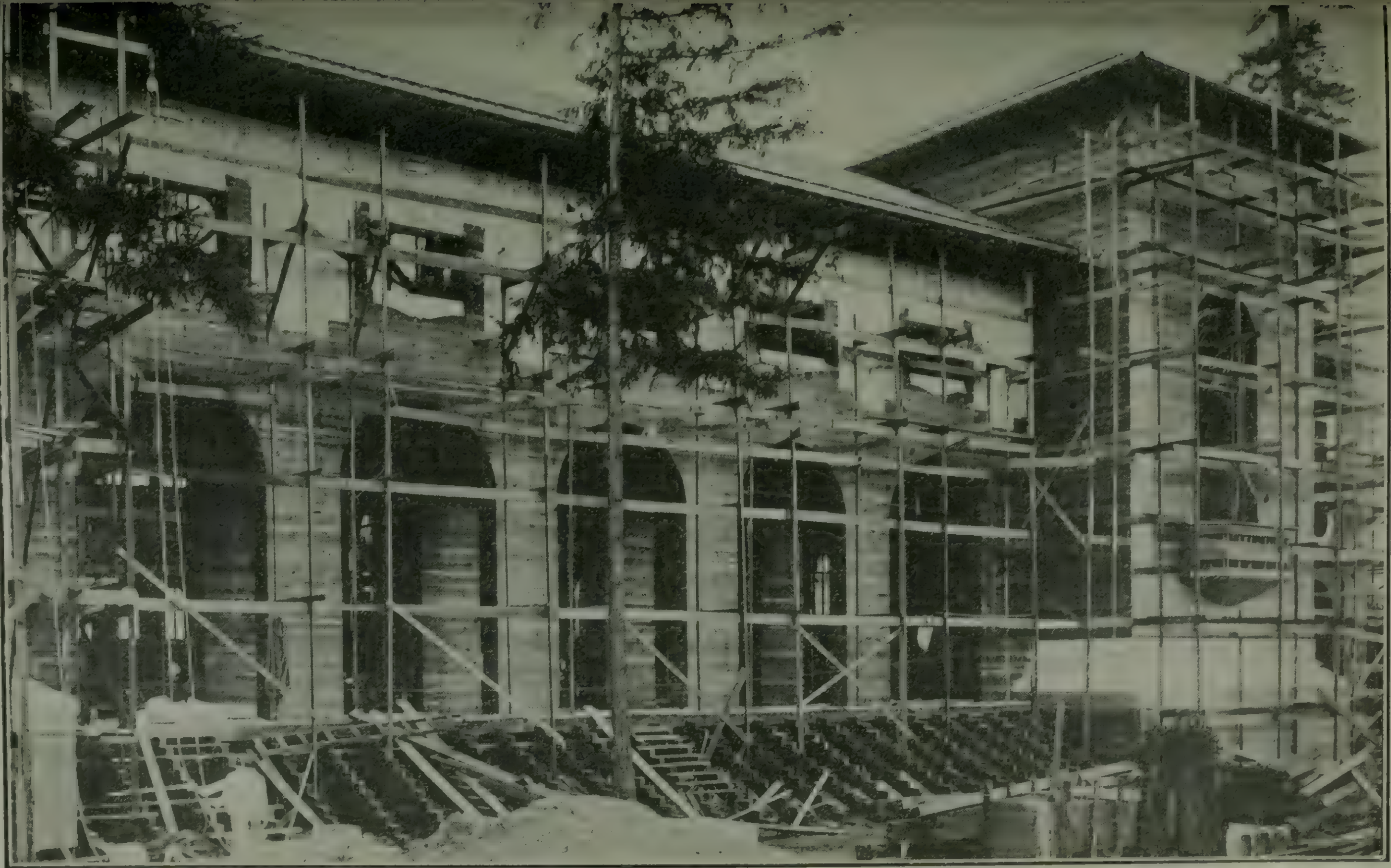
The alteration of the south wing of the Ferry Building, where the ticket offices are, the design of a candy booth in the front of the building, the design for newstands and ticket booths, a chief wharfinger's office, and alterations to the north wing of the building is the architectural work done by the Department. All the work mentioned herewith has added greatly to the appearance of the building, and I believe will give entire satisfaction.

SAN FRANCISCO OFFICE BUILDING.

This structure is now being designed by the Department and from present indications the plans will be ready for bidding about May 1, 1909. This building will be what is known as a class A structure, or steel frame, with curtain walls of stone, brick, and terra cotta. The present idea is to have a monumental office building designed to meet the demands of the State officials who will occupy it. The lot of land has already been purchased on the corner of Polk and Fulton streets.

SAN QUENTIN AND FOLSOM PRISONS.

At Folsom we now have under construction the wall, twenty feet high, enclosing the prison proper. At the entrance this will have a massive double gate, which was designed by the Department. The wall and gate are of cut ashlar granite, which will need trimming or spalling off after erection. We have also opened a new quarry of granite to meet the increased demand for stone, constructed a runway to obtain goods at the commissary from the track near the canal, erected, by contract, for $6,300 a new electric generator, panel board arc lamps and appurtenances, and are cutting out the foundation for a new 500 single cell building. Its location comes in a solid granite formation, the dip of which towards the American River makes the west end deep in decomposed granite to get an even footing. The east end of this foundation is solid granite. The design of this building is complete and gives many



CALIFORNIA BUILDING, SEATTLE. ALASKA-YUKON-PACIFIC FAIR, DURING CONSTRUCTION, NOVEMBER 19, 1908.

new features, such as interior guard gallery, utility corridor, cell blocks of reinforced concrete, one man cells, plumbing fixtures in each cell, and complete ventilation. The outer shell or building proper is to be built of cut ashlar granite of a neat, plain, but heavy design. Outside of the wall is now being erected the hospital for the criminal insane. Some changes have been made in the original plans by this Department, but the main structural part of the building is cut ashlar granite. The work done on all this construction is by prisoners, and in the case of the hospital for the criminal insane, the progress has been hindered by lack of cut stone. The completion must await an additional appropriation, as the funds are now about exhausted.

At San Quentin Prison the cutting away of South Hill began before the organization of the department, but was continued and finished by us about September 15, 1908. Upon becoming the official head of the Department of Engineering, it came to my attention that there was employed at the prisons an engineering department to carry on their work at an expense of $700 per month. I therefore presented the matter to the Board of Prison Directors, advocating the reduction of the force, retaining one man at $200 per month under the head department to oversee the work. This request was immediately favored, and the reduction in expense made. Now there is employed a civil engineer for prison work at $125 per month. The plans for an 800 single cell building, including all the features of the Folsom Prison new cell building, a kitchen building, a dining-room building, and a general block plan for an eventual whole new prison, is being designed to now partially supplant the antiquated structures and finally all of them. All buildings will be massive reinforced concrete, located principally on the site of South Hill. The structures are so arranged that their outer walls will serve prison wall purposes also. In the dining-room an interior guards' gallery, with entrance and exit from the outside only, will be a vast improvement over present methods used in the dining-room. This gallery is about nineteen feet above the floor level and can not be reached from inside the building.

The contracts for materials for the 800 cell building, the kitchen and dining-room, were let by the Prison Board and excellent prices were obtained, saving the State much money. The excavation for the footings on the 800 cell building is now proceeding, but before we could receive any of the heavy building materials we were compelled to build a new wharf at the prison and extend the present one about 140 feet to the south. It is now completed, and the shipment of materials may now begin. As the prisoners are to do all work they possibly can on the new construction, the plans have been far enough advanced for two months past to not hinder or tie up the work.

WORK AT SUTTER'S FORT.

The Department made plans, specifications, and estimates for improving the grounds at Sutter's Fort under an appropriation for the work of $1,500. Our estimate for the work was $1,224.38, but when proposals on the work were sought and received, no bid came within the appropriation, and this Department advised the rejection of all bids and that the Board of Trustees make informal agreements on our estimated basis, which was done, thus bringing the cost of the work practically to our figures. The roof and floor of the old distillery building at the Fort were estimated. The floor area contained 1,007 square feet, and was contracted at fifteen cents (15) per square foot. The old roof tiles were removed and felt roofing was placed, and then the old tile reset upon this.

ARCHITECTURAL PLANS.

In looking over the plans heretofore furnished the State for its building work, the small number of drawings attracted my attention. At the outset, I demanded complete plans for the structures we were to have charge of, and therefore we have made drawings consistent with the work to be done. Where the State had been furnished, say twelve sheets of plans heretofore for a structure, this Department has furnished about twenty-five sheets, and, in addition, the full size detail drawings. The completeness of our building plans may be seen upon looking over our files and particularly noting what has been done. For instance, we made one hundred and twenty-nine sheets of drawings for the San Jose Normal School building, and this was even relatively a smaller number of sheets than on some of our other plans. Building plans as furnished the State before the inauguration of the Department can be gotten out for from forty to fifty per cent of the cost of the plans we now furnish, and in some cases for less. Complete plans reduce the extras a contractor has coming to him on a piece of work. The plans now made by the State have reduced the real extras to a minimum. For example, the extras on the $507,000 worth of contract building work at Agnews State Hospital will not exceed $700. This, in making plans, is very important; but is not so important as to avoid skeleton plans that allow the contractor to place his figure high for contingencies that might arise. It is the belief that when the contractors know what is to be done on a building they can figure more closely, and with a far better understanding of the work. In the matter of getting up this work for the State, the Department has proceeded along the most economical lines. The usual charge for plans is five per cent of the cost of the new work and seven and a half per cent of the cost of the alteration work. I have no intention to mislead and say this charge is too high, for it is not; but what I do wish to impress upon the reader is the quality, character, size, and cost of the building plans made by the Department. In numerous instances plans have been changed four or five times after adoption by the authority at the institution, notably the dairy barn and receiving building at the Southern California Hospital, six building plans at the Agnews Hospital were finished, then abandoned, complete new plans being made, and the creamery building at the Polytechnic School. Then again, a number of the plans have been changed twice, such as the administration building at the Feeble-Minded Home, Eldridge, California, and the receiving building at Mendocino State Hospital. Again, where there is much detail on cheap or small buildings, such as the Seattle Fair Building, the Ferry Building candy booth, and the Insectary, the plans are exceptionally expensive, requiring much more work relatively than larger and more costly buildings. For the percentage of cost of the plans to the State under the Department, the actual cost of those buildings already erected is taken. On buildings under construction or contemplated, the contract price or our estimates are given. It will be noted by reference to a following table the estimates agree very closely in general with costs of structures. In many instances, where buildings are constructed by day's labor, such as the receiving buildings mentioned before, prison building, or buildings at the reform schools, as at the Preston School of Industry, the patients, prisoners, or students do the greater part of the work. We have estimated the cost of the buildings upon a day's labor, not a contract, basis. Summing up the cost of all the new building work, we have a value of $2,769,382, and the percentage of cost of plans was 2.83 per cent. The alteration work amounted to $68,187, and the average percentage of cost was 2.3 per cent. This general percentage of cost includes the salary of the architect and the one statutory draftsman in order to get a fair comparison. The saving on a 5 per cent basis for new work and 7½ per cent on alteration was $62.310. We did work of design on a bridge at the foot of Market street, San Francisco, commissary building at the Veterans' Home, a log cabin for the Big Basin Park, changes in plans for the building for the criminal insane at Folsom, Warden's residence at Folsom, a dormitory at the Feeble-Minded Home, Cohn cottage, and Girls' cottage at the same institution. This drafting and designing was not complete in any of the structures—sometimes only details, and again additional plans to originals furnished by others. Aside from these minor drawings upon which we can not figure any percentage, the total cost of plans, specifications, bills of materials, estimates, and all details, has been $71.307.10.

It is earnestly believed that with better facilities and more room for working, the cost of plans may yet be reduced materially.

The building work of the State should be placed further into the hands of the Department that building materials may be bought in purchasing agent for the State in these matters at the hospitals is the steward, and at the other institutions some designated person. In large quantities, and thereby effect a great saving. As it is now, the numerous instances the people who have done this buying have stated they were not acquainted with this class of materials and the prices therefor. We have always endeavored to assist them and obtain figures for the needs of the building, but were handicapped by not having the authority to complete the transaction.

The great necessity for a good reliable buyer for this Department is plainly seen by looking at the following deal made by myself and sanctioned by the Advisory Board. During the fall of 1907 I began obtaining prices on cement, and finally after receiving bids or proposals about three times made a contract with the Western Building Material Company, September 21, 1907, for cement f. o. b. factory at $1.27 per barrel. We can receive on this deal 100,000 barrels, and yet may possibly need more before the contract terminates, May 21, 1909.

The reader may best compare the cost here presented to the price heretofore paid by the State by noting that during the life of this contract a carload of cement was ordered from another concern, and the price was $2.25 per barrel f. o. b. factory. Now, say the price was $2.10 per barrel f. o. b. factory, the State saved alone on this one transaction $83,000. This is not unreasonable, for I have ascertained that the State ordinarily pays a top price without getting the advantage of close figures. With a good, reliable business man as a buyer, undoubtedly the State could make a vast saving along the line above mentioned. The saving on this cement alone more than paid for all the expense of the architectural division of the office in its great amount of work.

Before leaving the subject of buildings, I desire to draw attention to one very difficult problem. The lack of a proper block plan for each institution. There should be a complete survey made of the grounds, giving the contours, sewer lines, all pipe lines, natural objects, buildings, water supply, etc., and then a complete plan should be outlined for the building arrangement. If such a scheme were followed, we could locate the buildings for future needs, and also arrange to have the central power plant economically situated. As it is now, the institutions are yearly receiving additions without proper attention to a comprehensive scheme of location. We have made such a survey and layout for the Agnews State Hospital and the San Jose Normal School in connection with their whole new structures, but the other institutions are badly in need of this work. I believe there should be an appropriation for the purpose of making such survey and block plan of buildings. It would certainly reward the State tenfold in a very few years, for as it now is, if one desires to find an underground pipe sometimes he will spend two or three days. Again, with such a plan, heating, gas, water pipes, etc., may be located at a minimum of cost. It is suggested that an appropriation of $5,000 be made for this purpose.

CALIFORNIA REDWOOD PARK.

There was designed a log cabin for this park, but the lack of funds has delayed its building. During October this year, Mr. P. M. Norboe, assistant in the department, went to the Big Basin Grove and spent four days in making a survey for the contemplated sewage disposal plant and water supply. I herewith append the report on the subject:

October 17, 1908.

MR. N. ELLERY, *State Engineer*, *Sacramento*, *Cal.*

DEAR SIR: In compliance with your verbal instructions made at the request of Mr. G. B. Lull, State Forester, I visited the California Redwood Park, near Santa Cruz, and investigated the feasibility of installing water supply and sewage disposal systems for the main camp.

That portion of the Park which attracts most visitors is a small valley in the middle of the "Big Basin," at the junction of the East Fork of Waddell Creek with Bloom's Creek. The floor of the valley is slightly rolling, covered with a heavy growth of virgin forest and dense undergrowth. The administration headquarters and main camping ground, known as Governor's Camp, is situated in the north arm of the valley, along Waddell Creek and at the terminus of the road from Boulder Creek. From this point trails radiate in several directions to different points of interest, but no wagon roads as yet have been constructed.

About ten (10) acres of the valley have been partly cleared of underbrush, and it is here that the administration buildings, boarding and lodging houses and camps are established.

The number of inhabitants, campers, and visitors have seldom exceeded two hundred (200) in one day, but as the Park becomes better known and its beauties appreciated, the number of visitors and of campers will be greatly increased, so that facilities should be provided for about one thousand (1,000) people.

The only water supply now available is Waddell Creek, flowing along one side of the camp ground. The only means of disposing of sewage and refuse is by depositing on the surface of the ground or in pits. In either case it finally reaches the creek and in a short time will become a menace to the health of all using the water of the creek.

Water Supply.—Water can be brought to the grounds in pipes, under pressure, sufficient for several thousand people, either from Bloom's Creek, Union Mill Creek, Sempervirens Creek, or Maddock Creek, or all combined if need be. All but the last named, however, have their water sheds on private lands used for grazing, sawmills, shake and post makers camps, etc., so that the water is subject to more or less pollution.

The last named, Maddock Creek, has its source removed from accessible timber to tempt the lumberman, and with but little grazing land. At a distance of less than six thousand (6,000) feet from the camp, the creek is at an elevation of 104 feet above the bed of Waddell Creek at Governor's Camp. Water may be piped from here and delivered into tanks on the hillside above the camp at sufficient elevation to give ample pressure for fire protection to the buildings.

At the time of my visit, October 9th, I measured the water flowing in Maddock Creek and found it to be eighteen (18) gallons per minute, equivalent to 25,920 gallons in twenty-four (24) hours, and the creek was lower than has been known in twenty-five (25) years, so that it seems to be safe to estimate this source as sure to provide enough water at all times for over a thousand people at the camp. Should the population be enough greater to require all the supply for domestic use, then by the expenditure of say $150, a hydraulic ram can be installed in Waddell Creek at the camp which will supply the grounds for sprinkling and watering stock.

Sewage Disposal.—As above stated the methods of disposing of sewage matter now in practice is to deposit it in pits or on the surface of the ground. Much excreta is deposited on the ground in secluded spots for the reason that there are no public toilets. Camp slops and refuse are thrown on the ground. As the population increases these practices will become unbearable nuisances as well as menaces to health, even when the source of water supply is removed beyond chance for contamination.

To provide a means of proper disposal of the camp sewage there should be a number of automatic flushing range toilets and urinals placed at convenient and in conspicuous points above the grounds. These to discharge through sewer pipes into a trunk sewer traversing the grounds along near the creek bank, and terminating in a septic tank situated far enough so that any slight odor arising therefrom shall not reach the camp. The effluent from the tank, after undergoing the cleansing septic action, may be discharged into the creek without harm.

I submit a plat of the portion of the park, embracing Governor's Camp and vicinity, also a sketch showing a tentative plan for water supply and sewage disposal plants to cost about $5,000.

I desire to acknowledge my indebtedness to Senator S. H. Rambo, warden, and Mr. J. F. Creed, foreman, for many courtesies and much assistance in my investigations.

Respectfully,

P. M. NORBOE,
Assistant State Engineer.

TABLE No. 1.

Cost of Building Plans, Giving Cost or Estimate and Plan Percentage to November 28, 1908.

Agnews State Hospital Building.

	Cost Price or Estimate.	Cost of Plans.	Operating Expense.	Plans Percentage.	Remarks.
Two quiet and medium	$136,102	$1,741 29	$401 50	1.5	
Assembly hall	100,000	2,595 33	171 30	2.7	2 designs
Two nurses' homes	60,000	651 37	130 98	1.3	
Treatment Building and tower	61.000	2,924 43	220 34	4.8	2 designs
Two receiving buildings	179,313	3,065 52	487 30	1 9	
One power plant	105,000	1,141 40	347 95	1.4	
Superintendent's residence	25,000	2,205 83	238 34	9.7	2 designs with changes
Two demented buildings	91,700	1.731 29	245 11	2.1	
Two convalescent buildings	60,000	1,478 37	117 60	2 6	
Two workers buildings	125,000	2,737 33	209 12	2.3	
Block plan		270 91			
Two infirm buildings	57,788	725 90	306 02	1.7	
One kitchen building	39,232	1,179 28	133 86	3.3	
Two disturbed and violent buildings	85,886	2,446 99	555 88	3.5	2 designs
One administration building	56,000	1,994 64	198 92	3.9	2 designs
One dining hall	45,000	1,930 99		4.3	
One commissary building	17,752	590 39		3 3	
One bakery building	20,000	661 43		3.3	
Laundry building	1,500	73 30		4.9	
Connecting passage	3 000	47 90		1.6	
General drawing		71 95			
Perspective		71 00			
Typical details		4 34			
Extra design		959 87			
Totals	$1,269,273	$31,418 62	$3,650 17		
Estimate	$1,300,000.	Whole institution		2.6%	

TABLE No. 2.

Cost of Building Plans, Giving Cost or Estimate and Plan Percentage to November 28, 1908.

BUILDING.	Cost Price or Estimate.	Cost of Plans.	Operating Expenses.	Percentage of Plans.	Remarks.
Stockton receiving building	$81,000 00	$2,301 99	$468 09	3.4	
Stockton cow barn	6,000 00	150 18	----------	2.5	
Male ward, heating	5,750 00	71 41	----------	1.2	
Plumbing repairs	7,500 00	30 68	----------	0.4	
Home for Feeble-Minded.					
Administration building	70,000 00	2,362 10	456 36	4.0	
Dairy barn	5,000 00	170 05	52 94	4.4	
Manor house	15,000 00	518 81	40 32	3.7	
Nursery	2,000 00	73 39	----------	3.6	
Southern California Hospital.					
Receiving building	55,000 00	1,493 63	272 19	3.2	Changed four times.
Repairs to roofs	12,000 00	286 84	39 56	2.7	Alteration.
Dairy barn	11,000 00	636 71	152 86	7.1	Changed four times.
Folsom Prison.					
Cell building	475,000 00	2,308 14	196 55	0.5	
Double gate and tower	40,000 00	771 59	191 96	2.4	
California Polytechnic School.					
Dormitory	21,000 00	674 19	174 51	4.0	
Cottages	5,000 00	176 81	27 68	4.0	Three complete designs.
Creamery	10,000 00	509 47	115 05	6.2	Changed three times.
Propagation house	1,500 00	57 84	----------	3.8	
Machine shop	5,000 00	176 53	----------	3.5	
Napa State Hospital.					
Receiving building	91,000 00	2,196 72	97 58	2.5	
Detached cottages	24,000 00	715 65	----------	2.9	
Kitchen floor	1,500 00	41 56	----------	2.7	Alteration.
Veterans' Home.					
Repairs to building	8,000 00	130 73	----------	1.6	Alteration.
Plumbing repairs	2,500 00	39 13	----------	1.6	Alteration.

Mendocino State Hospital.					
Receiving building	43,000 00	1,060 05	218 69	2.9	Revised two times.
State Agricultural Society.					
Stock building	2,190 00				
Poultry building	4,480 00	210 76	......	2.7	
Lavatories	896 00				
Agricultural pavilion	40,000 00	961 57	42 72	2.5	
Manufacturers' pavilion	25,000 00	782 80	111 01	3.5	
Seattle building	40,000 00	1,563 30	250 35	4.5	Very decorative.
Insectary	7,466 50	379 37	93 42	6.3	Nearly cabinetwork.
San Jose Normal School	330,000 00	9,248 75	569 59	2.9	Estimate not yet made. Least is given.
San Diego Normal School	*40,000 00	*52 72	*14 92	......	Sketched and details only.
Ferry Building, San Francisco.					
News and fruit stand	3,950 00	194 00	3 24	5.0	Alteration.
South wing	7,300 00	280 04	......	3.8	Alteration.
North wing	23,623 00	365 10	......	1.5	Alteration.
Post office	1,972 00	86 64	......	4.3	Alteration.
Wharfinger's office	4,842 00	85 76	......	1.7	Alteration.
Blind Home, Oakland.					
Dormitory	46,000 00	1,406 13	124 54	3.3	
San Francisco Normal School building	4,828 00	96 06	......	2.0	Alteration.
Preston School of Industry.					
Repairs to buildings	2,500 00	65 44	......	2.6	Alterations.
San Quentin Prison.					
Cell building and layout	*2,000,000 00	*1,439 20	*245 15	......	Not complete.
State office building, San Francisco	*400,000 00	*169 63	*41 39	......	Not complete.
Total	$1,469,782 00	$31,008 53	$3,513 68	2.35	New work.
Total	73,015 00	1,673 30	42 80	2.3	Alterations.

*Not used.

TABLE No. 3.

Buildings Constructed or Under Construction by Contract.

Name of Building.	Contractor.	Estimated Cost.	Contract Prices.	Date of Contract.	Kind of Building.
Agnews State Hospital.					
Two infirm	Morrison Bros.	$69,036 00	$57,888 00	April 28, '08	Reinforced concrete.
Two receiving	F. O. Engstrum Co.	212,000 00	176,038 00	June 17, '08	Reinforced concrete.
One demented	F. O. Engstrum Co.	50,560 00	45,850 00	June 17, '08	Reinforced concrete.
Two quiet and medium	F. O. Engstrum Co.	137,620 00	136,102 00	Aug. 31, '08	Reinforced concrete.
Two disturbed and violent	Rickon, Ehrhart Co.	86,000 00	85,860 00	Sept. 23, '08	Reinforced concrete.
California Polytechnic School.					
Two cottages	J. Maino & Sons	$3,570 00	$3,848 00	May 14, '08	*Frame.
Creamery	F. O. Engstrum Co.	10,000 00	9,980 00	June 25, '08	*Frame, lath and plaster.
Dormitory	F. O. Engstrum Co.	22,152 00	20,765 00	June 25, '08	Frame, lath and plaster.
Southern California State Hospital.					
Dairy barn	J. C. Beer	$15,000 00	$10,430 00	July 17, '08	*Frame, Painting and stalls excluded.
Stockton State Hospital.					
Heating	J. G. Sutton Co.	----------	$5,740 00	May 29, '08	----------
Industrial Home For Adult Blind.					
Dormitory	Rickon, Ehrhart Co. and San Francisco Re-building Co.	$47,000 00	$44,630 00	Aug. 6, '08	Reinforced concrete.
Ferry Building, San Francisco.					
Alteration south wing	Walsh & McLaughlin	$9,000 00	$7,300 00*	----------	Glass, marble, and steel.
Alteration north wing	Jordan & Co.	21,000 00	23,623 00	----------	Glass, marble, and steel.
Alteration news stand and fruit stand	----------	5,000 00	3,950 00	----------	Glass, marble, and steel.
Wharfinger's office	----------	2,846 89	3,489 00	----------	Frame.
Post office alterations	----------	1,400 00	1,248 00	----------	----------

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* These have been completed.

TABLE No. 4.

Buildings Constructed or Under Construction by Day's Labor.

Name of Building.	Estimate of Cost.	Cost When Finished.	Additional Work.	Kind of Building.
Agnews State Hospital.				
Kitchen building	$39,232 00	Nearly finished		Reinforced brick and concrete roof.
Bakery building	18,000 00	$19,774 95	Ovens extra $2,733 00	Reinforced brick and concrete roof.
Commissary building	18,000 00	17,752 11	Corridor extra $2,000 00	Reinforced brick and concrete roof.
Demented building	50,560 00	Nearly finished		Reinforced concrete.
Dining building	45,000 00	Nearly finished		Reinforced concrete.
Agricultural Society Buildings.				
Stock building	$2,710 00	$2,190 27		Frame, concrete piers.
Poultry building	4,200 00	4,480 00		Frame, concrete piers.
Lavatories building	715 00	896 00	Also bored ground for gravel bed	Frame.
Seattle building	40,000 00	Will be below estimate.		Frame.
Insectary	8,500 00	Nearly finished 7,466 50	Breeding case left out and cheaper heating used.	Frame, concrete foundation.
California Polytechnic School.				
Propagation house	$1,500 00	$1,441 04		Frame, concrete foundation.
Machine shop	5,000 00	5,723 00		Frame, concrete foundation.
Southern California State Hospital.				
Roofing	$12,000 00	$11,500 00		Replacing old roof with slate.
Napa State Hospital.				
Detached cottages	$24,000 00	Nearly complete.	Patient labor.	Plain one-story brick.
Receiving building	91,000 00*	⅓ done, mostly	patient labor.	Reinforced concrete.

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* Estimate on day labor basis without institutional help. Prison work not given; entirely done by prisoners.

TABLE No. 4—Continued.

Name of Building.	Estimate of Cost.	Cost When Finished.	Additional Work.	Kind of Building.
Feeble-Minded Home.				
Administration building	$70,000 00	Half finished		Reinforced brick, three-stories.
Two epileptic cottages	24,000 00	$20,000 00		Frame, concrete foundation.
One barn	5,000 00	Nearly finished		Frame, concrete foundation.
One manor house	15,000 00			Frame, concrete foundation.
Mendocino State Hospital.				
Receiving building	$43,000 00*	¼ done, mostly	patient labor.	Reinforced concrete.
Veterans' Home.				
Repairs to buildings	$8,000 00	All used		Roofs, bracing, floors, etc., repairs.
Repairs to plumbing	2,500 00	All used		
San Francisco Normal School.				
Changes and repairs to old building	$5,000 00	$4,828 00		Changes principally.
State Printing Office.				
Repairs for strengthening	$1,050 00	$1,182 23		Rodding and placing timbers in old building.
Stockton State Hospital.				
Receiving building	$81,000 00*	½ done, mostly	patient labor.	Reinforced concrete.
Cow barn	6,000 00*	$3,563 92	Mostly patient labor.	Frame, concrete foundation.

*Estimate on day labor basis without institutional help. Prison work not given; entirely done by prisoners.

TABLE No. 5.

General Engineering Work at Public Institutions.

	Estimated Cost.	Contract Price.	Actual Cost.
Septic tanks, Southern California Hospital	$6,750 00	$6,376 84	
Storm water drains, Southern California Hospital	14,012 00	13,746 29	*$11,593 00
Electric installation, Folsom State Prison		6,341 00	
Trestle to quarry, Folsom State Prison			1.677 35
Oil tanks, Mendocino State Hospital	3,087 00	3,100 00	*2,818 00
Water tower, Mendocino State Hospital	5,626 00	8,000 00	*5,622 43
Landscape improvement, Sutters Fort			1,224 38
Septic tanks, Soldiers' Home, Yountville			6,105 33
Repairs to dam, Soldiers' Home, Yountville			22,439 17
Cement sidewalks, Stockton State Hospital			6 146 27
Steel stack, Agnews State Hospital	1,777 00	2,536 00	*2,115 00
Oil tanks, Agnews State Hospital	1,534 00	2,800 00	*1,736 12
Concrete stack (not constructed) Agnews State Hospital	1,079 00		
Asphalt-macadam pavement, San Diego Normal School		3,000 00	*2,426 87
Wrecking buildings, San Jose Normal School		3.000 00	*3,000 00

*These costs are the actual costs to the contractor, exclusive of profits.

The system of daily reports, which are sent in from every piece of construction work, has now been in use sufficiently long to show the value of this scheme. From this on we will have our estimating work on a basis that will prove very efficient. I herewith present some information in regard to the plan. Summarized, the daily building report contains the following subdivisions, and a weekly time card for each worker. From these time sheets, bills, and reports the work is segregated and ultimately unit prices obtained. Following the résumé of the daily report is a summary giving unit costs on the two Agnews State Hospital buildings, the bakery and commissary buildings:

DAILY BUILDING REPORT.

Class of work—

1. General.
2. Preliminary.
3. Temporary:
    - *a.* Sheds and scaffold,
    - *b.* Plant and tools.
4. Earth Work:
    - *a.* Excavating,
    - *b.* Fill,
    - *c.* Grading.
5. Masonry:
    - *a.* Brick,
    - *b.* Stone,
    - *c.* T. C. tile partitions.
6. Forms.
7. Concrete.
8. Reinforcing:
    - *a.* Bars,
    - *b.* Fabric.
9. Structural steel.
10. Sheet metal.
11. Ornamental iron.
12. Carpentry:
    - *a.* Rough.
    - *b.* Doors and windows placed and finished—complete,
    - *c.* Millwork, outside and inside.
13. Furring and lathing:
    - *a.* Metal,
    - *b.* Wood.
14. Plastering:
    - *a.* Exterior,
    - *b.* Interior.
    - *c.* Ornamental.
15. Painting and waterproofing.
16. Underground pipe work.
17. Roofing:
    - *a.* Tile, slate, shingles,
    - *b.* Metal,
    - *c.* Asphalt.
18. Flooring:
    - *a.* Cement,
    - *b.* Wood,
    - *c.* Patent.
19. Electric.
20. Heating and ventilating.
21. Plumbing.
22. Skylights.
23. Marble.
24. Tile and mosaic.
25. Cold storage.
26. Elevators.
27. Machinery.

UNIT COST FROM SEGREGATION SHEETS MADE FROM DAILY REPORTS.

Agnews Bakery Building.

Unit cost of excavation per cubic yard	$0 82½
Unit cost of forms complete per yard of concrete	4 59
Unit cost of form labor per yard of concrete	3 08
Unit cost of form material per yard of concrete	1 51
Unit cost of concrete complete per yard	18 59
Unit cost of reinforcing steel per yard of concrete	3 01
Unit cost of reinforcing steel labor per yard of concrete	89
Unit cost of crushed rock per yard of concrete	1 22
Unit cost of sand per yard of concrete	44
Unit cost of gravel per yard of concrete	87
Unit cost of cement per yard of concrete	3 49
Unit cost of concrete workers per yard of concrete	3 45
Unit cost of inspectors and timekeeper per yard of concrete	63
Unit cost of rock per yard	1 60
Unit cost of sand per yard	1 84
Unit cost of gravel per yard	1 37
Unit cost of form lumber per M	13 32
Unit cost of labor on reinforcing steel per ton	16 21
Unit cost of structural steel (roof) "contract"	1,268 66
Unit cost of structural steel (roof) labor	86 36
Unit cost of asphalt roofing per square yard	58¾
Unit cost of brick per M (old)	2 00
Unit cost of brick per M (new)	14 55
Unit cost of sand per yard	1 84
Unit cost of lime per barrel	1 84
Unit cost of teams and labor per M brick	49
Unit cost of sand per M brick	1 11
Unit cost of lime per M brick	45
Unit cost of cement per M brick	2 35
Unit cost of material for steel reinforcing per M brick	43
Unit cost of miscellaneous steel per M brick	1 59
Unit cost of labor on steel	87
Unit cost of labor on steel per ton	50 20
Unit cost of scaffolding per M brick	26
Unit cost of masons per M brick	8 68
Unit cost of masons' tenders per M brick	3 07
Unit cost of brick work complete per M	25 17
Unit cost of asphalt roofing per square yard	58¾
Unit cost of material for metal lath and furring per yard	43
Unit cost of labor complete metal lath and furring per yard	33
Unit cost of steel workers' metal lath and furring per yard	23
Unit cost of furring metal lath and furring per yard	10
Unit cost of metal lath and furring complete per yard	76
Unit cost of painting material per square yard	087
Unit cost of painting labor per square yard	57
Unit cost of painting complete per square yard	65.7
Unit cost of outside plastering complete per yard	1 57½
Unit cost of cement per yard of plaster	34
Unit cost of sand per yard of plaster	13
Unit cost of lime per yard of plaster	04
Unit cost of plasterers per yard of plaster	62½
Unit cost of plasterers' tenders per yard of plaster	33
Unit cost of scaffolding per yard of plaster	05
Unit cost of cleaning up per yard of plaster	06½
Unit cost of inside plastering complete per yard of plaster	30.6
Unit cost of plaster per yard of plaster	10
Unit cost of sand per yard of plaster	01.3
Unit cost of lime per yard of plaster	00.3

Unit cost of plastering labor per yard	$0 17
Unit cost of millwork, hardware and nails	601 96
Unit cost of labor on same	158 47
Unit cost of electrical work (including 2 motors) "contract"	164 00
Unit cost of sheet metal work	295 90
Unit cost of asphalt roofing	282 00

Agnews Commissary Building.

Unit cost of excavation per cubic yard	$0 75$\frac{8}{10}$
Unit cost of forms complete per cubic yard of concrete	4 74
Unit cost of form labor per cubic yard of concrete	3 14
Unit cost of form material per cubic yard of concrete	1 60
Unit cost of concrete complete per yard	20 19
Unit cost of reinforcing steel per yard of concrete	3 48
Unit cost of reinforcing steel labor per yard of concrete	93
Unit cost of crushed rock per yard of concrete	1 36
Unit cost of sand per yard of concrete	55
Unit cost of gravel per yard of concrete	83
Unit cost of cement per yard of concrete	3 47
Unit cost of concrete workers per yard of concrete	2 98
Unit cost of inspector and timekeeper per yard of concrete	63
Unit cost of form lumber per M	19 82
Unit cost of labor on reinforced steel per ton	13 88
Unit cost of asphalt roofing per square yard	61
Unit cost of brick per M (old)	2 00
Unit cost of brick per M (new)	14 54
Unit cost of sand per yard	1 84
Unit cost of lime per barrel	1 84
Unit cost of teams and labor per M brick	52
Unit cost of sand per M brick	1 02
Unit cost of lime per M brick	41
Unit cost of cement per M brick	2 37
Unit cost of material for steel reinforcing per M brick	44
Unit cost of labor on steel per M brick	63
Unit cost of labor on steel per ton	62 15
Unit cost of scaffolding per M brick	28
Unit cost of masons per M brick	7 62
Unit cost of tenders per M brick	2 71
Unit cost of reinforced brickwork complete per M	23 89
Unit cost of material for metal lath and furring per yard	44
Unit cost of labor complete per yard metal lath and furring	25
Unit cost of steel workers per yard metal lath and furring	19
Unit cost of furring per yard metal lath and furring	06
Unit cost of metal lath and furring complete per yard	69
Unit cost of painting material per square yard	06½
Unit cost of painting labor per square yard	42¼
Unit cost of painting complete per square yard	48¾
Unit cost of outside plastering complete per yard	1 50
Unit cost of cement per yard of plaster	34
Unit cost of sand per yard of plaster	12
Unit cost of lime per yard of plaster	05
Unit cost of plasterers per yard of plaster	63
Unit cost of tenders per yard of plaster	30
Unit cost of scaffolding per yard of plaster	05
Unit cost of cleaning up per yard of plaster	01
Unit cost of inside plastering complete per yard	33
Unit cost of plaster per yard	09
Unit cost of sand per yard	01
Unit cost of lime per yard	00.3
Unit cost of plastering labor per yard	20
Unit cost of scaffolding per yard	03

TABLE I.

State Agricultural Fair Grounds.

Stock Building.

Lumber and mill work	$977 28
Shingles	330 00
Hardware	34 33
Team work	113 31
Concrete, labor and materials	35 55
Labor, shingling	112 60
Carpenter work	477 20
Survey	10 00
Inspection	100 00
Total cost	$2,190 27

Area, 7,392 square feet; cost .2963 per square foot.
Cubical contents, 118,272 cubic feet; cost .0185 per cubic foot.
Building, open frame and concrete pier foundation.

Poultry Building.

Excavation	$7 50
Concrete, labor and material	38 25
Hardware, galvanized iron	578 46
Lumber and mill work	1,702 91
Glazing	249 00
Concrete floor labor and material	825 00
Carpenter work	796 75
Teaming	102 48
Tools	10 00
Survey	20 00
Inspection	150 00
Total cost	$4,480 35

Area, 7,500 square feet; cost, .597 per square foot.
Cubical contents, 180,000 cubic feet; cost, .0248 per cubic foot.
Building, frame and concrete pier foundation.

Two Lavatories.

Excavation	$37 80
Lumber and mill work	495 87
Hardware	9 77
Plumbing	125 00
Teaming	21 37
Carpenters	132 00
Inspector	75 00
Total cost	$896 81

Area, 616 square feet; cost, $1.455 per square foot.
Cubical contents, 8,624 cubic feet; cost, .0104 per cubic foot.
Frame structures.

TABLE II.

Veterans' Home.

Social Hall Floor. (Concrete on wooden floor.)

Carpenter removing old floor	$62 25
Labor on concrete	50 12
Gravel	24 00
Secondhand lumber	2 50
Expanded metal	56 84
Hardware	35
Cement	44 52
Inspector	80 00
Total cost	$320 58

1,655 square feet floor; cost, .1937 per square foot.

Moving Uncle Tom's Cabin.

Rent of moving outfit	$33 00
Carpenters' labor	34 00
Common labor	14 50
Inspector	45 00
Total cost	$126 50

Moved 360 feet; cost, .3514 per foot.

Repairs to Roof.

Plans	$146 63
Lumber. new and second hand	157 66
Hardware	265 88
Freight	147 03
Sheet metal and skylights	204 08
722 M shingles	1,998 30
Teaming	23 50
Removing old shingles	79 82
Labor on sheet metal	77 44
General carpenter work	104 22
Painting	12 50
Labor placing shingles	677 20
Inspector and foreman	496 00
Expense account	14 17
Tools	3 60
Total cost	$4,408 03

772 M shingles laid for .877 per M.

Repairs to Kitchen.

Lumber and mill work	$284 85
Concrete, labor and material (37¾ yards)	240 59
Filling earth	26 25
Teaming material	22 25
Hardware	14 84
Steel bars	65 94
Tile (Welsh quarries)	87 95
Excavating	38
Plumbing, labor and material	244 99
Carpenter, labor	316 95
Total cost of repair	$1,304 99

TABLE III.

Stockton State Hospital,

Cow Barn.

Excavation	$111 37
Concrete, labor and materials	175 77
Lumber	1,655 36
Carpenter work	412 15
Hardware	138 51
Painting and material	105 76
Inspector	965 00
Total cost	$3,563 92

Area, 13,000 square feet; cost, $2.74 per square foot.

Cubical contents, 298,600 cubic feet; cost, .0124 per cubic foot.

Sidewalks.

Sand filling	$14 40
Teaming	584 00
Steam roller	37 50
228 yards crushed rock	586 21
290 yards gravel	475 16
1,094 barrels cement	1,635 03
73½ yards sand	4 90
Grading	1,325 97
Sand fill	74 69
Labor on concrete	435 98
Sewer pipe	15 60
Inspector's salary	831 40
Lamp black and building paper	37 80
Preliminary expense	87 63
Total cost	$6,146 27

41,638 square feet of walk; cost, .1473 per square foot.

NOTE—Inmate labor is charged at the rate of 50 cents per day; attendants at $1.84 per day; institution teams at $4.

TABLE IV.

California Polytechnic School, San Luis Obispo.

Machine Shop.

Excavation	$331 13
Concrete, labor and material	826 62
Lumber	1,958 65
Mill work	571 99
Plumbing	567 00
Hardware	180 72
Tools	14 72
Paint	75 00
Teaming	173 15
Shingling	58 00
Carpenter labor	723 75
Painting	42 25
Inspection	200 00
Total cost	$5,723 00

Area, 4,070 square feet; cost, $1.406 per square foot.
Cubical contents, 97,686 cubic feet; cost .058 per cubic foot.
Building, frame and concrete foundation.

Forge Shop.

Lumber	$403 01
Mill work	93 47
Hardware	45 32
Paint	37 00
Plumbing	70 45
Concrete, labor and material	80 02
Excavation	109 13
Shingles and labor	140 80
Carpenter labor	226 65
Labor painting	82 50
Teaming	8 16
Inspector	130 00
Total cost	$1,426 11

No plans.

Propagation House.

Concrete and floor work	$292 15
Lumber and mill work	352 98
Hardware	55 44
Paint	27 68
Plumbing	249 40
Trucking	39 01
Carpenter work	289 38
Inspector	135 00
Total cost	$1,441 04

Area, 1,260 square feet; cost, $1.14 per square foot.
Cubical contents, 17,640 cubic feet; cost, .081 per cubic foot.
Building, frame and concrete foundation.

TABLE V.

San Diego State Normal School.

Asphalt Macadam.

Crushed rock	$281 25
Asphalt, as per specifications	157 50
Hauling, spreading and rolling, heating and mixing	1,988 12
Total cost	$2,426 87

Barber Asphalt Company, contract price, $3,000.

20.341 square feet 4½ inches thick in center and 3 inches at sides; cost per square foot, .119.

TABLE VI.

Agnews State Hospital.

Bakery.

Excavation	$231 50
Excavation for oven	8 91
Reinforced concrete and floors	10,860 31
Reinforced brick masonry	4,657 62
Metal lath and furring	578 86
Inside plastering	361 35
Outside plastering	1,141 71
Carpentry, including glazing	760 43
Plumbing	66 25
Electric work (contract)	164 00
Asphalt roofing (contract)	282 00
Sheet metal roofing (contract)	295 90
Painting	68 54
Equipment, charges	297 55
Ovens (contract)	2,733 00
Total cost	$22,507 95

Area, 5,196 square feet; cost, $4.33 per square foot.

Cubical contents, 108,760 cubic feet; cost, .2069 per cubic foot.

NOTE.—This building is constructed of reinforced brick and concrete roof. The ovens were a separate contract from the building proper.

Commissary Building.

Excavation	$249 50
Reinforced concrete	9,558 30
Brick masonry	4,253 62
Metal lath and furring	523 49
Inside plastering	280 58
Outside plastering	1,067 03
Carpentry, including glazing	763 42
Plumbing	90 79
Electric work (contract)	124 00
Asphalt roofing (contract)	305 00
Sheet metal work (contract)	240 00
Painting	48 81
Proportion of plant charges	297 55
Total cost	$17,752 11

Area, 5,196 square feet; cost, $3.417 per square foot.

Cubical contents, 108,760 cubic feet; cost, .163 per cubic foot.

This is a reinforced brick and concrete roof building.

TABLE VII.

State Insectary, Sacramento.

81 yards concrete, labor and material	$410 30
Teaming material	54 80
Rough hardware and tools	61 70
270 square feet sidewalk, including steps	298 34
Excavating 110 yards earth	69 48
Cost and labor of insulation	39 19
Cost lumber and shingles	957 56
Cost finish hardware	101 69
Cost mill work	1,210 11
Cost paint and labor	533 73
Cost plastering and material	276 46
Plumbing (contract)	250 00
Sheet metal (contract)	190 25
Electrical work (contract)	140 00
Ventilating and motor (contract)	502 00
Galvanized iron stack (contract)	112 00
Teaming	7 43
Carpenter labor	1,425 46
Glazing (contract)	151 00
Inspector and foreman	425 00
Total	$7,466 50

Area, 3,334 square feet; cost, $2.24 per square foot.
Cubical contents, 60,012 cubic feet; cost, .124 per cubic foot.
This does not include heating plant.

TABLE VIII.

Repairs to State Printing Office.

Lumber	$133 95
Iron work	527 18
Hardware	86
Labor, carpenters	356 00
Teaming	1 50
Inspector	75 00
Architect's office	87 74
Total cost	$1,182 23

Placing timbers in old structure.

CONTINGENT APPROPRIATION AND MISCELLANEOUS WORK.

The contingent appropriation of $5,000 per annum is inadequate for the work of the Department. The current expenses with an office force of forty or sixty employees is beyond the appropriation, and necessarily there has been a deficiency of about $2,500 per annum. The traveling incumbent upon the heads of the Department has occupied about one half or more of the time, and this necessarily takes considerable of the contingent money. It is urgently requested that this appropriation be made sufficient to carry on the work of the Department without hindrance.

As State Engineer, I have attended several Good Road meetings, made several trips of investigation on the river, and have personally investigated all the work of the Department. The Department has been instrumental in bringing about several innovations in some branches of its work, notably—established the fact that our mountain State roads may be accelerated in speed and cheapness of construction by the use of a steam traction shovel; has employed the new plan of water cushions for weirs, ditches and waterways, thus effecting valuable State work; has made a flexible brush mattress with cable, concrete, and brush, which makes an ideal revetment or river bank protection, and has employed in brick building construction a reinforcing metal, giving added strength to brick walls from shock or horizontal forces. All these ideas are proving very effective in their various capacities and will result in placing such work on a better basis.

RIVER CONTROL.

Ages ago Suisun bay probably extended from Iron Canyon at the north to Tejon Canyon on the south, a distance of more than 400 miles, with an average width of 50 miles. By the continual, if slow, accumulation of detritus washed down from the surrounding mountains, the water was driven farther and farther toward the Golden Gate, and the two great valleys, the Sacramento and the San Joaquin, were formed by this accretion from the highlands.

This great inland sea which stretched along the foot of the sierras had finally become but a remnant—Suisun Bay, lying just inside the gateway, now called Carquinez Straits.

The area of Suisun Bay is about 50 square miles at ordinary stages. Contributary to it were 100 square miles of marsh lands covered by the tide daily.

In the deltas of the Sacramento and San Joaquin rivers are more than 500 square miles of land, with an elevation of less than ten feet above low tide. The range from low to high tide is six feet at low stages of the rivers.

The principal islands forming the deltas of the two rivers named are as follows:

Lower Sacramento River.

Sherman, area	14,000 acres
Brannan, area	7,000 acres
Andrus, area	7,600 acres
Grand, area	17,000 acres

Lower San Joaquin River.

Bouldin, area	6,400 acres
Mandeville and Bacon, area	13,200 acres
Roberts, area	60,000 acres
Rough and Ready, area	1,600 acres
Union, area	42,000 acres

These islands were all formed by the gradual deposition of fine naterial brought down from the mountains by the annual floods of the ivers. By the action peculiar to sediment-bearing streams, the banks were built up higher than the surface of the land some distance away, nd nearly all of these islands have that characteristic. Being surounded on all sides by the streams that built them, the borders of the slands forming the banks of the streams are higher than the land at he interior, so that they may be correctly described as being "saucerhaped." The rims of these bowl-like islands were sometimes raised vell above tide level, as at the upper end of Grand Island, where the ank was about fourteen feet above low tide, and at the head of Roberts sland on the San Joaquin, the level of the bank was eighteen eet above datum. The lowest place on this island being about low vater level. The lowest point on Grand Island was more than ten feet elow low tide and twenty-five feet or more lower than the rim at the pper end of the island.

Before mining in the mountains had sent untold millions of yards of etritus down the rivers, and before levees had been constructed along heir banks in attempts to keep the water off the adjoining land, the vaters of the rivers were free to spread over the floor of the valley whenver they were swollen to a volume larger than the space between the anks.

As stated above, the banks were higher than the land at a distance. his condition produced troughs or basins between the rivers and the sing ground of the foothills. The fall from the top of the river bank is metimes as great as ten feet in a thousand for short distances. For nstance, the Colusa Basin, lying west of the Sacramento River, is, in ne place, fifteen feet lower than the river bank two miles away.

Prior to the commencement of farming on the low lands and the buildg of protection levees, the high waters ran over the banks filling the asins to the flood level of the stream and obliterating all trace of the annel, excepting as the banks were marked by the growth of trees.

During the flood of 1853 the conditions are described as presenting to view a "sea of water" from Sutter's Fort (in Sacramento City) westward to where Davisville now is, and southward to Stockton, the water being three feet deep over the banks of the river.

The conditions that caused more than one million acres of land to be inundated by the waters of Sacramento River, and as much more by the San Joaquin and its tributaries, were simply insufficient size of channels.

Hydraulic mining began to send débris down very shortly after Marshall's discovery of gold in 1848, and naturally great quantities of it were arrested in the channels where the slight gradients reduced the velocity of the water.

Very soon after the miners began washing the hillsides into the rivers, farmers were attracted to the rich lands lying partly submerged on the islands of the river deltas, and began, in 1852 or 1853, to build levees to keep the water off the land. The first attempts were at the upper end of Grand Island, where small levees were built to keep off the flood waters from the river. These were extended from time to time along the banks of Old River and Steamboat Slough, until finally the entire island was encircled, not, however, without suffering breaks at different times. Of late years the levees have been so strengthened that they withstood the flood of March, 1907, while the nearby islands were flooded.

The settlement of other islands followed; more levees were built; the river more or less successfully "fenced" off from spreading over the lands. The result of all these changes, filling the river beds with débris and narrowing the channels with encroaching levees; has been to raise the water plane all along the course of the streams.

The Commissioner of Public Works estimated, in 1894, that the Sacramento River from the mouth of the Feather to Suisun Bay had been reduced in cross-sectional area one third. Low water stages at Sacramento are five to seven feet higher than in 1849.

In the summer of 1908, just passed, the river registered 5.3 feet on the Weather Bureau guage at "K" street wharf—the lowest recorded in twenty-one years.

In its original condition the river was never able to carry its flood waters, notably in 1853 and 1862. Although the latter date was twelve years after hydraulic mining had commenced, the fact that low water registered 0 on the gage as late as 1856, and in 1861 it was down to 1½, is taken to indicate that not much filling had occurred up to that time, and yet, as before stated, the water ran over the banks all along its course converting the valley into a sea ten to twenty miles wide.

In attempting to devise any scheme for relieving the situation as it exists in the Great Central Valley, it is found that the interests of navigation, drainage, flood control, and irrigation are so intimately connected that one can not be discussed without considering the others.

And they seem to pair off in antagonisms although so interdependent. Large reservoirs to intercept the flood are advocated, and could undoubtedly be made to greatly lessen the dangers of the flood waters. But to construct and maintain them without regard to their use for irrigation would not be thought of. Yet, if they are to be useful for the latter purpose, they must be filled with the first water that comes in sufficient quantity, else they may not be filled at all. If they are filled then, when the flood arrives their capacity to absorb the flood flow is gone. So the one interest is opposed to the other.

Navigation requires a small channel in order to husband the water into a narrow space when low; flood protection demands a waterway of ample dimensions. Elaborate schemes have been worked out to reconstruct the main channels of the rivers so as to carry ordinary high stages, with overflow structures to take off the surplus into auxiliary channels, confining it between embankments so as not to flood the lands, all of these by-passes to converge into the one channel entering tide water.

Another scheme is to dredge the detritus from the river channels, using the material dredged to strengthen the levees on the banks. In the case of the Sacramento River, it has been estimated that the channel from Feather River to Suisun Bay has filled from six to fifteen feet and that from 80,000,000 to 120,000,000 cubic yards of detritus are lodged there. Let all of this be taken out and still the channel will not carry ordinary floods, much less the extraordinary. The river from near Colusa to the mouth of the Feather has channel capacity to carry within its banks only about 30,000 second-feet, yet the records show that at Iron Canyon sixty miles above there were, March 19, 1907, 204,000 second-feet flowing. The stretch from Stony Creek, where it has the first opportunity to overflow, to Colusa the gradient of the river, determined from the slope of the low water surface, is 1.29 feet per mile, and for the stretch of small channel way, from Colusa to Feather River, the fall is only $\frac{34}{100}$ foot per mile, so it can readily be seen what extensive changes are necessary to be made in that stretch to make the river carry all the water that Iron Canyon sometimes delivers.

Whatever may ultimately be done for the solution of the several problems, it will all fail of giving protection to the islands of the Sacramento delta unless extensive channel enlargement and rectification be done at the confluence of the Sacramento and San Joaquin rivers.

All of the drainage of the Sacramento must enter into the bay through a narrow pass. Just above Rio Vista, where the overflow from up the river coming down through the Yolo Basin reënters the Sacramento through Cache Slough, the river was formerly 2,600 feet in width. This has been reduced to about 1,800 feet by means of jetties. A few miles below this the channel is only 700 feet between banks. When a flood wave is rolling down the river it must mount higher and higher as the channel narrows, and when it meets the incoming tide, five feet high, forming, as it were, a waterdam, it must ride on top of this tidal dam, with disastrous results to the shore embankments.

It would seem imperative that this constriction must be removed as preliminary to any scheme for river improvement above.

The conditions on the Sacramento may be briefly summarized as follows:

The river enters the valley at Iron Canyon carrying an observed maximum of more than 200,000 second-feet. The channel of varying capacities, and tortuous course, traverses the length of the valley the first sixty miles in the trough, thence occupying a ridge from which the land slopes either way to lower land on either side. After running for sixty miles the stream is augmented by Stony Creek, from the west. Thence the channel, even in ordinary floods, begins to spill its surplus which gathers into and floods Colusa Basin; the water in this basin being constantly added to by overflows at intervals nearly the whole length of the river, to Knights Landing. Some is spilled along the upper reaches over the east bank and is picked up by Chico Creek, Angel Slough, and other channels, let into Butte Basin, thence into Sutter basin and reënters the river at the lower end of the latter. When the flood wave has passed and the water level in the river lowers, Colusa Basin begins to return its water to the river through Sycamore Slough near Knights Landing. From Stony Creek to Feather River, a distance of 117 miles, the Sacramento has no tributaries, but sometimes, as in 1907, when Butte Basin is already full, Feather River breaks over into it, and the basin not being able to hold any more, overtops the levees along the river near Colusa, engorges the stream and adds to the outflow toward the west into Colusa Basin. Feather River, which also occupies high land, receives Yuba and Bear rivers from the east, overtops its banks and flows into Sutter Basin on the west, swelling the volume already received from Butte Basin.

The Sacramento having parted with its surplus in the upper reaches would now be able to keep within its banks except for the additions received from its east side tributaries just named. Being swollen by these waters, it now begins to flow out over the west bank, almost in a broad sheet, the water running to lower land in Yolo Basin. Arriving at Sacramento City, the river is again reinforced by the American River. This stream, when gorged, flows over its banks to the north, filling American Basin, which already has received considerable quantities of water from the Sacramento River and the foothill drainage. Below Sacramento the river would, except for levees, overflow both banks, all the way to Rio Vista, that to the west running into Yolo

Basin, and on the east flowing toward Stockton till intercepted by the Mokelumne, by which stream it would be conducted into the San Joaquin. Near Rio Vista the waters that were discharged into Yolo Basin are returned to the river through Cache Slough, the quantity here entering, having been largely increased by the hill drainage from the west of the basin.

All along both banks of all of the streams, levees have been constructed in attempts to keep the water from overflowing the adjacent lands; but never a flood has occurred yet that they were not breached, entailing great loss to the lands and crops inundated. Millions of dollars have been spent in these efforts at protection and other millions lost because of their failure.

The first thing that strikes the notice of even a layman in examining the river is the glaring fact that the levees are too close to the banks almost everywhere. It is less than a thousand feet from the wharves of Sacramento City to the levee on the opposite side and thirty feet, height measured on the gauge, endangers them. The maximum amount of water entering the valley above Sacramento City on March 19, 1907, has been estimated at more than 500,000 second-feet. Think of carrying that amount between banks 1,000 feet apart. With the present channel capacity, it would have to move at a velocity of sixteen feet per second, or if it were possible to restrict the velocity to ten feet per second, it would require the levees to be raised about twenty feet higher, neither of which conditions could possibly be attained.

The problems of the maintenance of navigation, protection from floods and the drainage and irrigation of land have been studied by able engineers, and good, bad and indifferent solutions offered ; but the first requisite is a unification of purpose and harmony of effort among the various and varied interests involved. That having been attained, methods may quickly be determined upon and carried out.

Is not the addition of 1,000,000 acres in the Sacramento Valley, and nearly as much in the San Joaquin, to the permanent wealth producing area of California worth a united effort ? An empire in extent, of as productive land as exists anywhere.

Japan supports forty-eight million people within a territory the size of California, only one sixth of which is tillable land, and nowhere has that country land or climate to compare with the Great Central Valley of California, the superior productiveness of which can more than furnish the conditions required for our people when it is brought under ideal conditions of protection and cultivation. But to give it the wonderful development it should and can have, all interests must unitedly strive for and accomplish restoration of navigable conditions, protection from flood disaster, and reclamation by drainage and irrigation where these improvements are required.

From the data of surveys, gauge readings and information furnished by the United States Geological Survey, and a study and observation of the Sacramento River, it is very evident that in a general comprehensive scheme of improvement for flood conditions of the river we must open wide the mouth of the stream, make cuts to obviate the bad sharp turns below Rio Vista, then continue up the river, cutting out all bad bends. We should begin at the mouth of the river rather than from any midway or other point and pursue the work up stream. If the stream were straightened out above Rio Vista to Red Bluff then would the waters rush down and pile up in the lower reaches of the river, endangering vast tracts of reclaimed lands. Probably the most important part of a general scheme for flood control is the systemization of the location and construction of new levees and the proper replacing of the old ones. The levees are now perched upon the bank ridge so close to the water line that a few feet of erosion endangers them and perhaps thousands of acres of land with crops. The eagerness to get all the land possible under cultivation and the system of dredging in vogue along the Sacramento and San Joaquin rivers, makes the near river bank the most convenient place for a clam shell dredge to drop the material, and also save the maximum of acreage. There are so many diversified opinions and interests involved that it is a difficult matter to get one or several landowners to begin the work upon a proper basis when his or their neighbors entirely disregard the plan. This is positively wrong, and some central authority should have power to compel the landowners to levee their lands in a way beneficial to the whole people affected by the reclamation.

This authority must have powers that command the whole levee system. Until we adopt a plan of this nature, a recurrence of the disastrous breaks caused by flood waters will continue, and relief can not be expected. For flood relief there must be sufficient cross-sectional area to carry away the highest water.

Undoubtedly, near the mouth of the river there must be provided such area way between levees that when the flood waters happen to meet the high tide, the river waters may pass over the crest of the tide.

The dredging of the Sacramento River or the San Joaquin River within the tidal area would not materially assist the passage of flood waters, but beyond the reach of the tidal flow then the increased depth is a vast factor in that the cross-section for the flow is increased.

Again, dredging the rivers for navigable purposes has its advantages, and I believe if dredging could progress on the Sacramento River and deposit the material in the proper location for a complete levee system, it would prove a great boon to the landowners. The problem of navigation can be cared for without materially helping the property owner, yet the same owner in his endeavors to keep his land under reclamation has largely assisted the navigability of the river. It is only fair and just that the landowner in his undirected struggle against flood waters receive some consideration at the hands of those who propose to benefit navigation. In fact, the two interests should work in true harmony and accord to accomplish a good deep river and one capable of caring for flood waters.

PROGRESS OF RIVER WORK.

By act of the legislature, approved March 21, 1907, there was appropriated $125,000 to be expended by the Department of Engineering "for rectifying and improving the channels of the Sacramento, San Joaquin, and Feather rivers, and such other river channels of the State as the Department of Engineering may determine, and to improve the navigability of said streams."

The damage to the river work wrought by the floods of 1907 appearing to be too great to be fully restored with the funds available when the Department of Engineering took charge of the rivers, it was decided to do that work which seemed most urgent, and the Consulting Board adopted as its policy, that where work was to be done that was plainly of immediate benefit to contiguous property interests, those interests should be required to furnish funds to cover part of the expense of the work planned, and that all rights of way should be given free of cost to the State.

At the time the Department of Engineering was organized and succeeded to the duties of the Commissioner of Public Works, the only work which had been commenced and not completed was as follows:

Near Marysville it had been intended to make a cut-off across Eliza Bend, in Feather River, and a contract had been made to clear the right of way of timber and brush. The price agreed to be paid under the contract was $111 per acre for clearing 25¾ acres, aggregating $2,847.25. Payments had been made to the amount of $2,080.20 by the Commissioner of Public Works. When the Department took charge it was found that only 21.83 acres had been cleared, and as the time limit of the contract had long expired, and further, the Department had decided to abandon the proposed cut-off, it declined to allow the remainder of the clearing to be made and settled for the amount actually cleared, amounting to $2,425.25 less $2,080.20 previously paid. Prior to the flood of 1907 the Commissioner of Public Works had undertaken some protective work at Rocky Point, on the right bank of the Sacramento River, at the town of Washington, Yolo County.

In the fall of 1907 the Department of Engineering constructed a stretch of brush revetment along the levee at the same place, and used some old brush left over from the work of the Commissioner of Public Works, and for which payment had not been made. The brush was piled on the river and before using any from the pile the Department had it measured and found the pile to contain 64.70 cords. That amount was used and credited to the contractors, Messrs. Clark and Henery, who had furnished it to the Commissioner of Public Works.

The work accomplished by the Department in channel protection and rectification since assuming the duties thereof May 11, 1907, is best given by outlining the work on each improvement.

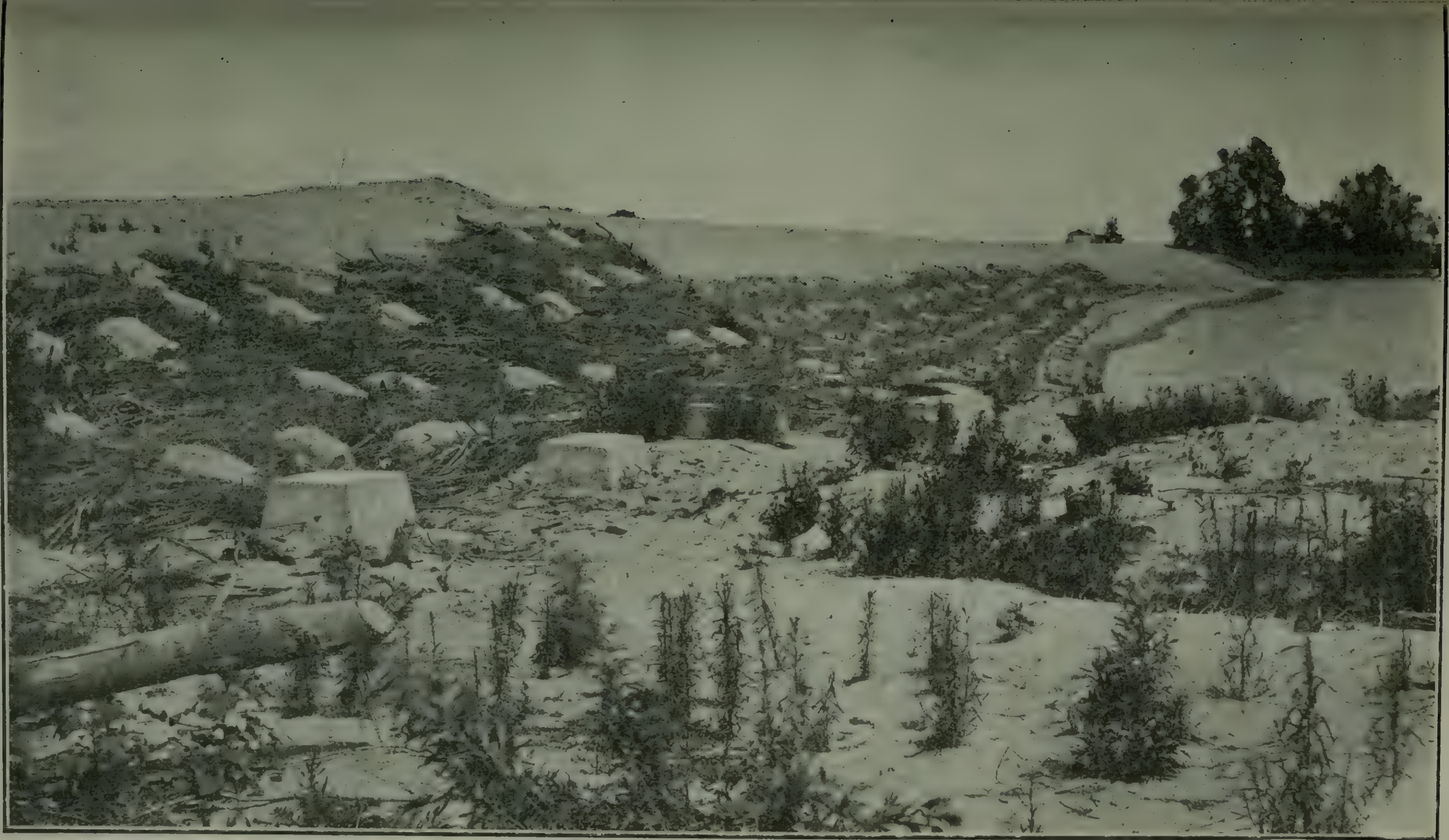
At Rocky Point, on the right bank of the Sacramento River, at the east end of the town of Washington, the flood of 1907 had very nearly overtopped the levee, and had eroded the embankment badly. This is a particularly dangerous point, being so situated as to receive the force of the current from American River, cutting diagonally across the Sacramento. Many times a break has been threatened here, and great quantities of rock have been placed on the slope of the bank on numbers of piles driven to protect the bank from washing. But the whirling current cuts away the bank at the foot of the slope causing the rock to roll into the river, leaving the upper slope exposed. The protection used by the Department in this instance is a flexible brush mattress, which it is believed will be effective in protecting the bank and stopping further erosion. Its character and method of application will be described further on. The estimated cost of this work as designed was $3,502.40, but after construction was commenced it was deemed best to extend the work beyond the limits first intended. The total cost was $4,879.61. The people of Washington and vicinity and the county of Yolo contributed one half of the expense of the work.

KRIPP BREAK.

The high water of March, 1907, caused a break in the levee in the right bank opposite Y street levee in the city of Sacramento, on the Kripp farm. This break occurred about the place of the Payne break of several years ago, and carried away part of the structure used in closing the latter, the expense of which was more than $50,000.

The effect of this break was to cover many acres of land with sand, rendering it valueless for cultivation, and an immense volume of water poured into the Yolo Basin, already well filled from overflows occurring farther up the river. The effect of this vast outflow on the channel of the river along the city water front and for some distance below the break was very marked; increasing the depth above and shoaling below.

Being unable to obtain satisfactory offers from dredge men for closing the break by contract, the Department hired a dredge and crew, paying $160 per day of twenty-two hours. The levee required to close the break was 1,600 feet long, 24 feet maximum height, and 16 feet wide on top, and containing 102,489 cubic yards of earth. The estimate of cost was



FLEXIBLE BRUSH MATTRESS ON SAND FILL, KRIPP BREAK, SACRAMENTO RIVER.

$7,687. The actual cost of building the levee, including superintendence and inspection, was $5,667.64, or 5½ cents per cubic yard.

To protect the embankment from wash the face of it along the lower half of its length was revetted with the standard flexible brush mattress adopted by the Department. The cost of the revetment was $2,773.95, making the total cost of the closure $8,448.25. One half of the expense was paid by private and public interests affected, and the other half by the State.

TISDALE WEIR, TEMPORARY REPAIRS.

The concrete weir at Tisdale ranch, Sutter County, about six miles below Grimes on the Sacramento River, had become undermined by the flood of 1907, and when the high water of 1908 began running over it, a portion of the concrete apron broke off and was carried away. To prevent the destruction of the entire structure, a flexible brush mattress was floated on and suspended like a curtain, over the broken parts which effectually arrested the undercutting and prevented further damage. The method adopted was effective for a temporary repair, but had no real permanent value.

BRANNAN ISLAND.

The west shore of Brannan Island, from the site of the Zeile wharf southward, was attacked by the high water of 1907, the levees washed away and the shore line in places moved inward. The levees were restored by the reclamation district, but the waves and tide driven by continuous northwest winds continually ate into the newly placed embankments. At the request of the district trustees, the Department of Engineering placed nearly three quarters of a mile in length of flexible brush mattress on the face of the embankment, the district paying one-half of the expense. The revetment did not extend as far as it was desired to make it, but it had to be curtailed for lack of funds in the district. There should be several hundred lineal feet added in order to protect the ends of that already placed.

SHERMAN ISLAND.

Two places where the levees on the north shore of this island were being eroded by the waves were revetted with flexible brush mattress. The mattress at Jap Landing was dropped in eighty feet of water, and successfully protected the bank. In this instance, as in the others, the property owners paid half the cost of the work.

The extent and unit cost of both Brannan and Sherman Islands revetment work will be found in the tables given for river work.

MERKELEY LEVEE.

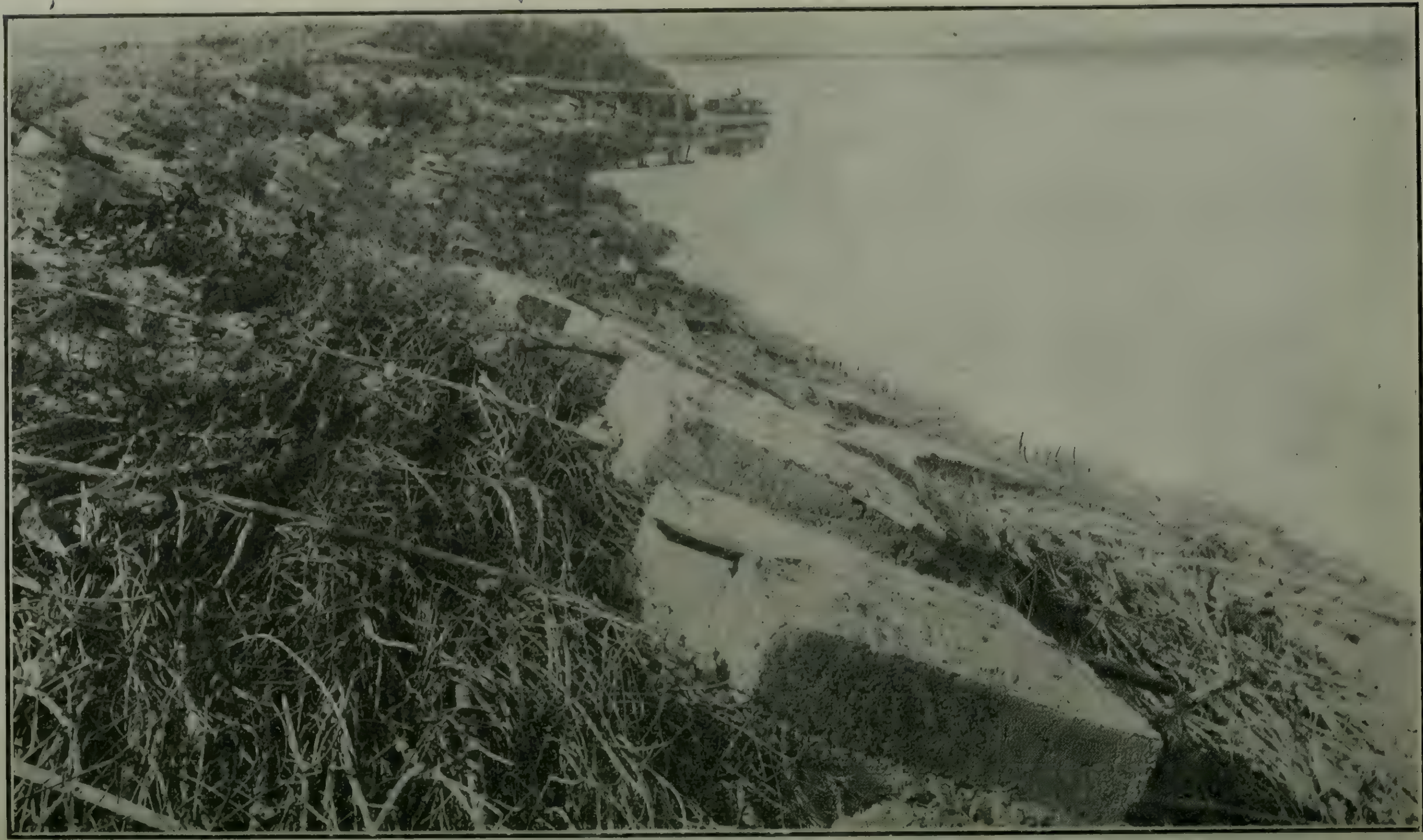
During the spring of 1908, the river bank began caving very badly on the east side of the river, along the rear of the hop-fields a short distance south of Sacramento City.

The Sacramento Southern Railroad occupied the levee, and the caving became so bad as to threaten the track, and seriously alarmed the people in the vicinity. The reclamation district and the railroad, each agreed to pay one third of the expense of revetting the threatened bank, which was done, the State paying one third.

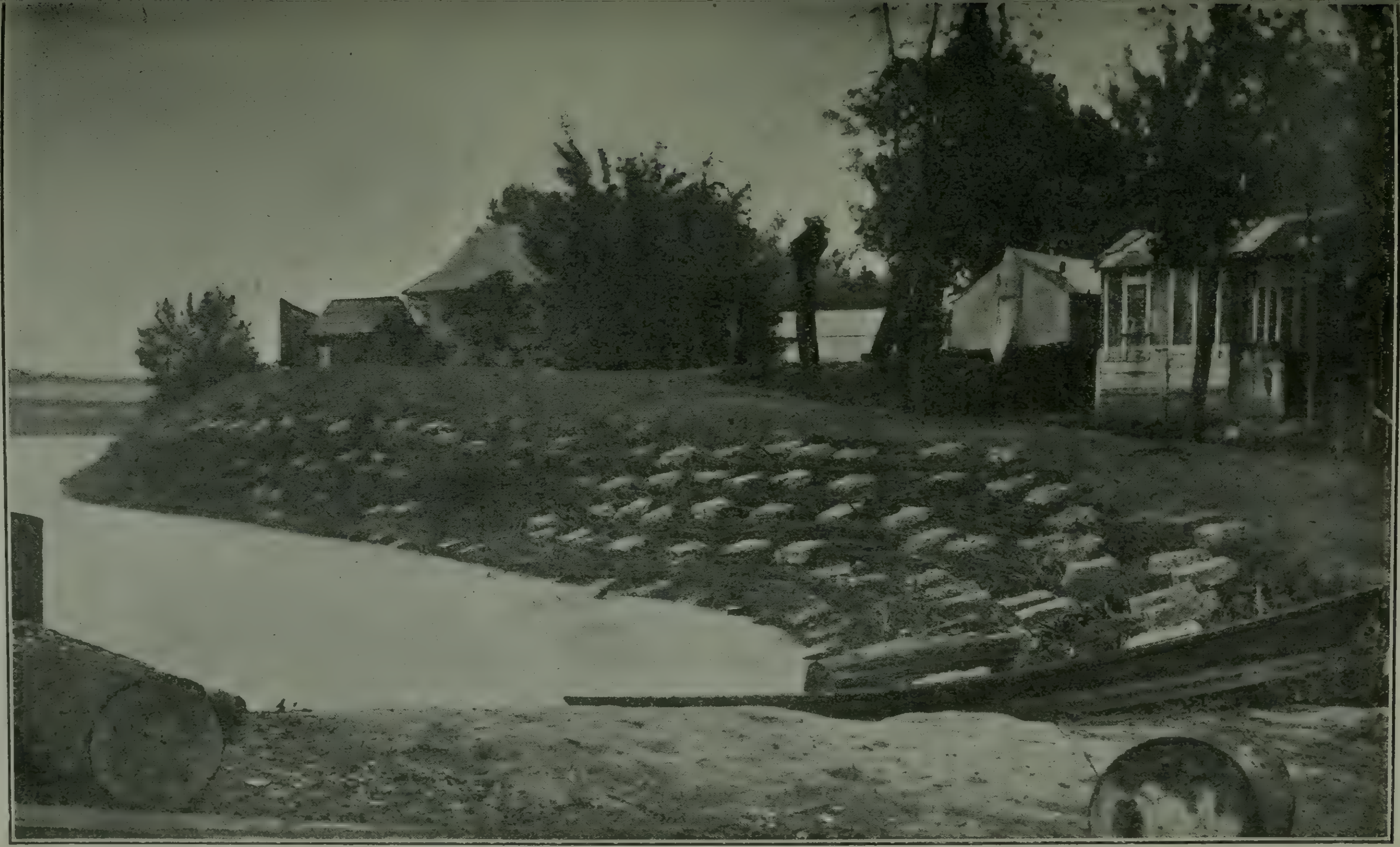
The revetment introduced by the Department of Engineering as a protection to river banks is quite a departure from the kind that had been used before. The method that was formerly used was to make a mattress of brush fascines, usually woven with wire or cable, and weighted down with loose rock laid on top of the mattress. If the slope of the bank below the water line, where it could not be graded, should be steep, no rocks would lie on it. Should erosion take place at the lower edge of the mattress, the latter would drop down, the rocks roll off and then the brush would rise with the water, be torn loose and carried away.

NEW FLEXIBLE REVETMENT.

The type of revetment now constructed by the Department of Engineering has grown out of a plan successfully originated by myself in bank protection work along Eel River, Humboldt County. Five years ago, the plan in crude form, was employed by the State to inaugurate channel rectification and arrest bank erosion for that stream. The developed plan consists of a mattress composed of brush fascines eight to twelve inches in diameter and about twenty feet long, bound with wire. These fascines are laid double, breaking joints, and woven over and under with three galvanized wire "strands" or cables, one-quarter-inch in diameter. Galvanized anchor cables three quarters to one inch in diameter, are laid on the slope extending from the barge floating in the stream to upon or over the levee to a safe point where a line of concrete blocks are sunken in the soil and are connected by a one half to three-quarter-inch diameter galvanized cable. These anchor cables are fastened to the line attaching together the line of "deadmen," or as called by this Department, anchor blocks. The anchor cables are spaced about eight feet centers and are attached on the water end to a line of cable passing through heavy concrete blocks made on the barge. These concrete blocks are called by the Department sinker weights. After this skeleton of cable and concrete work is set and ready, the mattress is woven on top of these cables and the mattress is tied or lashed to the anchor cables beneath the mattress every six feet. After the mattress is woven to its desired width another cable, three-quarter-inch diameter and galvanized, is drawn down over the mattress directly over the anchor cable. It is fastened to the anchor cable at six or eight feet intervals through the brush. The ends of this top cable are fastened



FLEXIBLE MATTRESS FOR REVETMENT, SHERMAN ISLAND. PLACED 1908.



FLEXIBLE MATTRESS REVETMENT, ROCKY POINT, YOLO COUNTY.

to the anchor cable on the land end by a cable clip just above the brush mat and the water end is made long enough to reach the sinker block where it is fastened. Also, just at the water edge of the mat the anchor cable and the top cable are fastened together.

Above the water the mattress is woven in place on the ground which has been prepared by grading to a uniform slope. When the waters edge is reached the weaving takes place on the cables suspended over the water by placing planks on the cables. The barge is held off shore by spars or struts which are held taut by shore lines to the barge. After the mattress is completely woven, blocks of concrete two or three feet square and from six to twelve inches thick are placed on the mattress, the size and distribution of which depends upon the figured buoyancy of the brush and the force of the current to be resisted. These blocks are moulded in place on the mattress and thoroughly fastened to the top cable usually with a turn or knot of the cable firmly embedded in the concrete. When the mat is thus made ready the barge is shoved away, permitting the structure to sink and conform to the bank slope. The mattress so made will, because of its flexibility, conform to the variations in the slope of the bank below the water where it could not be graded. Should the current cut under the edge of the mattress the weights will drop down, carrying the mattress down as the earth is washed away, and all—mattress and weighting—being secured by cables to the anchorage on shore, will continue to hang over the bank like a curtain. No weights can roll off and release the brush.

In the work on Eel River the brush above the water line soon sprouted and grew into a dense live mat that no current could move. It is well known that wood under water and constantly saturated will last indefinitely, so if a mattress will grow into live brush above the water its life should be indefinitely long.

It was found in the Sacramento River that not much brush would grow above the wash of the waves, on account, in a great measure, of the hot sand upon which it was laid. The department had not the facilities for keeping the revetment wet at the several places where it was placed and as the property owners could not be persuaded to do so, it has not been done. To remedy that omission as far as possible and get a live mat to growing an effort will be made this winter to stake all of the mattress laid down with live willow stakes which, when driven well in the ground during the spring of the year, will give a strong healthy growth. The principle involved in this form of mattress is to protect the bank beneath the low-water mark by that portion that is indestructible, and get a growth above ordinary water so that it may eventually form a live mat entangled with concrete and cable which will extend from high to low water. (See photograph of Eel River growth, printed later.) When the willow has reached a sufficient growth, it then should be trimmed back, and allowed to spread out thickly, but not grow too tall. This protection will give a natural living growth all cabled and concreted together in one mass, which will resist a great velocity and consequent erosive influence.

SAN RAFAEL CREEK.

For many years the people of the city of San Rafael had endeavored to have the channel of San Rafael Creek improved. The creek is a narrow, somewhat tortuous tidal stream connecting with San Francisco Bay a few miles north of San Quentin Prison. There is a very large freight traffic conducted on the creek by sailing scows, but as there was no water at low tide, and only about five feet at high tide, it would sometimes take a loaded scow thirty hours, or three tides to work her way from the mouth of the creek to the city wharves.

A petition had been presented to the Commissioner of Public Works for relief, and $5,000 was pledged as a fund to pay part of the expenses of any improvement that might be undertaken. The Commissioner had surveys made, and recommended that the creek be dredged.

Upon the transfer of the duties of the Board of Public Works to the Department of Engineering, negotiations were renewed by the people of San Rafael, surveys were made and plans worked out.

It was desired to make a cut across a long curve near the mouth of the creek, shortening the distance very much, and making a straight channel which would be a great advantage to vessels navigating it. It was found, however, that there were interests opposed to changing the channel from its natural course, and as it would entail long delays to undertake to carry the matter through the courts, the cut-off was abandoned and a contract let to dredge the creek to a depth of four feet from the mouth to the first wharf, just inside of the city limits, and make it sixty feet wide.

The estimated cost was $9,450, and the contract was let for $7,951. After completing the channel as stated, it was decided to continue work to the head of navigation, 2,400 feet farther, which was done, a channel being excavated to a depth of four feet below low tide. This extension brought the expense up to $10,589, one half of which was paid by the citizens.

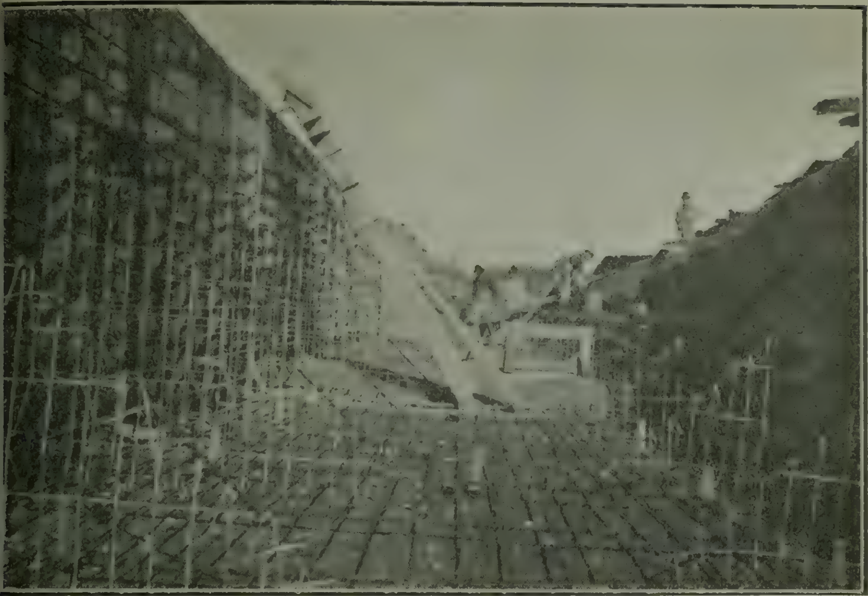
The contract price per cubic yard of material dredged was five and eighty-nine hundredths cents (.05 89-100). Since the completion of this work the matter of the extension of the dredging from the mouth of the creek into the bay across the mud flats for about 3,000 feet was taken up and after applying through Colonel John Biddle, U. S. A., in charge of this work for the Federal Government, for permission to do this work, and receiving the sanction of the War Department, advertised for bids for the dredging and construction of one thousand (1,000) feet of protective timber bulkhead. December 28, 1908, is the date set for receiving bids.

TISDALE WEIR—REPAIRS AND IMPROVEMENTS.

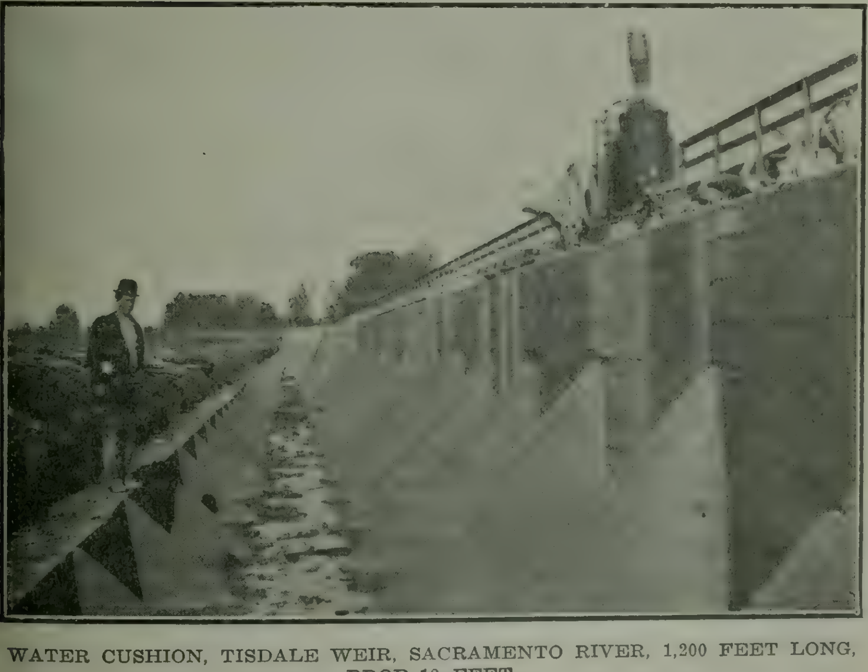
Owing to the fact that Sutter County had constructed a bridge alongside the weir, on the upstream side, which was considered by the Department of Engineering to have contributed some to the partial failure of the weir, and which was considered a menace to its safety; and further, it did not appear from the records that the county had ever obtained formal official permission to place the bridge there, it was thought the county should contribute something toward repairing the broken structure. Negotiations were opened to secure a contribution from the county, which delayed work for some time. Finally, the Sutter County Board of Supervisors appropriated $1,000, to aid in restoring the structure, and assured the Department that the county would use every effort to prevent log jams from lodging against the bridge and endangering the weir. Plans having already been prepared, bids were asked for and a contract was awarded the Western Bridge and Construction Company on their, the lowest, bid of unit prices to repair the weir where damaged, and add a reinforced concrete water cushion to the weir to prevent further cutting on the land side where the water poured over the structure. Formerly the weir had steps to drop the water down easily from the crest of the concrete to the inner ground level. Nearly always water flowing over a structure, and having a flat apron to leave on, gradually erodes the ground and finally destroys such a structure. To prevent this, we designed a water cushion 1,150 feet long, 12 feet deep, with a lip 3 feet high, into which the water can drop and form a cushion exactly upon the principle of a natural stream of water flowing over a fall causing a hole into which the water falls and eddies when it leaves the hole without cutting force. This may be seen on any mountain stream. Views of the construction of this new and important work are herewith presented.

IMPROVEMENTS AT MARYSVILLE.

Ever since the streams began filling with débris the confluence of the Feather and Yuba rivers has given trouble. The Yuba, just before joining the Feather River, originally made a sharp bend, and the current struck that of the latter upstream. The Yuba has quite a steep gradient, and since mining began has brought an enormous quantity of detritus with its rapidly flowing water. The Feather River, with much less velocity, has a far greater volume of water than has the other. Just below the confluence the river, now known as the Feather only, makes two short bends, forming a sharp reversed curve like the letter "S." The effect of these two curves, known as Shanghai and Eliza bends, is to retard the flow and make the current more sluggish. The small, heavily laden Yuba River, striking the large volume of water in the Feather in such a way as to oppose the force of



REINFORCING SCHEME TISDALE WEIR, SACRAMENTO RIVER.



WATER CUSHION, TISDALE WEIR, SACRAMENTO RIVER, 1,200 FEET LONG, DROP 12 FEET.

the currents against one another, suddenly checks the velocity of both, and they drop a large part of their respective loads. In this way the beds of the streams have been raised until that of the Yuba, a short distance from Marysville, is thirteen feet higher than land inside of the levees. The Federal Government several years ago made a short cut changing the mouth of the Yuba so as to enter the Feather River lower down and at an angle pointing down stream. While this was undoubtedly an improvement upon the natural conditions, yet the sharp bends below continued to hold the water back and raise the flood plane against the Marysville levees.

Many times the people of Marysville, Yuba City, and contiguous territory had endeavored to have something done to relieve the situation.

The Board of Public Works in 1906, began clearing the ground preparatory to making a cut across the chord of Eliza Bend, but had not commenced excavation when the Department of Engineering succeeded to the duties of the Board. At the solicitation of the people concerned, the Department made a thorough examination of the situation, with the result that the Eliza Bend cut-off was abandoned and a more comprehensive plan adopted.

The Department plan is to divert the Yuba from a point above Marysville conducting it southerly for about two miles and entering Feather River at the lower end of Eliza Bend and in a direct line with the course of the Feather, below. Then to make a cut from the present junction of the two streams, in a line in prolongation of the course of the Feather from the Marysville-Yuba City bridge, and intercepting the Yuba cut about one third of a mile above the junction of the latter with the Feather River channel. This will cut out both Shanghai and Eliza bends, unite the two streams at an acute angle, so that their currents will each help the other instead of being opposed as at present. A right of way nine hundred (900) feet in width was secured for the Yuba cut-off last winter, and the land for the cut cleared of timber. Later, a contract was let for the dredging of a channel, to begin at Eliza Bend and work upstream as far as the railroad bridges.

Owing to delays in getting a dredge up the river, low water came on and nothing could be done during the summer.

In the mean time the Department proceeded to have a channel excavated from the point of diversion to pass under the railroads and highway bridges to connect into the head of the proposed dredge cut. It should be explained that there has been a small high-water channel existing along the line of the proposed cut for several years and both the Northern Electric and Western Pacific railroads had provided for the possibilities of the enlargement of the channel by constructing bridges with ample waterways where they cross the stream. These bridges, of course, prevent dredges excavating further upstream. Therefore, from the south side of the Northern Electric railroad bridge to the point of diversion the channel had to be excavated by teams and scrapers. This work was completed in September last.

The contractor having the contract for dredging obtained the use of a dredge which has just completed a job of levee building a few miles below Eliza Bend, and now has made about 800 feet of the cut.

Plans have been submitted to the War Department, and as soon as permission has been obtained and the necessary rights of way secured, work will begin on the Feather River cut. All of those who are familiar with the conditions that have existed there for years, are sanguine that the changes being made will materially lower the flood plane, and reduce the danger to the levees and property for the whole section of country around Yuba City and Marysville.

MOKELUMNE RIVER.

In common with all other rivers of California which traverse the mining regions of the mountains, the Mokelumne River has been injured by reason of the accumulation of débris in its channel.

Because of neglect its navigability had become destroyed in that portion above New Hope Landing. Great snags and drifts had lodged in the channel, and these had caused bars to form effectually preventing the passage of boats. In 1905 the property owners along the river united in an effort to have the river improved. They raised over $30,000 for the purpose and the State contributed about $15,000, with which amount the river was snagged and the bars cut out for a length of ten miles from New Hope Landing, and terminating at the Galt-New Hope bridge, crossing the river near the village of New Hope. Thus ten miles of navigable water was added to the highways. Last year the property owners along the river from the present head of navigation to the railroad requested the Department of Engineering for assistance and offered to contribute two thirds of the expense of improving the channel from Galt-New Hope bridge to Woodbridge dam.

A careful survey was made of the river, with frequent cross-sections over the entire length to be worked. It was decided that the improvement should consist of destroying snags and drifts, dredging out bars that form shoals, and the making of some thirteen or fourteen cut-offs across short bends. The petitioners desire that only about five miles of the channel be opened the first year. In addition to contributing two thirds of the expense of the work, they also agree to procure free privileges for all work contemplated. An obstacle to the immediate commencement of the work is the presence of the highway bridge above named, which prevents the passage of a dredge or snag-boat to begin operations. This bridge has been ordered by the War Department to be removed, and the counties of Sacramento and San Joaquin, jointly have prepared plans for a drawbridge to take the place of the fixed bridge, and it is understood that construction will soon begin. The Department is now cutting off the trees for fifty feet on either side of the river for a distance of about five miles above the Galt-New Hope bridge. This cutting away the timber from the banks prevents the chances of trees toppling into the stream where the bank is caving away and becoming a menace to navigation. The work is also preliminary to the use of the dredge, so that snags may be lifted out and placed well back upon the bank.

SAN JOAQUIN RIVER.

Near the confluence of the Tuolumne with the San Joaquin River, in Stanislaus County, a stream called Walden Slough diverts from the former, running westerly. About a mile below the confluence named a large stream named Finnegan Slough leaves the San Joaquin River, and running northwesterly, is joined by the Walden Slough, coming from the east. Some two miles farther down, another stream known as Amphlett Cut, runs north from the main river and joins Finnegan Slough. The combined waters of these three streams continue in a northwesterly direction approximately parallel with the parent stream and enter the Stanislaus River some two miles above its junction with the San Joaquin. In their course these three sloughs, individually and combined, flood large tracts of land. The Commissioner of Public Works closed all three of the sloughs with dams at or near their respective diversions from the river, but the first high water occurring after their completion washed them away.

Walden and Amphlett sloughs are not of sufficient size to do much injury to navigation on the San Joaquin, although they carry enough water to flood many acres of land.

Finnegan Slough, however, is very large, having about one third as much cross-sectional area as the river has at that point. It has materially enlarged in the last few years, and having a steeper gradient than the river, it draws a large part of the water away from the latter. The effect of the division of the water is surely to cause the river to shoal below that point. The conditions are being aggravated each year, and in the interests of navigation on the river should be remedied.

Some of the property-owners whose land is injured by the flooding petitioned the Department to restore the dams that had been washed out. Examinations and surveys were made, and it was found that to close the streams with dams and to construct the additional works necessary to protect them from again being washed out would cost about $17,000. In effecting the closure as planned all of the overflow land along the sloughs would be reclaimed. Only one group of landowners were willing to contribute toward the enterprise, and they were only able to pledge about fifteen per cent of the estimated cost.

The surveys made by the Department show that between Finnegan Slough and Amphlett Cut there are three very sharp curves in the San Joaquin River, and that cuts aggregating less than three fourths of a mile in length would shorten the river to one and a half miles between these points, whereas it is three and a half miles by the present channel. The making of these cut-offs would be strictly in the line of navigation improvement, and at least a portion of the expense might properly be borne by the Federal Government, but there are no funds available for it. Even if the cuts were made, the dam in Finnegan Slough, if not the others, should also be made. The cost of making the cuts, dams, and protection levees required would be a total of $26,000. These cuts, when made, would divide the lands, and set off small tracts from the main holdings, and it was found that the property owners would not grant rights of way without compensation for the lands cut off.

Under the circumstances it was not deemed expedient to do any work on the project at this time.

MOONS BEND.

At this place, situated on the Sacramento River at the head of Butte Slough, about four miles below the town of Colusa, during March, 1907, the river was running bank-full, when it was suddenly augmented by a large quantity of water from the Feather River overflowing and crossing the plains north of Marysville Buttes. It overtopped the Sacramento River levees, virtually crossed that stream, and broke the levees on the west side. Flowing thence into the Yolo Basin, along the arc of Moons Bend (sometimes called Butte Slough Bend), three bad breaks were made in the west levee. This levee is controlled by the owners of the adjacent land on the west, not organized into a district or association.

These property owners concluded to construct a new levee across the chord of the bend, and applied to the Department of Engineering for assistance in doing so, urging that along the line of their proposed levee would be the location of a cut-off whenever the scheme of rectification and reclamation proposed by the so-called Dabney Commission should be completed, and that they (the landowners), were ready to convey to the State the right of way that eventually would be required in consideration of the assistance to be given them by the State at this time. The proposition was considered by the Department, but in the mean time the property owners proceeded to construct the levee upon the line selected by themselves. The cost of the levee was stated to be $15,750, and the property owners requested that the State should pay one half of it. Afterward, they modified their claim and offered to grant the State one third interest in the right of way for a cut there for one third of the cost to them of building the levee.

Finally, it was proposed to grant the right of way, provided the State pay one third of the cost of the construction of the levee. The matter was taken before the Advisory Board, but as yet nothing has been done.

OAK HALL BEND.

During the spring of 1908, complaint was made to the Department that the river bank near Oak Hall, four miles below Sacramento, was caving badly and endangering the levee. A survey was made, but the conditions not appearing to be dangerous, and the property owners not evincing sufficient interest to provide money for a portion of the cost, no construction was done.

LAKE EARL.

For many years the owners of land annually submerged by the waters of this lake have sought to obtain assistance from the State for relief. The legislature, by act approved March 17, 1907, appropriated $15,000 for "Permanently draining Lake Earl in Del Norte County," contingent upon a like sum being deposited in the treasury of Del Norte County for the same purpose, by the persons interested, thus making a fund of $30,000 for constructing a drainage canal.

Surveys had previously been made for such a project under the direction of the Commissioner of Public Works.

In June, 1908, Mr. P. M. Norboe, Assistant State Engineer, made an examination of the lake, and his report thereon follows:

July 10, 1908.

MR. N. ELLERY,
State Engineer, Sacramento, Cal.

DEAR SIR: In regard to the proposition to drain Lake Earl, Del Norte County, I have to report:

The lake is a body of fresh water lying along the coast and separated from the ocean by a narrow range of sand dunes. It is fed by a number of short creeks rising in the hills toward the east and by the run-off of the rainfall from the slopes of the hills and valley land adjoining the lake.

The lake is subject to a fluctuation in depth from extreme high water in the spring to extreme low water in the late summer of about eight feet. The difference between average high water and average low water being about six feet. The extreme low water plane is about two feet below mean low tide. The range of the summer tide being about five feet, would place extreme high water in the lake one foot above high tide and six feet above low tide. It would seem then that the water might be drawn down about six feet by a gravity drain, and any reduction of the water plane below that must result from evaporation.

No contour surveys of the lake have been made, but it is believed that ordinary high water covers about 5,500 acres, which is reduced to about 3,500 acres at ordinary low water, making 2,000 acres uncovered, and the maximum reduction in depth between these stages is six feet. This assumption would give a volume of 6,000-acre feet of water to be drawn off.

About 5,600 acres of "lake land" has been segregated to the State as swamp and overflowed land, not quite all of which becomes submerged; but there are some lands not classed as swamp and overflowed land which does become covered with the high water. Most of the swamp and overflow land has been purchased from the State, excepting in the deeper portions, where it seldom becomes exposed.

The lake is in two parts connected by a narrow strait. The western arm at one point approaches within a few hundred feet of the ocean shore, and the sand ridge between is so low that often during storms the ocean waves dash over into the lake. The owners of the submerged lands frequently cut a channel from the lake to the ocean, holding back the tide with temporary bulkheads until the right time. Upon a receding tide, the bulkheads are suddenly removed, when the head of water in the lake is sufficient to scour out a large channel which continues to discharge until a returning tide chokes it up with sand, when the work must all be done over again.

The high water surface of the lake is sometimes lowered in this manner several feet, and large areas of submerged land uncovered.

By the timely drawing off of the water in the manner stated the farmers are enabled to obtain fair crops of hay, but the method is very expensive and not always successful.

After the water has been drawn off as much as can be, as just described, evaporation will lower the surface of the lake to a point even below the level of mean low tide in the ocean, but the process is so slow that the land is uncovered so late in the season that it does not produce herbage of much value, and unless the season happens to be rather drier than normal, the recession on account of evaporation may be nil.

Should some means be found to keep the level of the lake surface low during the rainy season, then evaporation would materially lower the low water plane, enabling profitable crops of forage to be grown on the land that is already owned, and would farther extend the area of uncovered lands, which would immediately be purchased from the State, and thus add quite an amount of property to the tax roll.

It would not be a difficult matter to construct a conduit from the lake to the ocean, through the narrow ridge separating the two bodies, and to provide the conduit with automatic gates to prevent the sea water entering when the tide should be higher than the lake.

The distance from permanent deep water in the lake to low water in the ocean is about 3,000 feet, which would be the length of conduit required. The outfall and tide gate chambers would have to be built particularly strong to resist the pounding of waves and of huge drift logs that continually drift ashore.

The beach along here is shifting sand, and this presents a problem that would be extremely difficult of solution. Should expensive outfall works be constructed no one can predict how long they would remain operative, nor how soon the sand would choke them up, even completely covering them. It is well known that sand beaches exposed to the free flow of tide and storm waves are always shifting; that a storm one day will build up immense sandbars, and in a few days remove them, building somewhere else.

The writer feels quite sure that efficient drainage works can be installed for the amount of the appropriation therefor, to wit, $30,000, but would hesitate to recommend their location at the place mentioned for the reason that they might be wholly useless within a week after completion.

There is a place farther south where the shore and the bed of the ocean for a long way out is rock, free from shifting sand, where outfall works would never be troubled with sand. But to reach this point, a conduit would have to be about two and one half miles long, with excavation nearly forty feet deep for a mile or more, and the whole line through dense timber.

A drain on this line would probably cost more than twice the amount of money available.

A drain depending upon gravity flow can not lower the water in the lake below the elevation of low tide in the ocean, or even quite to that stage, and any lowering of the lake surface below that point will depend solely upon evaporation.

Owing to the benefits that could accrue, in a public sense, to the addition of so large a tract of land to permanent productiveness, and the uncertainty of being able to maintain effectively a gravity drain that can be installed for the amount of funds available, it is suggested that the same or better service can be had by means of a pumping plant.

Such plant, having the requisite capacity, should not cost to install more than $10,000, and the extent of the drainage accomplished would be under complete control.

The cost of operating a pump to maintain the lake at its present low water stage would be probably between 50 cents and $1.00 per acre per year. If a larger area shall be uncovered, the cost per unit would be reduced.

I recommend that no plan be adopted without further investigation, including field surveys, to determine the area and volume of water to be disposed of.

Respectfully,

P. M. NORBOE,
Assistant State Engineer.

I have closely observed and am familiar with the conditions of wind and tide which prevail along the northwest coast, and therefore agree with and approve Mr. Norboe's conclusions that the successful operation of a gravity flow outfall for Lake Earl, discharging into the ocean in an open roadstead with sand bottom, and practically without hydraulic head, would be very doubtful. The risk of failure is so great that the expenditure of a large sum in experimentation is not warranted by the apparent chances of success.

FLOOD PROTECTION FOR STOCKTON.

While the Department of Engineering is not directly connected with the project now being executed to prevent the city of Stockton from being flooded, yet the work being in line with river correction, the Department may properly take cognizance of it.

Mormon Slough is a channel having its source in the foothills east of Stockton. Its course through the plains traverses a low and flat country, subject to inundation from the San Joaquin River on the south, and also from the Calaveras River on the north. A branch of the latter, leaving the main river near Bellota, runs southward spreading over the country and flowing into Mormon Slough. The latter named stream passes through the city of Stockton, and is the channel used for navigation from Stockton to the San Joaquin. Being a sluggish tidal stream, when the San Joaquin is in flood and overflowing streams above are gorging it, disastrous consequences ensue to the city.

Some years ago Congress made appropriation for the purpose of making a "diverting canal" to take the water of Mormon Slough from above the city of Stockton, convey it across the country north of the city, and discharge into the main channel of Calaveras River west of Stockton, from whence it reaches the San Joaquin below.

This appropriation was made with the provision that the State of California, or the property holders, should furnish a free right of way.

March 25, 1903, the legislature appropriated $60,000 to be expended in payment for rights of way for the diverting canal. Some lands were purchased and others obtained by suits in condemnation instituted by the Commissioner of Public Works. The total cost of the right of way was more than $86,000, the city of Stockton paying all above the $60,000 appropriated by the State. During the summer just passed work was commenced under the direction of the War Department, and is steadily progressing at the date of this writing.

THE SAN JOAQUIN RIVER.

The San Joaquin differs largely from the Sacramento River, inasmuch as its mouth is about three times the width of the mouth of the Sacramento. This gives an easy flow off for the flood waters, but in places may make shoals, which for navigation purposes can be remedied by jetties permitting the high waters to overflow them. Farther up the San Joaquin is found numerous sharp bends, making the river difficult of navigation, and also greatly retarding the passage of flood waters. These conditions should be taken in hand and receive some attention. The navigability of this stream is of vital importance to the people of the San Joaquin Valley and should be jealously guarded by them. At Firebaugh, the official head of navigation, it is understood that during the dry season flow scarcely any water is permitted to remain in the stream on account of a private diverting dam for irrigating purposes. This is a direct hindrance to navigation, and its maintenance there should be investigated by the Federal Government—the guardian of the navigable waters of the State.

EEL RIVER WORK.

During the year 1905, the State began the jetty and revetment work for the rectification of the channel of Eel River, and the protection of the banks from erosion. Before this time attempts had been made in a small way to prevent the inroads of the flood waters of this stream, but all proved futile. It was, therefore, with skepticism that the people of that vicinity viewed the work of the State. However, there has now elapsed three years since the inauguration of the work, and during this time two severe floods have been resisted effectively by both revetment and jetties. It is now concluded that the Eel River can be successfully treated by the method employed by the State and compel the waters of the river to maintain their channel without cutting the whole Eel River Valley and leaving a slightly covered gravel bar in the place of highly cultivable soil.

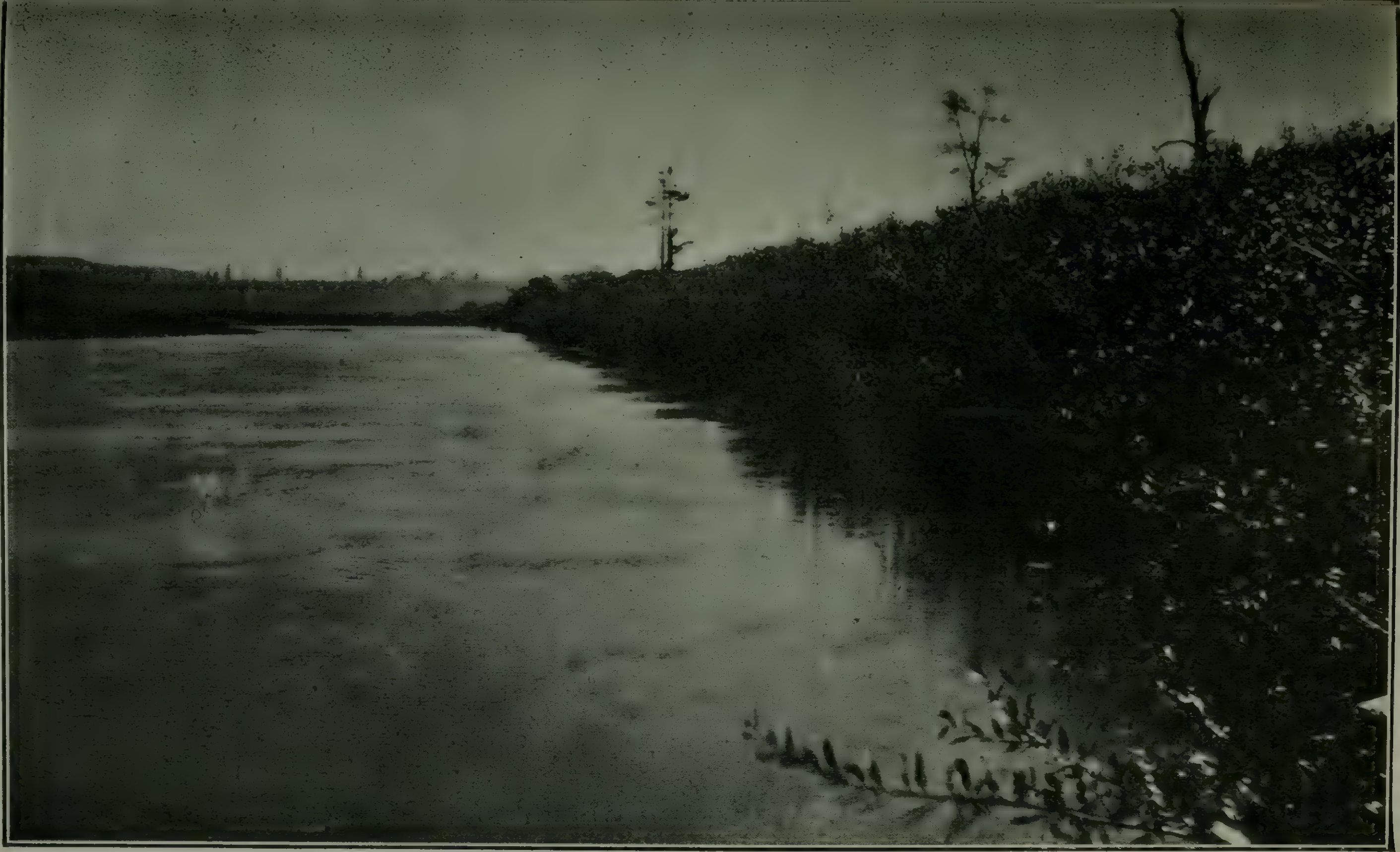
It is estimated that to revet and properly handle Eel River from the the mouth of the Van Duzen to the mouth of the Eel it would require an expenditure of approximately a million dollars. A great amount of good efficient work could be done by the property owners if they would look closely to the State's work and copy after it. Do not try and reduce the cost materially, or else you are doomed to failure. The strong current, and the trees and débris it carries in flood time, makes the task of handling its waters one of the most difficult on the Pacific coast. I will herewith present a description of this work and what it has accomplished.

Two jetties were constructed, one on the west bank of the river above Pleasant Point, and the other on the east bank of the river near Bryant's ranch. The west side jetty is about 800 feet in length, and was constructed by driving piles about twelve feet centers each way, then brush was woven in between these piles and wired tightly down on the gravel bed. A layer of brush about five feet thick was placed, then about two feet of river gravel poured on top of it. Again brush, then gravel, until the required height was reached, then the piles were sawed off and large concrete blocks were placed on the structure completely covering it. These blocks were wired or cabled to the pile heads, the wire having been embedded in them. On the upstream side huge blocks weighing ten tons were placed, dipping about forty-five degrees upstream. The east jetty was of the same construction as the west one, but only 450 feet in length. Both structures were placed in the stream at an angle of about forty-five degrees to the bank, *i. e.*, pointing downstream, so that huge redwood trees weighing about two hundred tons would not strike the jetty squarely but obliquely in order that the full impact may be partially dissipated along the line of jetty.

The revetment began on either side of the river at a gravel bar growth near the old bank line for complete protection of the beginning, in order that the river could not get behind the work. It continued downstream to the shore end of the jetty, then temporarily stopped. Here I might state that all jetties not above the water plane always cause an eddy or swirl that cuts the bank just below them. This is what happened to the Eel River jetties, but when a crescent-shaped cut occurred it was revetted and then at the downstream end of such cut the velocity neither ran up or downstream, making a nil point where bank cutting was practically prevented. This made an excellent stopping point for the revetment, for it has been found that if the revetment did not extend to a point of protection it would gradually be eaten away at its downstream end.

The manner of constructing the revetment for this stream was new but having faith in the natural protection furnished stream banks by willow growth, I proceeded upon the theory that such growth, induced by revetment, would have the same effect.

The banks were sloped back to about forty-five degrees, then along the crest were sunk the anchor blocks with a line of cable or wires running through and attaching them together. At the lower edge of the bank the same was done with sinker blocks. Then wires were run up and down the bank from the anchor block line to the sinker block line. Upon this skeleton brush, not in fascines, because the work was during the dry season and above water, was woven about thirty inches thick with the body of the brush lying pointed about forty-five degrees upstream to permit of an easy diversion of the flowing water. On this brush were drawn wires directly over the lower wires from the line on the crest of the bank. This top line of wire was fastened through the



GROWTH OF WILLOW BRUSH, EEL RIVER REVETMENT WORK, SHOWING LIVING BANK PROTECTION.

brush to the bottom wires the same as a mattress is fastened. Upon this flexible brush mat was set, in places, flat concrete blocks attached to the wire, and again long stretches were overlaid with river gravel, serving the same purpose as concrete but considerably cheaper. This work has proven very effective, and it is recommended that more of it be done so that no chance may be taken with the waters from above eating away the land and eventually destroying the work. The natural beginning point for this work is the mouth of the Van Duzen River, where no damage can accrue to its upper end.

During 1907 there was considerable additional concrete placed on the west jetty and 850 feet of revetment as described above done on the west bank below the jetty, and 2,500 feet of revetment done on the east bank below the jetty.

In the late fall of 1906 the county undertook to revet the bank beyond our work on the east bank, but the high waters of that winter practically destroyed the whole of it.

Again in 1908, this Department revetted 765 feet of the west bank and 2,160 feet of the east bank. All the work done during the years 1907 and 1908 was accomplished in an excellent manner, and will be an effective part of the scheme. The east bank is now revetted between two gravel bars of the river and crosses one bad sag, which has been specially treated with a large anchor block in the stream to hold the revetment against large trees that may partially float and partially drag through the sag.

It is recommended that an appropriation of $15,000 be made to continue the west bank work below the mouth of Van Duzen River, and to maintain the present work.

MAINTENANCE AND GENERAL RECOMMENDATION ON RIVER WORK.

To keep the construction of the river work up to its proper condition, and to promote and continue the work begun entirely under the State's superintendence, it is recommended that $250,000 be appropriated and placed under the control of the State Department of Engineering.

PEAT LEVEES.

The rich and valuable islands of delta sections of the San Joaquin and Sacramento rivers are enclosed by levees constructed largely of peat soil, and during flood flows are severely damaged, some almost beyond repair.

At the solicitation of the owners of Jersey Island in the spring of 1908, in my official capacity, I visited and examined, without charge, the levees of the property in an endeavor to outline a plan to successfully meet the needs of all the peat districts. I therefore present my report thereon, with the belief that it may assist in bringing this vast territory to its proper development.

REPORT ON PEAT LEVEES, JERSEY ISLAND.

At your request, and after a personal examination of the levees of Jersey Island March 7, 1908, I beg to report my conclusions and recommendations for the building up, safeguarding, and maintaining the levee system of the island.

There appears to me a general lack of system in your levee work, with a consequent lack of strength to withstand the floods and the necessary resistance to the water damage. The primary consideration of Jersey Island, as of the other islands in the neighborhood, is a good system of levee building and maintenance. For neglect along this line may bring disastrous and irreparable damage to the land, and surely a financial loss, which might have been warded off by proper management of your levees.

Without good effective work along the line indicated your land has no secure valuation. It is, therefore, sound engineering and business to place your embankments against floods in the best condition.

Jersey Island, like the islands in the delta section of the San Joaquin and Sacramento rivers, is almost wholly composed of a peat soil, an accumulation of vegetable growth and alluvium deposits. This material, when used for levee work as has ordinarily been the practice, is not of much value, for during the dry season of the year it becomes exceedingly light in weight and cracks excessively, making a very dangerous barrier for high or threatening waters. When this material is first thrown up from the river or slough bed or sides, it has sufficient weight to make a fairly good levee, but on account of the porosity of the peat lands there is great liability of a subsidence or settling of the soil, permitting the levee to sink below the level attained when the dredgings were first placed in the embankment. This is augmented whenever the roots of the tule begin to decay beneath the new material of a new levee, thus allowing the soil to compress and greatly lessen its coherent strength. What is needed is a mass of roots that will take the place of the tule roots making a sort of grill foundation for the levee, and giving it, by this mass of roots, great coherent strength and resisting power. This idea can not be overestimated, since several practical examples have come before my observation in a professional way in such a marked degree as to leave no doubt of the efficacy of roots as a binding and sustaining power to weak or porous soils. For example, upon the reclamation of salt marsh land, I have observed a settlement or subsidence of the soil between sixteen and eighteen inches. This was due to the decaying of the marsh grass roots and the natural compression of the earth to occupy the voids thus created. Note the similarity of the tule roots in the peat lands. Again, my experience with river work has positively demonstrated the fact that roots from a good thick growth of brush give a supporting strength to the earth and make it almost impregnable to the erosive action of water. On Jersey and surrounding islands it will give absolute security. With the tule lands of the lower river sections there is still another levee weakness that must be met. The dry hot summers crack and dry out the levees until if they be subjected to horizontal water pressure from the outside they are liable to break and float away. Here again, a brush growth will bind together the dry levees, and, if properly cared for, prevent failure of this nature and as a supplementary help will prevent the large cracks of the levee. Let me here recite some facts in relation to this work that the advanced plan may be somewhat clarified.

The inherent principle of forestry and the conservation of river water is to obtain a growth over the drainage basins of the headwaters of the streams. This growth retains the moisture in the soil, thus preventing a too rapid run off. Apply this principle to your levees for the retention of the moisture, thus preventing cracks and giving more weight to resist flotation of the peat material.

From tests made of the peat soil of Jersey Island by my assistant, the following facts were deduced:

The specific gravity of this soil is .25, or, in other words, it weighs one quarter as much as the water. When saturated with water the peat developed a specific gravity of .8, or eight tenths of the weight of water, and that upon such saturation the volume increased to double its original size in the dry state. One cubic yard of dry peat weighs 405 pounds and has a flotation power of 1,270 pounds. One cubic yard of wet peat weighs 1,470 and has a flotation power of 190 pounds.

Certain conclusions must therefore be drawn as follows: Peat material built in a wet state into a levee will shrink about 50 per cent under the heat of summer, and with such shrinkage must come considerable cracking. It is too light a material when dried to make levees, unless it received some process to hold it against floating away, and that a well cultivated levee of this material cleared of brush is a positive absurdity. These facts have all been proven by actual observation.

Undoubtedly, you have observed how much more difficult it is to remove earth when interlaced with brush roots than to remove earth devoid of such roots. In handling earth materials in engineering practice for the past twelve years, I can safely state that in numerous instances the difficulty from such roots has doubled the price of the work.

Of the various kinds of brush I have tested on river work, the common willow variety seems the best suited to the purpose of holding in check the erosive power of the water and binding the earth material together. It is the natural barrier provided and is indigenous to all our streams. In the applications of this willow growth, the whole future security of the levee systems of the peat districts lies. The work done on Eel River by the State under my direction, and which has stood the severest of tests, has amply proven the efficient use of willow growth for protection purposes, and after what has been accomplished there with a friable soil, subjected to a torrential stream, I positively can not see how properly handled willow growth can do anything but provide the most secure levee capable of being constructed, and one that will resist any action to which your levees are subjected.

By planting the willows on the berm of the levee (space between the outside edge of the levee and the ordinary bank line) and up the outside slope, the roots will so interlace the soil as to give it vastly increased power against the water pressure of the waterways.

For the purpose of handling the levees enclosing Jersey Island the treatment is somewhat varied from new levee construction on peat lands. A sufficient levee height should be attained to prevent flood or tidal overflow, and good slopes should be given to the embankment, that the pressure of earth weight may be distributed and a more rooted mass may resist the water pressure.

A levee of 72 feet base, 12 feet on top and 8 feet high, of wet peat would have a good bearing area with an average pressure downward of one eighth of a ton per square foot. If you were to construct new levees of the aforementioned dimensions completely willowed, the cost should not exceed 90 cents per running foot. Drainage or seepage ditches should be approximately 100 feet inside of the central line of levee.

At the time of my examination I positively think the greater part of your levees is of sufficient height to resist high waters, and all they now need is the careful brushing completely over to give absolute security.

The Jersey Island property is subjected to the pressure of high water and the wave action caused by winds. Along Taylor Slough the principal danger lies in the high water and tide waters, while the San Joaquin River frontage is subjected to wave action. On Dutch Slough, except for about one half mile on the lower end where wave action is encountered, there appears no great danger from either flood, tidal, or wind action.

The matter of dredging material for levee building is very vital to any change or new method of levee treatment. Especially is this so where inconstant conditions might arise, such as subsidence of material, shrinkage, cracking of material, friability of soil, and lack of cohesion. To illustrate the points directly involved in the Jersey Island work, there is subsidence of material through roots decaying and compression of the large cracks in the peat, and there is lack of cohesion of binding together in one mass by noting the voids in the levee built of peat by the clam shell dredge.

Should there be employed a complete willow growth to bind the soil of the levee into one mass, and thereby prevent cracks, we would still be confronted with the possibility of some subsidence. To meet this condition, I recommend covering the whole levee, from about two feet of the seepage ditch to the very water edge at low tide, with a mass of willows planted on two feet centers. With this manner of growth an impregnable barrier will be created capable of withstanding all the water action met in the Jersey Island section, and so thoroughly binding together the levee as to make it a mass of einforced earth, capable of sustaining its own and extra earth weight. After this has een done, we can add to the elevation of the levee very readily and easily.

Some form of suction dredge can be employed with certain efficiency. For example, here is a suction dredge now in operation in Germany, the Fruhling by name, that an pump about any consistency of material up to 90 per cent solids with only 10 per ent water. This dredge has a marvelous capacity by actual test. It pumps 6,500 cubic ards of mud material per hour against 900 cubic yards per hour for 5 to 4½ cubic yards ucket clam-shell dredge, costing the equivalent of the Fruhling dredge mentioned. ur ordinary 4½ cubic yard bucket clam-shell dredge deposits 180 cubic yards per hour t its best. This difference in efficiency and capacity seems almost incredulous, but is rom actual working tests, thus giving a good and fair comparison. Such a dredge, with Mr. F. V. Wright's scattering device, would be ideal for filling between a heavy willow rowth. A levee of even density without voids would be obtained very cheaply by this uction method.

FLOOD GATES AND SIPHONS.

My examination of the island revealed a serious defect in the employment of flood ates where siphons, extending up over the levees without damage in the least to the mbankments, should have been used. I strongly recommend the disuse of flood gates nd penetrated levees on account of great liability to receive improper maintenance and ttention, thus subjecting the whole district so leveed to a dangerous plan. Water may e eating away the levee in or about the opening and suddenly burst forth without varning, carrying away a section of embankment and then possibly bring ruin to a vast ract, such as Jersey Island. I, therefore, recommend against flood gates and for iphon, that one dangerous point may be averted.

CROSS-LEVEES.

On the rear of your land at Jersey Island there has been constructed an independent ross-levee. This has been thrown up by a Marion shovel dredge, and assumes the form n section of a triangle with its apex uppermost. Later, this work must receive additional material in order to give it more body and more bearing area. An exception to his, however, is where the present levee rests on a hard pan and is thrown up to an xcessive height. Here the earth may be leveled off, shoving the top part in toward our land, thereby giving sufficient body to make a good embankment. The planting f willows from its outside edge to its crest is an extremely good piece of work. I, however, recommend that on the inner side at least eight rows of willows be planted, extending from two feet of the seepage ditch, about two feet between rows in the direction of he levee crest. At the higher parts of this levee there should be planted willows, completely covering it. This to be done, however, only after the surplus material has been vorked back as previously suggested. It is my opinion that this work be properly lone, there is but small necessity for a dredge at the present time. The real salvation of he levees is not in expending money on machines to continuously pile the material igher, but to protect the material which is already placed at a reasonably safe height.

SEEPAGE DITCHES.

The seepage ditches of Jersey Island are in numerous places too close to the levee et me call your attention to some serious results of this defect. The pressure of the atural earth level augmented by the levee material pressure, squeezes the side of the litch out and thereby cause cracks that could be averted by placing the ditches a farther listance from the levee crest, say 100 feet. This is an important fact in peat land, and hould receive proper recognition. I, therefore, recommend that any new ditches be nade at the above written distance, and in some places where the levees show signs of veakness, the present ditches be abandoned and new ones dug at a greater distance rom the levee.

The canal system was but casually studied, as this has only an indirect bearing on he levee arrangement and construction, and therefore I shall pass it, except to state hat with a completely brush covered embankment, the control of the seepage water vith pumps of ample power will be positive.

WAVES AND THEIR ATTENDANT WASH.

The whole line of frontage from Jersey Point up the San Joaquin River, with about the first one half mile up Dutch Slough, is subjected to an intense wave wash created by winds sweeping up from the bay. Efforts have been put forth to stop this damage, but nothing permanent has been accomplished. Stakes driven at intervals in two lines about eighteen inches apart, then filled with brush and wired down to the stakes, is the merest temporary makeshift, and should be replaced with a massive willow growth capable of coping with this destructive wash. From my experience with willow growth I have conclusively proven the efficiency of such growth for the purposes mentioned. Again, walls of rock in some places have been constructed. These are insecure, but may be made secure by a willow growth bracing against such walls and making them permanent. By this brush growth, a barrier may be created that will astonish the most sanguine advocate of its use. If properly maintained and trimmed, there need be no apprehension of failure or wash where the levee is protected by this living natural barrier.

WETTING LEVEES.

The extensive cracking of your levees, consequent on a long dry season, should, I think, receive some remedial measures. In resorting to the willow protected levee, I would recommend that the levees be well watered during the summer, thus giving a twofold result; prevention of cracks, and greatly increased growth of brush. After the willow has attained a height of five feet the necessity of watering will be obviated. An ordinary pump, either operated by hand or by a gasoline engine, should be employed for this purpose, allowing the water to be sprayed on the soil.

MAINTENANCE OF WILLOW GROWTH.

After the willow has gotten a good start and sufficiently rooted, it should be trimmed and cared for the same as a well kept orchard. Five feet in height above the crest of the levee is ample. No single bush should be allowed to grow its main stem more than two and one half inches in diameter, but should be kept cut back. All such large branches on the water side or slope of your levee should be half cut off, then bent over toward the water. Such half cuts will conform to this position and give added growth and entanglement, greatly enhancing the protection. Allow the willows to grow as thickly as possible, always giving them advantage of fair treatment, and the rapidity with which it attains sufficient growth to be of practical benefit will not exceed two years in time. It should not, however, be supposed this method of levee treatment will give unreasonable results, for we must give it ample time to grow and root to prove its efficiency on peat soil.

TULES.

Do not destroy the tules which grow between the waterway and the levee. They add strength to the levee where needed. Their roots entangle the mass of mud or peat that may without their binding quality give way.

In conclusion, it is my earnest opinion that through the proper application and maintenance of a levee system, constructed to meet the requirements given in this report, security will be attained, so there need be no fear of breaks, and the property they protect must therefore necessarily be so enhanced in value as to prove the greatest economy in the use of a simple natural remedy, the willow growth. The present great cost of dredging, as practiced, will be almost wholly obviated in two years, and at the end of five years, the application of the foregoing scheme will practically eliminate dredging for maintenance purposes.

Respectfully submitted.

N. ELLERY,
State Engineer.

DAILY REPORTS.

A facsimile copy of a segregation sheet of our daily reports on river ork is given in this report, so that the reader may see the manner f conducting the Department. This also pertains to all other classes f work.

A daily report is received from every job, although in somewhat ifferent forms, but are finally worked down to segregation sheets for nmediate presentation of the facts concerning the work.

COST OF DREDGING BY THE DEPARTMENT.

The river work of the Department has largely differentiated from ormer work of this class, but in comparison there is one item presentng figures the value and economy of which may be seen at a glance:

redging:

San Joaquin River cut-offs Nos. 3 and 4, 1898, cost per cubic yard, $0.12½.
Sacramento Snaggy Bend cut-off, 1900, cost per cubic yard, $0.15.
Cache Slough cut-off, 1901, cost per cubic yard, $0.94.
Diverting canal, Stockton (Government), 1908, cost per cubic yard, $0.14, about.

redging by Department of Engineering:

Kripp break fill, 1907, cost per cubic yard, $0.05½.
San Rafael Creek, 1908, cost per cubic yard, $0.0589.
Yuba River cut-off, 1908, cost per cubic yard, $0.0785.

Some instances exist where certain materials are more difficult of andling and therefore more expensive, or again, materials may through ecessity, by clam-shell dredge, be handled twice. However, the suction redge can in many instances obviate two handlings.

SUMMARY OF RIVER WORK.

Levee and Bank Protection.

Locality and Nature of Work	Square Yards Mattress.	Estimated Cost.	Contract Price.	Actual Cost.
Rocky point, Revetment	1,840	$3,502 00	Cost and 10%	$4.879 61
Kripp break revetment	3,400	2,250 00	Cost and 10%	2,773 90
Kripp break, levee (102,489 cubic yards)		5,250 00	Day's labor.	5,674 30
Brannan Island, revetment	21,892	18,998 00	Cost and 8%	22,081 38
Sherman Island Revetment	4,400	6,325 00	Cost and 8%	4,391 42
Merkeley Ranch revetment	3,440	6,513 00	Cost and 8%	5,177 10

Miscellaneous

Locality and Nature of Work.	Estimated Cost.	Contract Price.	Actual Cost.
San Rafael Creek, dredging	$9,450 00	$7,951 00	$10,589 00
isdale weir, temporary repairs		Day's labor.	678 68
isdale weir, permanent repairs	500 00	Cost and 10%	560 00
isdale weir, additions	11,018 00	$11,102 50	10,572 33
uba River cut-off, clearing		Day's labor.	1,604 50
uba River cut-off, excavation		Cost and 10%	2 829 83
uba River cut-off, dredging	10,500 00	$11,775 00	
hanghai Bend cut-off, balance on clearing			345 05

* Work extended beyond original plans.
† Work curtailed from original plans.
‡ Original contract was for 7,000 lineal feet of channel, afterward extended to 9,500 feet.

SEGREGATION OF COSTS.

Revetment at Brannan Island; a mattress of willow brush in three sections, 2,620 feet, 187 feet, and 175 feet, respectively; total length, 2,982 feet; average width, 66½ feet; average thickness, 14 inches. Superficial area, 21,892 square yards. Cubic contents, 8,586 cubic yards. This mattress was built from a barge, in sections 225 feet in length, the upstream sections overlapping on the previously laid section downstream. Concrete used, 700 cubic yards.

Item.	Unit Cost of Concrete.		Item.	Unit Cost of Revetment.	
	Total Cost.	Cost per Cu. Yd.		Total Cost.	Cost per Sq. Yd.
Labor	$1,287 01	$1.830	Grading	$229 59	$0.010
Cement	1,161 29	1.659	Labor	1,411 33	0.064
Gravel	864 35	1.235	Brush	6,440 51	0.293
Lumber and nails	374 91	0.535	Cable and clips	5,727 24	0.262
Equipment	1,198 25	1.711	Equipment	1,281 32	0 056
Inspection	262 42	0.375	Concrete	5,531 09	0.252
Commission	382 86	0.547	Inspection	262 41	0.012
Total	$5,531 09	$7.901	Commission	1,197 89	0.055
			Total	$22,081 38	$1.004

Revetment on Sherman Island: a mattress of willow brush, 176 feet and 352 feet in length, respectively; total length, 528 feet; average width. 75 feet; average thickness, 16 inches. Superficial area, 4,400 square yards. Cubic contents, 1,984 cubic yards. Concrete used, 182 cubic yards. Method of construction, same as at Brannan Island.

Item.	Unit Cost of Concrete.		Item.	Unit Cost of Revetment.	
	Total Cost.	Cost per Cu. Yd.		Total Cost.	Cost per Sq. Yd.
Labor	$311 26	$1.729	Grading	$75 00	$0.017
Cement	305 64	1.695	Labor	224 70	0.051
Gravel	218 00	1.211	Brush	1,488 70	0.338
Lumber, etc.	84 07	0.466	Cable and clips	903 94	0 205
Equipment	201 22	1.118	Equipment	96 10	0.022
Inspection	103 56	0.575	Concrete	1,313 35	0.301
Commission	89 60	0 498	Inspection	74 20	0.017
Total	$1,313 35	$7.292	Commission	215 40	0.049
			Total	$4,391 39	$1.000

Revetment at Merkeleys: a mattress of willow brush in 4 sections, aggregating 774 feet; average width, 40 feet; average thickness, 20 inches. Superficial area, 3,440 square yards. Cubic contents, 1,912 cubic yards. Concrete, 145 cubic yards. Method of construction, same as at Brannan Island.

Item.	Unit Cost of Concrete.		Item.	Unit Cost of Revetment.	
	Total Cost.	Cost per Cu. Yd.		Total Cost.	Cost per Sq. Yd.
Labor	$332 17	$2.296	Labor	$246 01	$0.0715
Cement	289 58	1.997	Brush	1,434 39	0.416
Rock	243 61	1.681	Cable and clips	1,025 41	0.2925
Lumber, etc.	213 75	1.474	Equipment	196 50	0.0572
Equipment	196 75	1.357	Concrete	1,423 61	0.4145
Inspection	46 75	0.322	Inspection	50 06	0.0146
Commission	101 00	0.698	Commission	299 00	0.0872
Total	$1,423 61	$9.825	Total	$5,177 10	$1.501

Kripp break, levee, and revetment: Levee, 1,600 feet long, 24 feet high, averaging 30 feet on top and containing 102,489 cubic yards. Revetment, a mattress of willow brush 710 feet long, 40 feet wide, 12 inches thick. Superficial area, 3,400 square yards. Cubic contents of mattress, 1,172 cubic yards. Mattress made on the bank and in place. Concrete used, 100 cubic yards.

Unit cost of levee: Total cost $5,667.64; cost per cubic yard, $0.0553.

Item.	Unit Cost of Concrete.		Item.	Unit Cost of Mattress.	
	Total Cost.	Cost per Cu. Yd.		Total Cost.	Cost per Sq. Yd.
Labor	$247 06	$2.47	Labor	$147 18	$0.042
Cement	163 79	1.64	Brush	921 05	0.272
Gravel	135 00	1.35	Cable and clips	548 92	0.162
Lumber	41 53	0.41	Concrete	824 32	0.269
Equipment	139 28	1.39	Inspection	148 00	0.044
Inspection	25 00	0 25	Commission	184 48	0.054
Commission	72 66	0.73	Total	$2,773 95	$0.843
Total	$824 32	$8.24			

Tisdale weir: construction of water cushion, 1,150 feet long, 12 feet deep, and 12 feet wide, with a lip 3 feet high. Total amount of concrete, 967.75 cubic yards. Total amount of steel, 61,549 pounds.

Item.	Unit Cost of Concrete.	
	Total Cost.	Cost per Cu. Yd.
For work	$916 63	$0.940
Form material	640 78	0 660
Steel work	327 06	0 385
Steel material	1,617 41	1,660
Mixing and placing	1,093 90	1.115
Cement	2,951 64	3.040
Gravel	1,600 30	1.650
Total	$9,147.72	$9.450

MISCELLANEOUS UNIT COSTS.

Yuba Cut-off: clearing right of way; 48 acres cleared at a cost of $1,604.55, or $33.429 per acre. Yuba Cut-off: channel excavated by scrapers, from Yuba River to the Western Pacific bridge; 21,620 cubic yards excavated; cost, $2,829.23, or $0.13 per cubic yard.

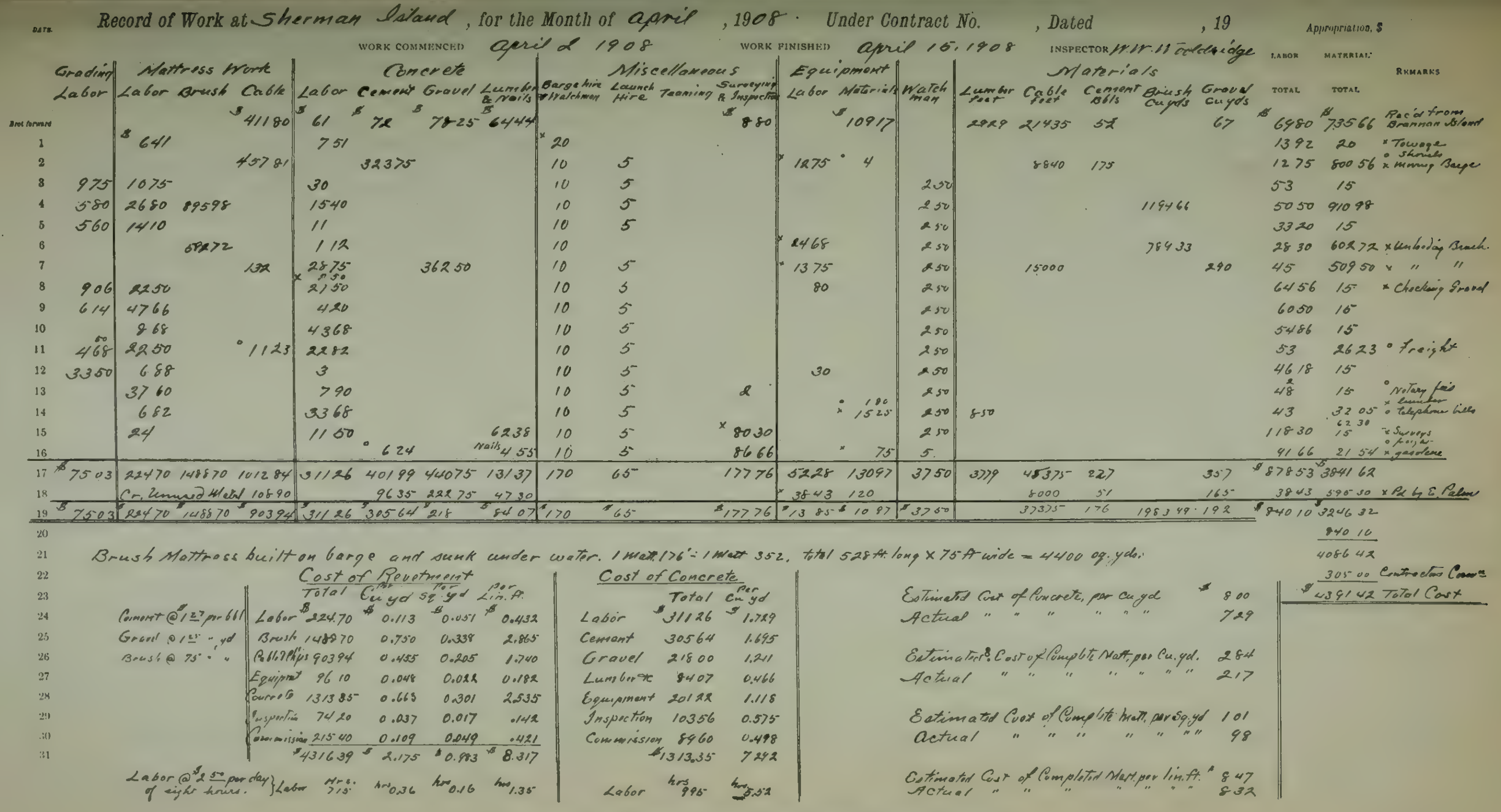
Survey of the Mokelumne River: 20.63 miles of traverse run; cost per mile, $16.10; 17.58 miles of levels run; cost per mile, $9.54; 12.52 miles of meander lines run; cost per mile, $11.

Office work and platting cost $270.00.

SAN FRANCISCO HARBOR FRONT.

The great amount of engineering work devolving upon the department on the San Francisco harbor front has been successfully and ably carried on by my assistant Mr. R. Barker. I have, however, personally viewed the work, and after January, 1909, expect to give my personal attention to this very important work in an endeavor to get the best engineering results possible. The architectural changes to the Ferry building are given in the tables for such work, except the new candy booth built and paid for by Foster & O'Rear after the design by this office. I shall therefore confine myself strictly to the engineering work at this point in the report.

East street, San Francisco, being under the control of the State Board of Harbor Commissioners, brings under their control on the harbor front the additional work of paving. This is an important part of the State work on account of the great amount of heavy draying and teaming over it. To date, it consists principally of basaltic blocks laid on an earth or sand fill. On account of the manner or mode of construction, the seawall, which is porous, permits the action of the tides to gradually work away the street fill and therefore undermine the foundation to the paving blocks. For this reason it was decided to not use a concrete foundation for the paving blocks, as it might in places be left suspended or crush down after a few years. In this connection it is proper to look at the class of seawall the State is constructing on the harbor front. In the first place, the mud is dredged out and a trench is made to receive the material of which the wall is to be constructed. Broken rock is transported to the place and dumped into the trench, the rock is brought up to the required height and finished by laying a hand course of rubble. The larger stones are somewhat segregated and used for facings. This constitutes a seawall. After carefully considering the matter, it is thought and recommended that this class of construction should be abandoned and a substantial hollow rein-



Record of Work at Sherman Island, for the Month of April, 1908. Under Contract No. , Dated , 19 Appropriation, $

WORK COMMENCED April 2 1908 WORK FINISHED April 15. 1908 INSPECTOR W. W. Wooldridge

DATE	Grading	Mattress Work			Concrete				Miscellaneous				Equipment			Materials					LABOR	MATERIAL	REMARKS
	Labor	Labor	Brush	Cable	Labor	Cement	Gravel	Lumber & Nails	Barge hire & Watchman	Launch Hire	Teaming	Surveying & Inspection	Labor	Material	Watchman	Lumber feet	Cable feet	Cement Bbls	Brush Cu yds	Gravel Cu yds	TOTAL	TOTAL	
Brot forward				$ 41180	$ 61	$ 72	$ 7825	$ 6444				$ 880		$ 10917		2929	21435	52		67	$ 6980	$ 73566	Rec'd from Brannan Island
1		$ 641			751				× 20												1392	20	× Towage
2				45781		32375			10	5			× 1275	° 4			8840	175			1275	80056	° Shovels × Moving Barge
3	975	1075			30				10	5					250						53	15	
4	580	2680	89598		1540				10	5					250				119466		5050	91098	
5	560	1410			11				10	5					250						3320	15	
6			60272		112				10				× 2468		250				78433		2830	60272	× Unloading Brush.
7				132	2875		36250		10	5			× 1375		250		15000			240	45	50950	× " "
8	906	2250			2 50 × 2150				10	5			80		250						6456	15	× Checking Gravel
9	614	4766			420				10	5					250						6050	16	
10		968			4368				10	5					250						5486	15	
11	50 468	2250		° 1123	2282				10	5					250						53	2623	° Freight
12	3350	688			3				10	5			30		250						4618	15	
13		3760			790				10	5		2			250						2 48	15	° Notary fees
14		682			3368				10	5				° 180 × 1525	250	850					43	3205	× Lumber ° Telephone bills
15		24			1150			6238	10	5		× 8030			250						11830	62 30 15	× Surveys ° freight
16						° 624		Nails 455	10	5		8666		× 75	5.						4166	2154	× gasolene
17	$ 7503	22470	148870	101284	31126	40199	44075	13137	170	65		17776	5228	13097	3750	3779	45375	227		357	$ 87853	$ 384162	
18		Cr. Unused Metal		10890		9635	22275	4730					× 3843	120			8000	51		165	3843	59550	× Pd by E. Palmer
19	$ 7503	$ 22470	$ 148870	$ 90394	$ 31126	$ 30564	$ 218	$ 8407	$ 170	$ 65		$ 17776	$ 1385	$ 1097	$ 3750		37375	176	198349	192	$ 84010	$ 324632	
20																						84010	

Brush Mattress built on barge and sunk under water. 1 Matt. 176' – 1 Matt 352, total 528 ft. long × 75 ft wide = 4400 sq. yds.

4086 42

305 00 Contractors Comm.

$ 4391 42 Total Cost

Cement @ $1 27 per bbl

Gravel @ 1 25 " yd

Brush @ 75 " "

Cost of Revetment

	Total	Per Cu yd	Per Sq yd	Per Lin. ft.
Labor	$ 224.70	$ 0.113	$ 0.051	$ 0.432
Brush	1488 70	0.750	0.338	2.865
Cable & Clips	903 94	0.455	0.205	1.740
Equipment	96 10	0.048	0.022	0.182
Concrete	1313 85	0.663	0.301	2.535
Inspection	74 20	0.037	0.017	.142
Commission	215 40	0.109	0.049	.421
	$ 4316 39	$ 2.175	$ 0.983	$ 8.317
Labor @ $2 50 per day of eight hours. } Labor	Hrs. 715	hrs 0.36	hrs 0.16	hrs 1.35

Cost of Concrete

	Total	Per Cu yd
Labor	$ 311 26	$ 1.729
Cement	305 64	1.695
Gravel	218 00	1.211
Lumber &c	84 07	0.466
Equipment	201 22	1.118
Inspection	103 56	0.575
Commission	89 60	0.498
	$ 1313.35	7 242
Labor	hrs 995	hrs 5.52

Estimated Cost of Concrete, per cu yd	$ 8 00
Actual " " " " "	7 29
Estimated Cost of Complete Matt, per Cu. yd.	2 84
Actual " " " " " "	2 17
Estimated Cost of Complete Matt, per Sq. yd	1 01
Actual " " " " " "	98
Estimated Cost of Completed Matt per lin. ft.	$ 8 47
Actual " " " " " "	8 32

PHOTOGRAPH OF SEGREGATION SHEET RIVER WORK.

forced concrete construction either resting on piles or hardpan be devised and designed to continue any further work on the seawall. To be sure it will cost perhaps twice as much as the present method of work, but its stability and permanency will be worth every cent of the extra cost.

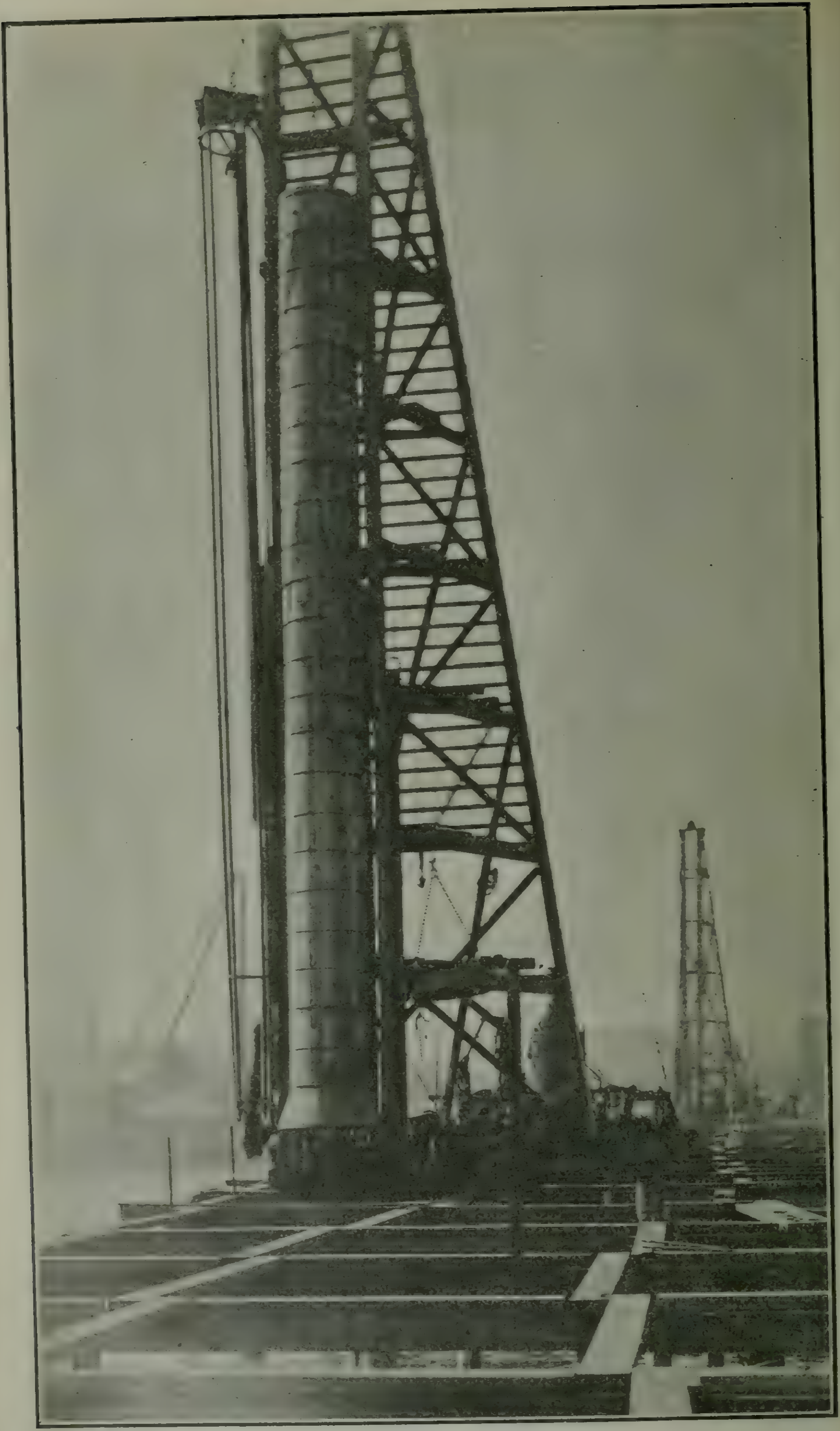
The construction of the piers is of great importance to the State and San Francisco, and should be done with the greatest care and economy. No effort should be spared to have the docks of San Francisco among the best, and I earnestly believe the State should construct this work so far as possible of concrete or masonry. The two new piers, Nos. 38 and 40, are to be of reinforced concrete in their entirety, and should prove an excellent class of construction. Steel should never be exposed to the salt water and air, as are the I beams in the new Pacific mail dock. Upon examination of the beams carrying the wharf proper, I found that the web of the metal would flake off at least 25 per cent. To prevent this they must be kept thoroughly painted, or else shortly new beams will be required. If these beams had been imbedded in concrete this rusting could have been obviated. The greatest care must be exercised in the foundation work along the water front, or else the construction may prove valueless. The one great point of dock work is to have the submarine part done thoroughly and without the sole thought of trying to get it done cheaply. Cheap construction and poor inspection is the cause of a heavy cost of maintenance. No matter what the State undertakes, there is always a tendency to cheaply build. Appropriation bills are often placed above the needs, then trimmed down to fit what is thought right. We should have an estimate for first-class work at a reasonable price and adhere to it. The most unwise economy the State tolerates is the cheap substructure work on the great water front at San Francisco. I would recommend a good substantial seawall to be practically indestructible, and docks and piers in keeping therewith. We can not accomplish this at once, but we can adopt such a plan and work to it. When funds are available, only permit them to be expended in first-class construction. Finally, as we go along with this scheme, the State will begin to cut off some of the very great maintenance expense. At some future time we must adopt this plan, and it is my opinion that no better time exists than now.

The new piers, Nos. 38 and 40, are 130 feet wide and 657 and 650 feet long, respectively. They when built will represent the initial construction along a permanent plan. The great amount of work at this State institution would require a very considerable space to give any detail. Therefore, the following table gives the work accomplished and under construction from May, 1907, to December 1, 1908. The mass of details and reports are filed in the department and open to inspection.

WORK ACCOMPLISHED AND UNDER CONSTRUCTION FROM MAY, 1907, TO DECEMBER 1, 1908.

	No. of Bids.	High Bid.	Low Bid.	Estimate.	Contract or Cost.	Date of Bids.
Paving.						
East street, vicinity of Piers 42 and 44—99,000 sq. ft., 1,880 ft. curb, etc.	9	$31,179 00	$28,821 00	$30,500 00	$28,821 00	Aug. 27, 1908
East street, between Kearny and Francisco—25,151 square feet paving, 2,176 square feet repaving at 10 cents	4	9,531 80	7,075 40		8,366 52	April 4, 1907
East street, between Lombard and Vallejo—22,000 feet new paving, 3,000 square feet repaving	5	8,240 00	6,652 50	6,600 00	6,652 50	Sept. 19, 1907
Extension, repaving 47,881					3,799 53	
East street, between Francisco and North Point—35,000 feet new paving, 32,500 repaving, etc.	2	14,965 00	14,906 25		14,906 25	Oct. 3, 1907
East street, bet. Kearny and Taylor—146,000 square feet paving, etc	3	58,045 00	52,449 00	48,000 00	52,449 00	Oct. 31, 1907
East street, between Market and Folsom—90,000 square feet repaving, 2,500 feet curbing, etc.	3	14,425 00	12,625 00	15,000 00	12,625 00	Nov. 7, 1907
Center street, east of Illinois—22,250 square ft. paving, 610 ft. curbing	4	8,986 00	7,303 00	7,000 00	7,303 00	Nov. 7, 1907
Crossing of Sansome and Chestnut—2,000 feet new paving, 3,000 feet repaving, etc.	3	915 00	893 00		893 00	Mar. 5, 1908
East street, between Clay and Washington—31,926 feet paved, 536 feet curb reset, 5 cesspools					2,937 20	April 20, 1908
East street, between Washington and Vallejo—120,000 feet paving, 40,000 feet repairing, 1,300 feet curb, etc.	5	30,015 00	21,722 00	23,000 00	21,722 00	July 9, 1908
Crossing on East street, Market and Clay	3	14.8c	7¼c		7¼c	Sept. 17, 1908
Bulkhead north of Wharfinger's office, asphalt					661 05	
Wiring tower					725 00	Mar. 23, 1908
Free Market, lot No. 16 seawall	18	9,294 00	5,476 00	6,000 00	5,476 00	Dec. 12, 1907
Wharves.						
Central Basin, 2 wharves Loop Lumber Co., wooden, 105,720 sq. ft.	7	64,760 00	44,760 00		44,760 00	May 23, 1907
Along Stewart street, repairs				Cost.	4,792 00	July 29, 1907
Pier 12 to Pier 14	6	2,967 25	2,380 00		2,380 00	
Bulkhead (reinforced concrete), Pier 19 to Pier 21		Day's labor.			17,559 06	Oct. 1, 1907
Asphalt wearing surface					1,263 49	
Bulkhead north of Wharfinger's office, 7,770 square feet		Day's labor.			4,836 81	Oct. 1, 1907
Central Basin, wooden, Union Oil Co., 6,437 square feet	8	4,797 00	3,911 00		3,911 00	Oct. 10, 1907
Illinois street, 17th to 18th streets	11	70,799 00	56,786 00		56,786 00	Nov. 29, 1907
Central Basin, wooden, Loop Lumber Co. to dry dock	8	2,500 00	1,577 00		1,577 00	Feb. 6, 1908
Bulkhead, wooden, section 12 of seawall, 30,000 square feet	7	3,942 00	1,600 00	2,000 00	1,600 00	Jan. 23, 1908
Section 12 of seawall	6	1,882 00	849 00		849 00	Feb. 28, 1908
Fisherman's concrete covering, studded piles, 1,500 feet	4	2,506 00	1,467 72		1,467 72	July 30, 1908
Bulkhead, section 12, seawall, steel and concrete, 37,860 square feet	6	76,300 00	64,500 00		64,500 00	Sept. 17, 1908
Pier No. 10, 2 chutes, wooden.	5	398 00	287 00	260 00	287 00	Nov. 5, 1908
Illinois street, south of Santa Clara—153,148 square feet	8	93,700 00	57,741 00		57,741 00	Nov. 10, 1908

Piers.						
Pier No. 27, 541 by 120 feet	6	139,000 00	129,800 00		129,800 00	April 12, 1906
Pier No. 27, extension, 60 by 120 feet					19,750 00	
Pier No. 40, 650 by 130 feet	7	423,057 00	302,400 00	375,000 00	302,400 00	June 22, 1908
Pier No. 38, 667 by 130 feet	11	357,500 00	279,000 00	350,000 00	279,000 00	Oct. 8, 1908
Sheds.						
On sections 1 and 2 of seawall, wooden, 80 by 400 feet					15,240 00	
On section 2 of seawall, wooden, 80 by 400 feet	11	27,300 00	11,993 00	11,600 00	11,993 00	July 18, 1907
On section 2 of seawall, wooden, 80 by 200 feet					5,997 50	
On Pier No. 27, wooden, 100 by 572 feet	12	28,800 00	22,475 00	26,000 00	22,475 00	Sept. 26, 1907
On Pier No. 1, wooden extension	5	1,450 00	1,225 00	1,250 00	1,225 00	Dec. 17, 1907
On Pier No. 3, wooden, 40 by 192 feet	8	1,529 50	1,132 00	1,300 00	1,132 00	Dec. 18, 1907
On seawall, lot No. 11, wooden, 37 by 87.5				3,000 00	2,905 00	April 16, 1908
On Pier No. 3, wooden, 71 feet 8 inches by 430 inches	5	5,537 00	4,700 00	4,200 00	4,700 00	July 9, 1908
Seawall.						
Section No. 12, 1,000 feet, 124,898 tons of rock	4	202,500 00	118,350 00	Cost.	97,249 95	June 13, 1908
Fisherman's Wharf	3	925 89	789 02		789 02	June 11, 1908
Section No. 12, cross embankment, 11,069 tons of rock	3	5,061 07	3,754 77		3,754 77	July 30, 1908
Section No. 11, 600 feet, 85,000 tons of rock	5	103,150 00	59,075 00	72,000 00	59,075 00	Nov. 19, 1908
Tugs and Dredges.						
Clam-shell bucket					1,300 00	Mar. 5, 1908
Fuel burners	4	1,044 31	395 00	500 00	395 00	Feb. 13, 1908
Electric lights for Governors Markham and Irwin	4	3,488 00	2,750 00	2,920 00	2,750 00	July 9, 1908
Electric light plant, Dredge No. 3	4	1,631 00	1,245 00	1,360 00	1,245 00	July 9, 1908
Winding drums, Dredge No. 2	7	955 00	779 00		779 00	May 8, 1908
Tubular boiler, Dredge No. 2				3,150 00	2,675 00	Aug. 8, 1907
Repairs to engine, Governor Irwin					1,575 00	July 2, 1908
Belt Railway.						
Roundhouse roof, corrugated iron	4	1,054 00		400 00	645 00	July 9, 1908
Oil tanks, reinforced concrete		Day's labor.		3,000 00	3,790 51	
Replacing T rail with girder rail				7,000 00	8,043 40	Nov. 29, 1907
Miscellaneous.						
Dredging Channel street				30,000 00	27,250 00	
Purchase of old lumber, per M					2 25	
Repairs to shingle roofs of sheds					3,514 49	
Lumber for general repairs, per M	8	20 00	15 75		15 75	Oct. 10, 1907
Cleaning East street, per M yards					80	June 2, 1908
Cleaning East street, per M yards, District No. 5					1 00	June 2, 1908
2 landing floats					2,296 00	



CYLINDER FOR THE NEW PIER 40, SAN FRANCISCO HARBOR FRONT.

CALIFORNIA ROADS.

At the last session of the legislature there was passed an act, known as the Savage Road Law, permitting counties to bond their whole property for road improvement purposes. It extended the supervisorial powers so that cities and municipalities may pay part of the expense of good country roads.

This is considered a step in advance, and those who have watched road legislation, and the results thereof, have contended for such enactment as a proper means for obtaining the necessary funds to make good roads possible. Aside from obtaining the funds for this improvement there are several very important factors involved in the road problem which must be taken cognizance of if we expect to advance to the position of our Eastern States.

We must obtain legislation of a character that will put road affairs on a systematic business footing. The State's great need is system injected into the management of and expenditures on our roads.

Centralize the road management power sufficiently to overcome the local influences, put well-paid, technical men in charge of technical work, and create a proper system of maintenance.

Those who have just casually viewed our present method of road work note the great measure of failure.

The county roads are handled, not by trained men, but by those who profess to know all about the construction and maintenance of roads. That the task is one of difficulty can not be denied. Even the engineer must be specially trained and experienced in this work if he expects to be successful. We need more substantial training for our road foremen and engineers. We need to impress them with the necessity of following scientific construction and maintenance, to take interest in their work and properly safeguard the maintenance expenditures. There is no greater economic problem presented to our State than the proper administration of our road business.

An approximate mileage of 50,000 and expenditure of $3,500,000 per annum for maintenance thereof, indicates the magnitude of this part of our public work. For years we have been expending between $2,000,000 and $3,500,000, practically all on maintenance, but have not attained the results sought. There must be some mistake or trouble. Consider our experience with oiled roads. For several years we have been applying oil on the roads with but little good effect, when if properly used, our State could make the finest highways in the world. The materials abound, and yet we do not take advantage of them. Other states of this Union, and especially those of the East and Middle West, would highly prize the native road materials of California.

Could the money expended on county roads for the past fifteen years have been applied to the construction of good rock roads, a system of highways could have been established and built connecting every county seat in the State. Had these same roads been given the same maintenance the county roads now get, in a very few years the deterioration would have been so great as to discourage those advocates who look at the subject but superficially. The great problem with the Savage road law is that no provision is made for maintenance. No matter how well we build our roads, they must be thoroughly and properly maintained if we are to receive the benefits accruing from good roads. Think of some road you believed, at the time, was well built, then remind yourself of its bad condition about four or five years thereafter. Numerous examples of this kind exist, and yet we persist in going ahead with the same unsystematic maintenance that prevailed twenty-five years ago.

Several counties are now bonded, or are about to bond, for road construction, but not one dollar for maintenance. I would advise a careful study of the problem, that the best results may be obtained.

Ask yourself how the work will be carried on, then investigate the laws inaugurated by other states in their endeavor to meet the same conditions, the same failure and troubles we have had.

The Aid scheme is not new or untried, but has proven most efficacious in a great many Eastern States. New Jersey was the pioneer to embrace state aid sixteen years ago, and continues to expend large appropriations through this method. A great many other states went through our experience and upon the adoption of the aid plan, placed their roads on a better business basis, brought the construction and maintenance under trained men, gave the counties uniformity in plans, disposed of the local influences, began an era of road education, and brought the maintenance to an efficient standard.

It is advocated by many that aid should be extended to the counties for maintenance and not for construction, and that the county engineers, or some one man, be appointed, or elected, to control the work on the county roads.

Carefully read what other aid law states have done, and note their success. It appears to me that we are, at present, so far behind the progressive states in road legislation that we can well afford to pattern after laws which have now stood the test for fifteen to sixteen years.

Should California begin with paying the maintenance and supervise the construction, or should we supervise the maintenance, and aid in the construction, as the aid states, with the exception of Massachusetts, do. An additional plan of assistance may be advanced whereby the State obtain and declare for a system of state roads, paying for their cost and maintenance, thus entirely controlling them as state institutions.

The people of New York have added to their aid law and now have by statute, outlined a system of state trunk roads to be entirely handled by the state. The aid law will operate to assist the localities beyond the trunk lines.

Pennsylvania is urged to adopt the same plan and the reasons therefor are aptly stated. "There are two fundamental policies which must be reckoned with. First, there must be a plan that is reliable in every respect which must be settled upon and then stuck to; second, and more important than the plan, the roads, when built, must have a system of maintenance and repair that will work. Not one cent of money should be expended in the cause of good roads until there be some provision made for a systematic plan, and also provision made for first class maintenance of the roads when built." This is the keynote to the problem.

After a study of California roads for eight years, I feel disposed to offer and recommend a law similar to that of the State of New York, and earnestly believe its enactment would prove of inestimable value. Should the State desire to enter into the scheme of a system of State highways, then the aid law could only be considered secondarily.

STATE-AID ROAD LAW.

AN ACT TO PROVIDE FOR THE IMPROVEMENT OF THE PUBLIC HIGHWAYS, AND TO MAKE AN APPROPRIATION THEREFOR.

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. The board of supervisors in any county of the State may, and upon presentation of a petition as provided in section two hereof, must pass a resolution that public interest demands the improvement of any public highway, or section thereof, situate within such county, and described in such resolution; but such description shall not include any portion of a highway within the boundaries of any city or incorporated village; and within ten days after the passage of such a resolution shall transmit a certified copy thereof to the State Department of Engineering.

SEC. 2. The owners of two thirds of the lineal feet fronting on any such public highway or section thereof in any county of the State may present to the board of supervisors of such county a petition, setting forth that the petitioners are such owners, and that they desire such highway or section thereof be improved under the provisions of this act.

SEC. 3. The Department of Engineering, upon receipt of such resolution, shall investigate and determine whether the highway or section thereof sought to be improved is of sufficient public importance to come within the purposes of this act, taking into account the use, location, and value of such highway or section thereof for the purposes of common traffic and travel, and after such investigation shall certify its approval or disapproval of such resolution. If it shall disapprove such resolution, it shall certify its reasons therefor to such board of supervisors.

SEC. 4. If such resolution shall be approved, such Department of Engineering shall cause the highway or section thereof therein described to be mapped, both in outline and profile. The said Department shall indicate how much of such highway or section thereof may be improved by deviation from the existing lines whenever it shall be deemed of advantage to obtain a shorter or more direct road without lessening its usefulness, or whenever such deviation is of advantage by reason of lessened gradients. The said department shall also cause plans and specifications of such highways or section thereof, to be thus improved to be made for telford, macadam, or gravel roadway or other suitable construction, taking into consideration climate, soil, and materials to be had in the vicinity thereof, and the extent and nature of the traffic likely to be upon such highway, specifying in its judgment, the kind of road a wise economy demands. The improved or permanent roadway of all highways so improved shall not be less than eight feet in width, unless for special reasons to be stated by such Department of Engineering it is required that it shall be a width of certain dimensions.

SEC. 5. Upon the completion of such maps, plans, and specifications, such Department of Engineering shall cause an estimate to be made of the cost of construction of the same and transmit the same to the board of supervisors from which such resolution proceeded, together with a certified copy of such maps, plans, specifications, and of a certificate of the approval of the highway or section thereof so designated as aforesaid.

SEC. 6. After the receipt thereof, upon a majority vote of such board of supervisors, it may adopt a resolution that such highway or section thereof so approved, shall be constructed under the provisions of this act, or of any existing act, and thereupon shall transmit a certified copy of such resolution to such Department of Engineering.

SEC. 7. In case the boundaries of such proposed highway shall deviate from the existing highway, the board of supervisors must make provisions for securing the requisite right of way prior to the actual commencement of the work of improvement.

SEC. 8. Upon receipt of the certified copy of the resolution provided in section six, such Department of Engineering shall advertise for bids once a week for four consecutive weeks in a newspaper published at the county seat of such county, and in one such other newspaper as shall be deemed of advantage for the construction of such highway or section thereof, according to such plans and specifications, and award such contract to the lowest responsible bidder, except that no contract shall be awarded at a greater sum than the estimate provided in section five. But if no bid otherwise acceptable be made within such estimate, such Department of Engineering may amend the estimate, certify the same to the board of supervisors, and upon the adoption by it of a resolution as provided in section six, based on such amended estimate, proceed anew to obtain bids and award the contract as herein provided. Such Department of Engineering may reject any or all bids and may as an alternative plan, upon the approval of the full advisory board of the department, do the work under the full control of such department, upon a day's labor basis; *provided*, the board of supervisors of the county in which the work is proposed, grant their consent thereto by a resolution of said board. Before entering into any contract for such construction shall require a bond, with sufficient sureties, conditioned that if the proposal shall be accepted, the party thereto will perform the work upon the terms proposed and within the time prescribed and in accordance with the plans and specifications; and as a bond of indemnity against any direct or indirect damages that shall be suffered or claimed during the construction of such road, and until the same is accepted. The people of the State of California shall in no case be liable for any damages suffered. Partial payments may be provided for in the contract, and paid in the manner herein provided, when certified to by such Department of Engineering, to an amount not to exceed seventy-five per cent of the value of the work done; twenty-five per cent of the contract price shall be retained until the entire work has been accepted. Whenever a county engineer or surveyor has been appointed or elected in the county in which such highway or section thereof is to be constructed, he shall have general charge and supervision of the work under the control of the Department of Engineering, and shall report to said department from time to time the progress of the work and such facts in relation thereto as may be required. If there is no county engineer or surveyor, such Department of Engineering shall have some competent person to superintend and have engineering supervision of the work.

SEC. 9. Two fifths of the expense of the construction thereof shall be paid by the State Treasurer upon the warrant of the Controller, issued upon the requisition of such Department of Engineering, out of any specific appropriations made to carry out the provisions of this act. And three fifths of the expense thereof shall be a county charge in the first instance, and the same shall be paid by the county treasurer of the county in which such highway or section thereof is, upon the requisition of such engineer or surveyor; but the amounts so paid shall be apportioned by the board of supervisors, so that if the same has been built upon a resolution of said board without petition, forty per cent of the cost of construction shall be a general county charge, and twenty per cent shall be a charge upon the road district in which the improved highway or section thereof is located, and if the same has been built upon a resolution of said board after petition as provided in section two, forty per cent shall be a general county charge and twenty per cent shall be assessed upon and paid by the owners of the lands benefited in the proportion of the benefits accruing to said owners as determined by the county assessor in the next section hereof.

SEC. 10. The assessor of the county in which any highway or section thereof has been improved or constructed pursuant to petition, as provided in section two of this act, shall have power, and it shall be his duty upon receiving notice from the board of supervisors of the county of the cost of construction or improvement of such highway or section thereof in such road district, to assess an amount equal to twenty per cent of said total cost upon the lands fronting or abutting on such highway or section thereof. Such assessment shall be apportioned according to the benefits accruing to the owners of the lands so located, according to the best judgment of said assessor, upon at least ten days' notice of the time and place of such apportionment to the persons affected thereby, and after such persons have had an opportunity to be heard, and the assessments so made when duly attested by the oath of such assessor shall be collected in the same manner as the general taxes of such county are collected.

SEC. 11. The construction and improvement of highways and sections thereof, under the provisions of this act, shall be taken up and carried forward in the order in which they are finally designated, as determined by the date of the receipt in each case of the certified copy of the resolution provided in section six by such Department of Engineering as hereinbefore provided.

SEC. 12. Upon the completion of such highways or sections thereof so constructed by such Department of Engineering and its acceptance of the same after payment has been made as herein provided, such Department of Engineering shall inform the board of supervisors of such counties that the highways or sections thereof designated have been constructed as herein provided; and he may serve notice on said board to accept such highway thus constructed, which notice shall be filed in the office of the clerk of such county; and twenty days after service and filing of said notice, such highway or section thereof shall be deemed accepted by said board of supervisors of said county; and thereafter they shall maintain the same as a county road and apportion the expense as they may be empowered by law. The county wherein such improved highways lie shall care for and keep the same in repair under the direction and supervision of the Department of Engineering and such rules and regulations as it may prescribe. Should the county fail to comply with said rules and regulations, then such Department of Engineering shall cause the maintenance work to be done, and the cost of the same shall be a county charge, paid for upon claims approved by the Department of Engineering, in the same manner as for other county roads.

SEC. 13. Whenever any county has had aid in building any such highway and it seems advantageous to such Department of Engineering that a section or sections of highway, not exceeding one mile in length, shall be constructed under this act to connect these roads together, and would be a great public utility and general convenience, notice may be served by said department on the board of supervisors of such county, and shall file one in the county clerk's office, designating the highway already constructed and the existing termini, and the section or sections, in his opinion, necessary to be constructed and the reasons therefor. And it shall be the duty of the board of supervisors to provide for the construction of such connecting highway or section thereof, within one year after the service and filing of such notice. The procedure for such work shall be in accordance with the provisions of this act.

SEC. 14. There is hereby appropriated out of any money in the state treasury not otherwise appropriated, the sum of one hundred and fifty thousand dollars to carry into effect the provisions of this act.

SEC. 15. The operation of this act shall not be affected by any conflicting act or conflicting part of any act wherever the same may now exist, and the highways may be improved under this act or any existing act relating to roads.

SEC. 16. This act shall take effect immediately.

The reader's attention is directed to a copy of the Savage law given in the appendices, as is also a table of costs of the county roads per annum, and a late specification of oiled macadam roads.

OIL FOR ROADS.

The subject of oiled roads has spread beyond the limits of the State and other states are going through several experimental stages of oiling highways. It has failed to attract attention longer, in California, and in passing over a great many pieces of oiled roads badly cut up or rutted, you always hear the driver condemn them. It is not the fault of the oil, but the application and maintenance. Many suppose the oil a panacea for road ills without further treatment. No more mistaken notion ever existed. Oiled roads must receive careful maintenance to be of economic value, and it is a positive setback to road business to allow the use of oil on roads to become so objectionable while yet so meritorious a material.

The use of the automobile, beyond doubt, wears a road faster than the vehicle hauled by animal power. The cloud of dust we have all seen after the passing of a swift moving automobile, surely gives evidence of the rapid wear caused by the machines. Again, macadam roads are much more quickly disintegrated when autos are used on them at high speed than by the older modes of travel. This change of vehicles has been so sudden as to allow no time to adjust the road building and repair. Our old way is now antiquated, and we must turn to new processes of work. Heavy asphaltic oil will meet the change. Applied properly, I earnestly believe we need have no fear of being able to cope with the destructive effect of machines on our highways. The oil will create a mass of material incapable of being sucked up by the flattened tires, and if made firm, which is proper, will not yield to pressure or tractive force. Good oil earth roads are still within our reach, and if we will put interest in our road work, as we should, and properly treat them then can the country roads be made so smooth, dustless, and mudless as to chagrin those who discountenance its use. Then have maintenance that is substantially good and they will remain in excellent condition. Gravel roads may be treated with heavy asphaltic oil with splendid effect.

The treatment of macadam with oil gives an almost ideal highway capable of withstanding much more severe usage than plain macadam. The asphalt of the oil acts as a binder to the particles of rock composing the body of a macadam road, gives it elasticity, and is a waterproof covering. In fact, it acts much as bituminous macadam, which makes an excellent road or even residential street for city use. The use of oil will not, however, be appreciated for road purposes until we obtain a systematic plan of construction and maintenance. Any one desiring information on the use of oil on roads may obtain the 1906 report on the subject, now in the possession of the Department of Engineering. Although two years old, this report presents the best method of oiling up to the present time.

PRESENT STATE ROADS.

The State roads now owned by California and under the control of this Department, all traverse the mountainous districts. No valley roads or macadam highways are under State supervision. To date, the policy of the State has been to construct and maintain roads through territory where construction is expensive and the counties through which they run are too poor to properly care for a road. In cases of this kind the assistance rendered by the State is proper and should be extended.

One may to-day attempt the trip of viewing the wonders of our mountains and find himself blocked by being unable to travel by road. The finest scenery of the Sierra Nevadas is inaccessible, and would, if opened by road, prove a valuable asset to the State.

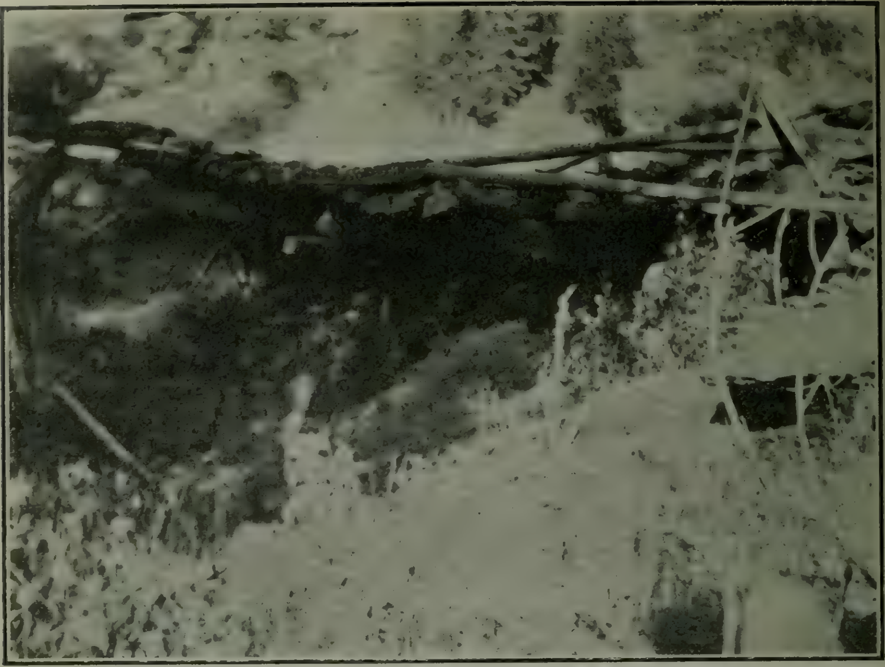
THE LAKE TAHOE WAGON ROAD.

The importance of this road is steadily growing and its traffic is so rapidly increasing that its maintenance needs, in consequence of the extra wear, are much greater than any time during the past twenty years.

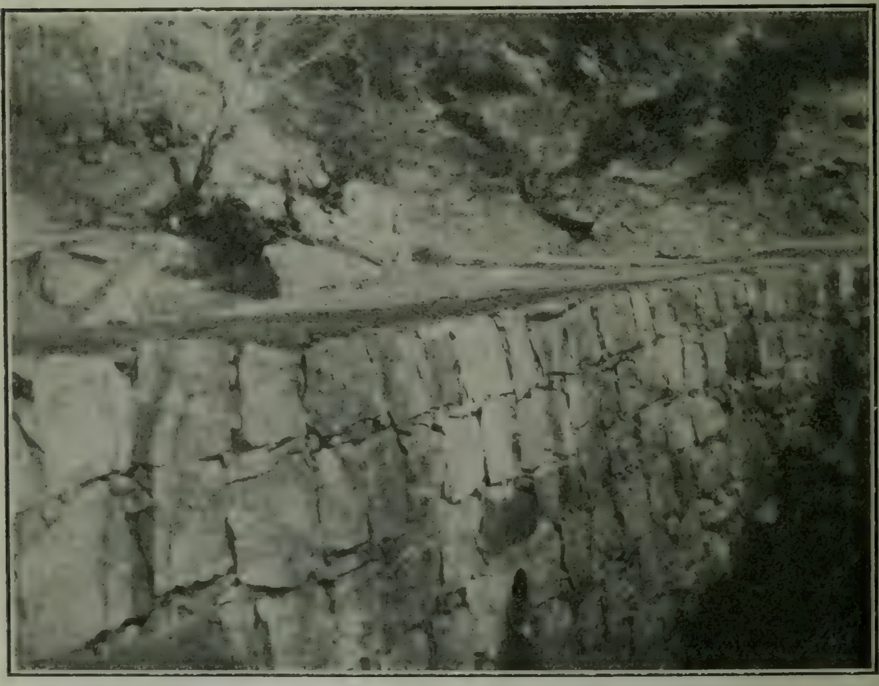
Heavy hauling over the first fourteen miles of this highway causes a deep light dust to accumulate during the summer months, and thereby makes traveling very disagreeable. With the increased use of automobiles and the great number of them traversing this State road, comes a demand for laying this dust and making a smoother surface.

The present maintenance fund of $5,000 per annum gives little or no money to be expended for the remedy of this bad feature. The original construction of this road used wooden culverts, brush fills, and wooden bridges, which necessarily have been giving out and so nearly at the same time as to almost deplete the maintenance fund for the purpose of replacing these structures with permanent ones. It should be the policy of the State to do this work in a permanent, substantial manner, so that eventually there will be no cost from this source. I have, therefore, made it the rule to replace these structures with stone, concrete or vitrified pipe, for culverts, as fast as they become unserviceable. This, with the fact that the lower twelve or fourteen miles of the road must be scraped and crowned each spring, keeps the funds too low to allow of any watering or oiling.

On November 1, 1908, this road possessed one hundred seventy-five vitrified pipe, stone, and concrete culverts, the concrete culvert or bridge at Oglesby Canyon, the cut ashlar granite bridge of eighty-one feet span over the American River at Riverton, and the rubble stone bridge of twenty-six feet span over Trout Creek. Permanent reconstruction work, to place the bridges and culverts in first class shape, would require about one hundred and fifty culverts with possibly twenty-five from the



TYPE OF ROAD FILL AND CULVERT ON LAKE TAHOE STATE ROAD BEING REPLACED BY THE DEPARTMENT.



NEW CULVERT AND FILL, LAKE TAHOE STATE ROAD.

CUT ASHLAR STONE BRIDGE, LAKE TAHOE STATE ROAD, 81-FOOT SPAN.

NEW STONE CULVERT, LAKE TAHOE STATE ROAD.

Summit to the Little Truckee River, seven bridges of twenty to thirty feet span and a bridge over the Little Truckee fifty feet in span.

However, the crossing last mentioned has a sufficiently good wooden structure for at least eight more years and the crossing of the South Fork of the American River near Strawberry is spanned by a wooden bridge of at least eight years' life.

The Oglesby Canyon bridge, contracted for to Mr. T. E. Clark of Sacramento for $846, was never satisfactorily completed by him, and in consequence, his cash bond of $100 was taken over by the State, and the work completed under the supervision of Mr. A. S. Lyon, the present superintendent of the road.

The Trout Creek bridge is built of squared rubble granite stone with both abutment foundations on bed rock, twenty-six feet span, and furnishes the State a valuable structure.

The legislature of 1907 appropriated $5,000 for the general improvement, the completion of the survey of the road, and the erection of milestones. Since 1901 milestones were cut for this road, but on account of the lack of a survey and therefore location, they remained unplaced, except those to the 25-mile post, at Riverton. After the appropriation, however, this Department began the survey July 23, 1907, and completed it August 30, 1907. Mr. George W. Kimble was in charge of the work and made a complete survey of the road from near the twenty-five milestone to the State line near Lake Tahoe. All topographical features were noted — creeks, culverts, grades, soils, and bridges. At every one thousand feet was established a concrete block as a monument showing the permanent location of the road, and establishing the right of way as shown by the main traveled part thereof. These monuments were set in the center of the road about eighteen inches below the surface and were witnessed by proper marks to readily determine their location. After the completion of this work Mr. A. S. Lyon set the granite milestones, so now, with the exception of the first two stones, which were never furnished, a traveler going from Placerville to Lake Tahoe, or returning, may know the distance he has gone. The following table gives the length of road and cost of survey:

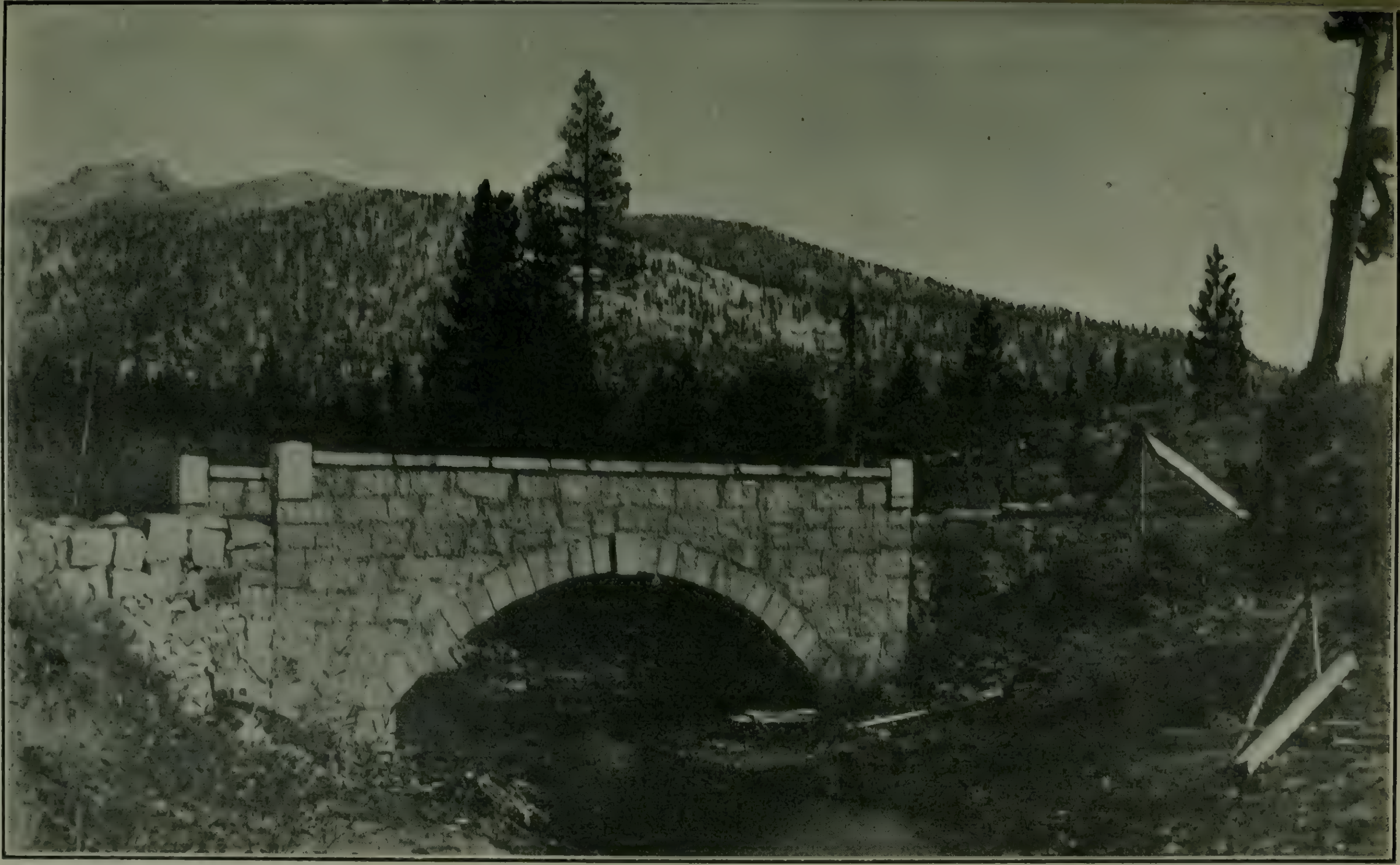
Lake Tahoe Wagon Road Survey.

Distance of total survey of road	61.91 miles
(From Placerville Courthouse to State line, Lake Tahoe.)	
Distance of survey made during 1907	36.83 miles
Distance of survey made during one day average, 1907	1.02 miles

Cost of Survey, 1907.

Engineer, levelman, and four helpers, with expenses	$1,124 11
Concrete blocks delivered	82 50
Total cost	$1,206 61
Cost per mile of survey, complete	32 76

From an intimate knowledge of the cost of a proper maintenance of



STONE BRIDGE, TROUT CREEK, LAKE TAHOE STATE ROAD.

this road, I therefore recommend the appropriation of $7,500 for the special treatment of the first fourteen miles of the road by either watering or oiling, and earnestly believe such would reduce the up-keep of this part of the road very materially.

For eight years we have struggled to get a better class of work on the structures, and now believe the expenditure as indicated would be very effective and an economical betterment.

SONORA AND MONO ROAD.

The 1907 session of the legislature appropriated $6,000 per annum for maintenance purposes, and this, in addition to the balance of about $12,500 in an appropriation for permanent structures on this road made in 1905, permitted the Department to accomplish many improvements.

The road as originally taken by the State, in 1901, was simply a rutted gully, which could be termed a road only in name. The roadbed was for great stretches a bed of boulders, the bridges were rotted out, and no culverts existed. Such a condition of affairs, with but meager funds to repair or practically rebuild a road, of seventy-eight miles in length through the Sierra Nevada Mountains, presented a gigantic task. However, at date, the vast superiority of the road in comparison with only three years ago, gives assurance that the road with adequate funds can be made over with excellent results. It is quite evident that a great number of beneficial changes in grade and alignment must be made before any permanent work can be applied.

Near the Huntoon Ranch, about eight miles from Bridgeport, a bad hill with a steep grade has been entirely eliminated by getting the right of way to construct the road around the hill, where at one time prior to the State's occupancy the road was located. From Leavitt Meadows to the summit of the Sierras, three very effective changes in grade may be made, and one positively must be made. The Quinlan grade of soft mire clay can be avoided by one half mile of extra road. Again, from Baker's Station to Deadman's Creek a very important change is necessary in order that a bad, slippery and steep solid granite roadway may be avoided for possibly three quarters of a mile. There are numerous minor changes to be made, but I have but called attention to the more pressing ones that we may get the road well drained with culverts and make some now dangerous places more easily passable. Until these changes are made no permanent work should be done on these stretches of road that eventually will be abandoned.

In this connection there should be a survey made of both ends of this road and also the necessary changes of location. The ends of the road are mentioned for the reason that the settlers and owners of abutting lands who are nearly all located at these points have a marked tendency to gradually infringe on the right of way.

A survey has its further value in giving the necessary data for change of grade and alignments. The Department is striving to get both ends of the road in good shape, while keeping the summit passable, and then work from both ways to the crest of the mountains. The ends are traveled much more than the section of road over the summit. In accordance with this plan during the year 1908 there has been erected on the Mono County end a combination bridge of 70 feet span with concrete abutments over the West Walker River to supplant an old wooden structure in dangerous condition. It was in this bridge that the steel from the Riverton bridge on the Lake Tahoe wagon road was used. A 25-foot reinforced concrete bridge with 16-foot roadway was erected at Junction over the east branch of the West Walker River. Two 20-foot span reinforced concrete bridges with 16-foot roadway and one 18-foot span reinforced concrete bridge were erected over small river crossings about one and one half miles west of Bridgeport. On account of cold weather we were unable to erect another 18-foot span reinforced concrete bridge near the three above indicated, but have all the materials on hand at its location, so that during next spring it can be readily built. From the isolated location of this work and its distance from rail connection it was deemed best to contract for these structures on a percentage basis. Therefore an agreement was made with Messrs. Jenkins & Wells, of Sacramento, to do the work on a ten per cent margin. Below is given a table of costs and estimates which when compared with similar work in more favored locations makes an excellent showing:

TABLE OF ESTIMATE AND COST OF SONORA AND MONO BRIDGES.

West Walker Bridge—

Commenced August 1, 1908. Finished September 30, 1908.
Span, 70 feet; clear height, 8 feet; roadway, 14 feet.
Combination wood and iron bridge; iron work of the bridge used.

New bridge material, cost	$350 71
77 cubic yards abutment, 96¼ barrels cement	481 03
Abutment, labor cost	593 68
Erection, labor cost	186 75
Inspection, cost	132 32
Contractor's commission	172 42
Total cost of bridge	$1,919 91

Junction Bridge—

Commenced August 15, 1908. Finished September 28, 1908.
Span, 25 feet; clear height, 4 feet; roadway, 16 feet.
Reinforced concrete on concrete abutments.

Preliminary work and excavation, labor cost	$128 29
40¾ cubic yards concrete, labor cost	349 35
60½ barrels cement, cost	386 78
7,574 pounds steel, cost	383 36
Forms, cost	56 45
Inspection, cost	132 32
Contractor's commission	141 32
Total cost of bridge	$1,577 87

Bridge No. 4—

Commenced August 21, 1908. Finished October 8, 1908.
Span, 20 feet; clear height, 4 feet; roadway, 16 feet.
Reinforced concrete on concrete abutments.

Preliminary work and excavation, labor	$128 80
36.4 cubic yards concrete, labor	322 60
51½ barrels cement	330 10
4,767 pounds steel	232 59
Forms	64 26
Inspection	132 32
Contractor's commission	118 72
Total cost of bridge	$1,329 39

Bridge No. 3—

Commenced August 31, 1908. Finished October 7, 1908.
Span, 20 feet; clear height, 4 feet; roadway, 16 feet.
Reinforced concrete on concrete abutments.

Preliminary work and excavation, labor	$130 29
32⅖ cubic yards concrete, labor	241 50
46½ barrels cement, labor	288 45
4,767 pounds steel	232 59
Forms, etc.	64 26
Inspection	132 32
Contractor's commission	106 61
Total cost of bridge	$1,196 02

Bridge No 2—

Commenced September 23, 1908. Finished October 14, 1908.
Span, 18 feet; clear height, 4 feet; roadway, 16 feet.
Reinforced concrete on concrete abutments.

Preliminary work and excavation, labor	$69 55
27⅗ cubic yards concrete, labor	291 50
38½ barrels cement	232 20
4,334 pounds steel	219 76
Forms, etc.	64 26
Contractor's commission	98 63
Total cost of bridge	$1,108 22

Bridge No. 1—

No work done on account of weather.

210 sacks cement	$336 00
4,334 pounds steel	229 76
Form lumber, etc.	55 86
Total cost of materials stored	$621 62

Total cost of five bridges erected	$7,131 41
Material for bridge No. 1	621 62
Total	$7,753 03

With the accomplishment of the above work and the construction of one hundred culverts of concrete, vitrified pipe or stone, to date there remains one hundred and eleven culverts to be constructed west of the summit and one hundred and two east of the summit, besides three 8-foot bridges, five 20-foot bridges and two 15-foot bridges. A wooden bridge over the Stanislaus River, built by the Union Construction

Company without cost to the State, and the Eagle Creek bridge are in good shape, and will last at least eight or ten years.

Having had charge of this road for seven years, and knowing its needs, I therefore recommend a special appropriation of $12,000 for the purpose of making some of the foregoing suggested changes and the necessary surveys for them.

MONO LAKE BASIN ROAD.

There has been appropriated a maintenance fund of $1,250 per annum for this road, but as I regret to state the road is not yet wholly completed to its western terminus, and consequently this money has been applied only to the work finished under the first contract.

The contract of Mr. J. F. O'Brien for the construction of the last five miles, 593 feet of this road, has been delayed materially by scarcity of labor until the spring of 1908. At this time he was unable to proceed with the work, and I therefore notified the people on his bond to complete the contract. Although they have not yet done anything towards the construction, they assure me of the completion of the work next summer. As it is impossible to work in the winter time on account of the heavy fall of snow, and as the season is so short and the constructive work in solid rock so difficult it takes much longer to get the same result as a road constructed in the foothills. One great setback to the completion of the road was the damage done by a heavy blast set off in 1906, in the solid granite and tearing away the whole mountain side. In fact, the loss caused the contractor by this blast was very serious and probably cost $3,000 to cut out a roadbed of solid granite. This also delayed the work one year, as it took the greater part of one season to replace this section.

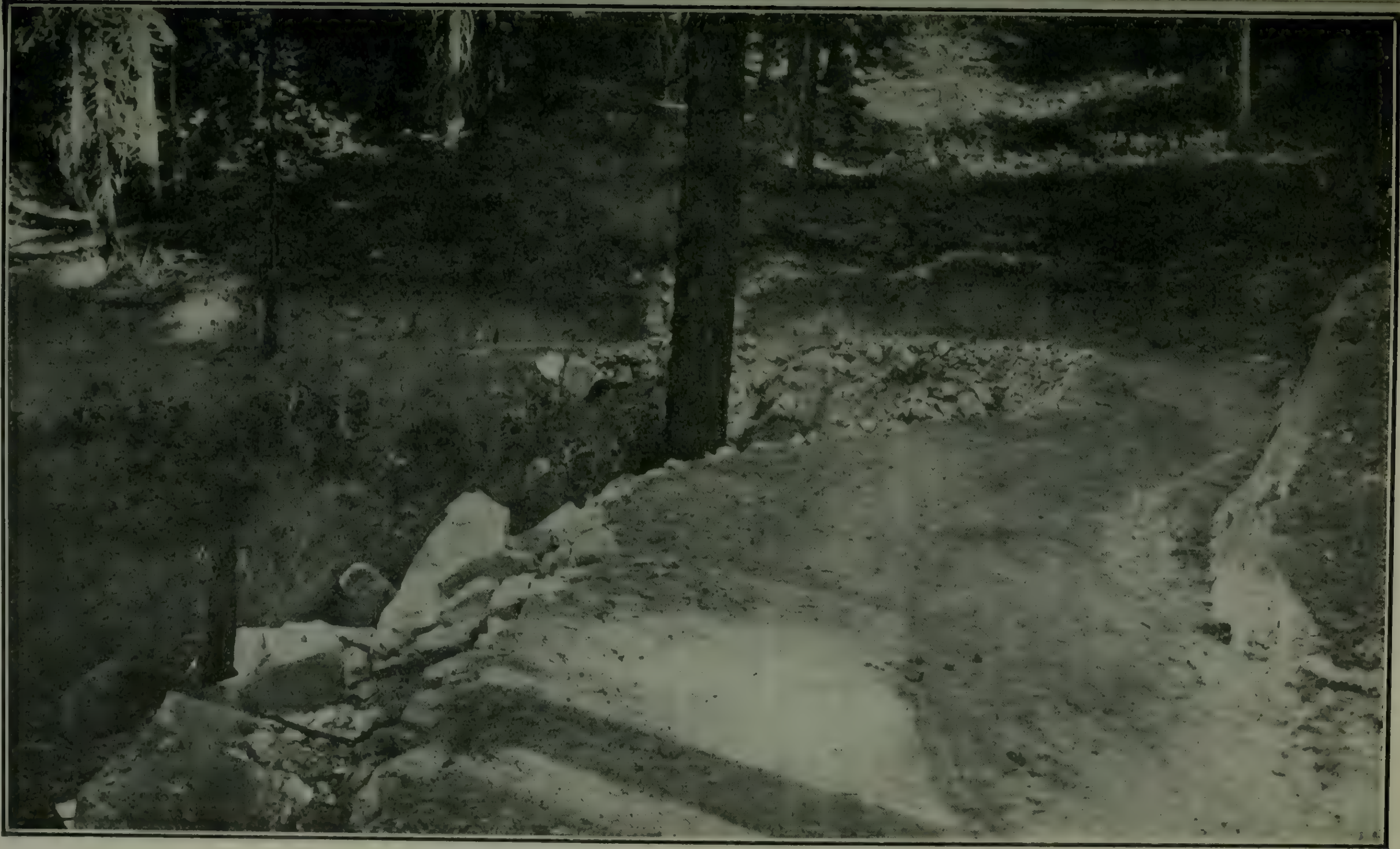
When this road is completed in 1909, there should be some action taken towards the improvement of the Tioga road proper. This road extends from Crockers Station, in the Yosemite National Park, to the lake at the head of Leevining Creek Canyon, or the western terminus of the State road.

The Tioga road has received little repairing, and consequently is in very poor shape for travel. Nearly its whole distance is in the bounds of the National Park, and should, therefore, be bought by the Federal Government and repaired. Unless this is done, travel by this route will be so badly handicapped as to make this beautiful country inaccessible to a great many people.

For the maintenance of the Mono Lake Basin road, I recommend an annual appropriation of $1,500.

KINGS RIVER CANYON ROAD.

The appropriation of $25,000 by the State, contingent upon the county of Fresno contributing 50 per cent as much, or $12,500, provided $37,500



KINGS RIVER CANYON ROAD. CONSTRUCTED 1908. MAXIMUM GRADE 6 PER CENT.

for the survey, location, and construction of this most important scenic highway of the State. During the year 1906 a survey was made for the first 20.1 miles to a point near Horseshoe Bend on the South Fork of the Kings River. In 1907 the survey was continued under the charge of Mr. E. B. Henderson. He crossed the river near Windy Cliffs and then kept on the north side of the river to the end of the survey near the Cedar Grove Hotel, in the floor of the Kings River Canyon. A total length of 32.8 miles gives a road from the General Grant National Park to the floor of the wonderful canyon of the South Fork of the Kings River.

During the same year or 1907, the construction work was begun, under the direction of Mr. M. P. Ormsby, at the north gate entrance to the General Grant National Park and continued to within one half mile of the summit of the ridge between Ten-Mile Creek and Millwood. This year, under the charge of Mr. H. F. Hill, the work of construction was continued until about 5¼ miles of roadway had been built. The Department bought a 31-ton steam traction shovel and two small two and one-fourth inch Burleigh drills for this work, and after considerable effort the machinery reached Mr. Hill about August 20, 1908. On account of the softness of some of the roads we were compelled to transport the shovel by team at a considerable expense; however, it is already demonstrated that the steam shovel is the quickest and cheapest way of constructing the mountain roads of California. It cuts the cost of hand work by 50 per cent in moving the class of materials encountered on these roads, and adds greatly to the width and alignment. A bed of solid earth must be cut out to permit of the shovel to travel in, while a sharp spur or ridge, which ordinarily was encircled, is now cut through with a great deal less cost. Large trees, stumps and brush are cast over the waste edge of the road with facility, so that the cost of grubbing the road is minimized. From the short operation of this shovel it is plainly seen and proven that the mountain roads of California can be built at much less cost than originally figured, if the traction steam shovel is used.

For nearly the whole distance of this road some of the most delightful scenery of California is passed. Leaving the big trees at the General Grant National Park and skirting the west slope of the ridge a panoramic view of the San Joaquin Valley is seen. Then crossing the summit of the ridge and descending into Ten-Mile is, for the last two miles, in full view of the main Kings River Canyon and Tehipite from Indian Point. Crossing Ten-Mile Creek and gradually descending until Lockwood Creek is passed, suddenly the road emerges on the crest directly overlooking the confluence of the Middle and South Forks of the Kings River. Here a rough, rugged, and rocky country is traversed until past Redwood Creek, when the ground encountered is very good for the construction of a road. This continues until within one half mile of the river crossing. It is on this side of the mountain, of good road ground, that may be seen the great gorge of Windy Cliffs. Where the road switches back on a turn on the crest of a ridge, the view of a deep chasm fifteen hundred feet deep is, perhaps, unsurpassed in beauty, and at the foot of this gorge, where the road survey is along the river, is a cave of unknown dimensions. The mouth of this cave is very close to the road, about one hundred feet, and extends into the limestone of Windy Cliffs. Continuing on the north side of the river until Grizzly Creek is reached, a wild river gorge is traversed. Beyond Grizzly Creek the ground gradually flattens out into the floor of the canyon.

So rough and rugged is the general country through which this road is laid out that we were compelled to expend some considerable money in building trails from the main trail toward the river to permit of camp being made within a reasonable distance of the work. During 1906, I personally conducted the last few miles of that year's survey, and then saw the futility of getting men to continue the work of survey without being compelled to walk or climb three miles out of the canyon to camp in the evening. I have traveled over the whole country near the line of survey, and am fully acquainted with the difficulties met with in the work, and fully appreciate the obstacles overcome by a survey through a canyon where one misstep might precipitate one headlong one thousand feet below.

I herewith give a résumé of the survey of this road and also the cost of the construction. Before proceeding, however, I wish to call the reader's attention to a view herewith presented in this report showing the steam shovel at work in rock. Note the body of the rock has been blown out. For the most part all the higher foothills of the Sierra Nevada's and those high ridges of the same range that are well timbered show an earth material superficially, and most surely a granite formation just beneath this surface. This was encountered in the construction of this road, and, consequently, ran up the price of hand labor per mile of road. It may be plainly seen from the figures on costs that the steam shovel which handled the hardest part of the work, the last mile constructed, brought down the average cost per mile.

During 1906 there was surveyed 20.1 miles of road at a cost of $167 per mile, or $3,341.72 for the total distance.

The following year Mr. E. B. Henderson, with a party, began August 17, 1907, and finished the survey November 17, 1907. He surveyed 12¾ miles of road in the roughest part of the canyon at the cost of $211 per mile, or $2,691.22 for the complete distance.

During 1907 Mr. M. P. Ormsby began the work of construction of this road at the north edge of the General Grant National Park and built 1.6 miles at a cost of $4,040 per mile. He stored $1,100 worth of tools and equipment for the year 1908. Upon the beginning of work this year Mr. Ormsby was transferred to another road, as I contemplated a cheaper method of building by steam machinery, and therefore required the services of a man skilled in that line. Mr. H. F. Hill took charge of the road and continued the work by hand until after numerous delays a shovel was delivered to him, and then he was able to run only one month, when the work had to be closed down on account of winter weather and the inability to hold men in that high altitude late in the year. Work began May 26th and ended October 28, 1908, with the results as tabulated:

3.5 miles finished 1908, cost	$13,103 00
Average cost per mile, 1908	3,750 00
Equipment stored, 1908	6,690 00
Hand labor per mile, 1908	2,330 00
Labor steam shovel, per mile, 1908	1,300 00

After carefully comparing hand work with steam shovel work, it is concluded that it will require about $50,000 to complete this road, without the bridge at the mouth of Boulder Creek, which will probably cost $5,000. Therefore, it is recommended that $50,000 be appropriated for this work, and that the road be made a State road, for obvious reasons connected with the maintenance. Through the scheme of paying partly for a road by a county and partly by the State the Department has been subjected to unwarranted severe criticism for the nonpayment of claims promptly. This occurred by the State claims being allowed within one week from presentation for audit, and the one third payable from the county appropriation has been out from a month to six weeks, depending upon the set meetings of the board of supervisors. I have carried numerous labor accounts on my personal funds to facilitate the work of the Department, but feel that a considerable portion of it could be obviated by a different manner of making the appropriations.

ALTURAS AND CEDARVILLE ROAD.

The State, at the session of 1907 legislature, gave aid to the county of Modoc in the repair of the Alturas and Cedarville road in the sum of $7,000. This amount, however, to be expended from the state fund after the county of Modoc had expended $3,500 on the same road. The writer made a trip between Alturas and Cedarville, in company with the county supervisors of the district, and viewed the work done two years ago by the State and the work done by the county during 1907 and 1908. These improvements were found to be substantially as they were finished and in excellent condition. Shortly after the county had expended the $3,500 designated by the statute of 1907, the Department began the work, September 26, 1908, of improving this highway. The following work, with costs, was done under the direction of Mr. J. H. Godfrey:

2,000 cubic yards material, gravel and rock, hauled on road	$1,544 49
Material cost per cubic yard	77
600 square feet of rough rubble wall	11 25
6 culverts built of stone	86 25
1 bridge and culvert repaired	72 43

The Alturas-Cedarville road is one of the commercially important roads in California. It is the main artery for all supplies to and from Surprise Valley and railroad connections. From Cedarville to Alturas is twenty-five miles through foothills and the Warner Mountains. The nature of the soil and rock, adobe and lava, two of the most difficult materials to make a good road of, practically continue throughout the whole distance. The treatment of this road is therefore a problem that can only be solved by sand and gravel surfacing. The appropriations from the State have not been sufficiently large to allow of good first-class substructures, such as concrete or vitrified pipe culverts, but the money has been chiefly applied to cutting out bad grades and surfacing the road.

SIERRA STATE ROAD.

The problem of getting a road from Downieville to Mount Pleasant on the Quincy road, was necessarily more difficult than if the country traversed sloped with the water shed. On this route, however, we were compelled to go contrary to this plan and cross the watersheds. Thus, to obtain a proper survey for the roadway caused more work, time and expense than ordinarily. A realization of this fact is foreign to the layman and he looks upon the expense of surveying as something superfluous. However, an improper survey in this character of country, crossing the water courses, may cost many thousands of dollars in construction, which most likely, with the expenditure of money for preliminary survey work, would have saved fifty times the cost of such work. Improper location of roads is evidenced throughout California, both by the difficulty of traveling and the expenditure of maintenance money. The State has so far obviated the catchy scheme of cheap, faulty location with the eventual heavy cost of maintenance.

There has been surveyed 14.52 miles of this road and there remains about six miles to be surveyed. I herewith present a table of cost of the survey, including office work, of getting out plans, maps, profiles, specifications, and cross-sections, with estimate of materials to be moved and cost of moving the same:

Table of Survey Costs.

Distance of survey 14.52 miles, total cost	$2,602 35
Cost per mile	179 22
Work of platting cross-section, estimate, etc., cost	485 00
Work of platting, cross-section, estimate, etc., cost, per mile	33 33

The survey began July 15, 1907, under the charge of Mr. J. B. Gray, but before completion he was recalled and Mr. Geo. W. Kimble placed in charge. The snow drove the party out October 22, 1907. The following year, or 1908, it was decided to start the construction work, provided the rights of way were obtainable. Where the survey crossed the ranch property of Messrs. Denari and Rasasco, through some cleared land, $1,000 was asked the State for this particular right of way. After a trip on foot over the whole survey, June 20 and 21, 1908, I decided to place the matter of obtaining these rights before the county board of supervisors, and should they secure them to then proceed with the work. Therefore, without cost to the State, all rights of way have been secured as far as Eureka.

On July 20, 1908, a crew, under the charge of Mr. M. P. Ormsby, was sent to Downieville to construct as much of the work as possible this year for the available money. Below follows the table of work with costs:

Table of Construction Work and Costs.

Wall building, loose rubble, 11,430 square feet, cost	$228 60
Grubbing and clearing roadway, 20,880 lineal feet, cost	605 72
Material removed, 13,260 cubic yards	5,434 55
Equipment and supplies on hand	1,750 00
Total expended	$8,018 87

Cost of moving material per cubic yard, 41 cents.
Cost of building one mile of road, $2,161.
Length of road built, 2.9 miles.

This road gives that section of the State a cross road, traversing a mountain range between two nearly parallel roads, which have been wholly inaccessible to each other by any reasonable distance. The grade established on the State road does not exceed 6½ per cent, which for that mountainous district is exceedingly easy. The width of roadway is 12 feet, with turnouts of 18 feet width and 100 feet in length.

The estimated cost of the completion of this survey and work of construction is $35,000, which I recommend, in addition to the original appropriation of $12,000.

TRINITY-TEHAMA-SHASTA-HUMBOLDT ROAD.

In 1903, $1,800 was appropriated for a survey along the Trinity River, from a Humboldt County road to North Fork, Trinity County. This survey was made from near the South Fork of the Trinity along the main river, for a distance of 21.57 miles to a point between Don Juan and Taylor's Flat, when on account of the lack of funds the survey was discontinued. After a lapse of four years the Trinity road matter again came to the attention of the legislature, and at the 1907 session $50,000 was appropriated with the view of obtaining a State highway connecting the roads of Humboldt County with those of Trinity, Tehama, and Shasta counties. The location of the route was placed under this Department, and therefore, on August 22, 1907, a survey party under the charge of Mr. J. N. Lentell was started out over what is known as the Low Gap of Mad River route. The survey began where the present Low Gap road ends and continued up South Fork Mountain to a low saddle thereon—elevation 4,000 feet—then descended to the South Fork of the Trinity River; thence up Rattlesnake Creek and Post Creek to its source; then, with a slight drop, ended on the road between Hay Fork and Red Bluff at a small station known as Peanut. The distance of this survey with auxiliary lines was 31¾ miles. From here Mr. Lentell and party proceeded to North Fork at the junction of the main Trinity River and its fork, and began a survey down the main river on the north side for a distance of 22.23 miles, where he tied on to the survey made in 1904, under a former appropriation. He also examined the so-called Hennessey road—a road being constructed by private enterprise from Burnt Ranch, on the Trinity River, over a range of mountains to the South Fork branch of the Trinity, and reported as follows:

REPORT ON HENNESSEY ROAD AND CONTINUATION.

January 1, 1908.

" Mr. N. ELLERY, *State Engineer, State of California.*

SIR: I went over the Hennessey road and found it from Hennessey's house to the summit of the divide and about a mile west of the summit graded, the grade being about 6 per cent, in a few places running up to 7 per cent. The road between these points is very crooked, being a series of loops, to get down from the summit on each side. From the point a mile west of the summit there is about a mile of unfinished road. From here, however, the road continues in a straighter line with very few loops until it reaches South Fork.

The road on the west of the divide, already completed and estimated about eight miles long, is on an even grade and does not exceed 6 per cent, except for about half a mile near South Fork, where it is between 8 per cent and 8½ per cent. The width for the lower three miles is about eight or nine feet solid roadbed, in some places a little less; the upper five miles about nine to ten feet in width, except about two miles where the slope of ground is slight it is 14 to 16 feet wide.

The elevations on the foregoing road are 2,100 feet at the eastern end, near Hennessey's house, and 3,100 feet at the summit of the divide.

I think it inadvisable to use this road at all, as the river road is the thing, for 3,100 feet elevation is too great a climb when a river road grade can be obtained. In the construction I might add, that my opinion is that the river route should be located on the north side all the way down. If the river is crossed then I would advise crossing at Dixon's Bar, about two miles below Don Juan Point.

I investigated the Berry Divide to the south of the present road and found the pass mentioned before in our conversation to be 860 feet lower than the highest point on the present wagon road between Redwood Creek and Trinity River, and about two miles further south than the present road.

I enclose you list of elevations.

Respectfully,

J. N. LENTELL."

The following is a list of elevations furnished by Mr. Lentell:

Elevations on Trinity River Route.

End of Ellery's survey, 1904, Trinity River	1100′	barometer
Don Juan Bridge, Trinity River	1000′	barometer
Trail to McDonald's (U. S. Government Survey, B. M.)	1732′	
McDonalds, (below Burnt Ranch)	1560′	barometer
Hennessey's House (Burnt Ranch)	2035′	barometer
Summit of Hennessey road	3100′	barometer
Bridge at mouth of the South Fork of the Trinity	470′	barometer
Willow Creek Hotel (U. S Government Survey, B M.)	462′	
Divide between Trinity River and Three Creeks (U. S. Government Survey, B. M.)	3123′	
Three Creeks (lowest)	2280′	
Summit between Trinity River and Redwood Creek (U. S. Government Survey, B. M.)	3720′	
North Pass above Berry's old house	2930′	barometer
South Pass above Berry's old house (1 mile south)	2880′	barometer
Berry's house, near Redwood Creek (U. S. Government Survey, B. M)	1038′	
Bridge over Redwood Creek	878′	barometer
Green Point Ranch at Marsh Place	1430′	barometer
Divide between Redwood Creek and North Fork of Mad River	2350′	barometer

The survey on the Trinity River was completed December 19, 1907, and after the field notes were received by the office, I placed a draftsman at work plotting the notes for comparative costs on the two routes as surveyed.

After these notes had been properly worked out, I received a petition of the people of Hyampom and Hay Fork for the survey of the route leading from Hay Fork down Hay Fork Creek to Hyampom, thence down the South Fork of the Trinity River to Grouse Creek; up Grouse Creek to its head; then down on to the Mad River, somewhere near Mountain View.

The purpose of the Department being to obtain as much data as possible, to lead to a proper decision in the selection of a route, I therefore went to Eureka, and on August 27, 1908, started for the Mad River section, traversing the country around the head of Grouse Creek, South Fork Mountain between Hyampom and the mouth of Grouse Creek, and then proceeded to Burnt Ranch, when on September 1, 1908, I examined the Hennessey road in company with Mr. Hicks, the superintendent of construction, and found what work was accomplished, done in an excellent manner. On the east slope of the summit over which this road passes, there must be done considerable work, and on the west side, at least a mile of quite difficult road must be built. Ten to twenty thousand dollars ($10,000 to $20,000) must yet be spent to give this road a grade to permit of travel. All culverts are made of poles which are the merest temporary construction.

After the examination I went along the survey up the Trinity River and carefully noted the character of country as far as North Fork. There is no question as to the excellency of a grade up the river proper, but the material is largely tough rock, very expensive to work. When once a road is constructed, however, a solid bed is secured, practically indestructible.

Upon the completion of the survey of the Mad River route in September, 1907, I visited and traveled by foot most of the survey. The material is largely soil, with some quantity of rock on Rattlesnake Creek. There is, however, no necessity to exceed at any point, a six per cent grade, even though the survey runs across the line of water courses. This feature is an objection for proper construction, but is taken up farther on in the treatment of a road completely across this section of the State. To properly decide the location of this important State highway, it is necessary to compare the following features:

1. Public service.
2. Possible development of territory.
3. Distances, grades, elevations, and mileage to construct.
4. Character of ground traversed and bridges.
5. County road approaches.
6. Cost of routes.
7. Snow and sun exposure.
8. Maintenance of road after construction.

The whole problem is treated by first making the assumption that the objective points to be reached or brought together by a road system are the cities of Red Bluff, Redding, Weaverville, and Eureka, and that Humboldt Bay is the objective point of the three interior cities. These places are the county seats of their respective counties, and certainly represent the centers of public interest in the matter.

From the point of view of public service, the road should be so located as to give these county seats the quickest and best connection and still serve the greatest number locally. Taking Eureka as a starting point and designating the three probable routes as the Trinity River route, Hyampom route, and the Mad River route, I will, after describing them generally, give approximately the local tributary traveling public to each route.

The Trinity River, or the northern route, passes over the present county roads through Arcata, Blue Lake, Korbel, and Willow Creek, in Humboldt County, then turning south from Willow Creek, extends to the mouth of the South Fork of the Trinity where the road bears southeasterly over the Hennessey road to Burnt Ranch, on the Trinity. From here a survey extends up the main Trinity to Helena, Trinity County; then by county road through Junction City to Weaverville. From this point either Redding or Red Bluff may be reached.

The Hyampom, or central route, passes through Freshwater, then by the way of Mad River reaches the head of Grouse Creek, down such creek to its mouth, where it turns to the south along the South Fork of the Trinity River to Hyampom; then up the Hay Fork Creek to the town of Hay Fork, from where any of the towns of Weaverville, Redding, or Red Bluff may be reached by present road. The new road by this route would be from the Mad River to Hay Fork.

The Mad River, or southern route, would leave Eureka and pass by present road through Fortuna, Alton, or Rohnerville, Hydesville, and Bridgeville. From Bridgeville the road extends along the Van Duzen over the Low Gap Ridge to Mad River; then the survey made by the Department crossed South Fork Mountain to the South Fork of the Trinity River; thence up Rattlesnake Creek and Post Creek to a small station named Peanut on the Red Bluff-Hay Fork road. From here the present road through Hay Fork leads to Weaverville and Redding, and the opposite direction leads to Red Bluff.

The Trinity River route would directly benefit Arcata, Blue Lake, Korbel, Willow Creek, Helena, and Weaverville, and a local scattered mining population along the Trinity River, and indirectly Eureka.

The Hyampom route would directly benefit Eureka, Freshwater, Hyampom and Hay Fork, and indirectly Weaverville, Redding, and Red Bluff, while little intervening population on the part to be constructed would be found. The Low Gap route would directly benefit

Fortuna, Alton, Rohnerville, Hydesville, the rich Eel River Valley, Bridgeville, Hay Fork, and Red Bluff, and indirectly Weaverville, Redding, and Eureka. On the part to be constructed scarcely any population exists.

Therefore, so far as serving the centers of population of the interested counties the three routes each have one county seat directly benefited, but so far as population along the new part is concerned, the Trinity River route is first in position.

For brevity permit me to designate the routes as follows: Trinity River route "Route A," Hyampom route "Route B," Low Gap of Mad River route "Route C."

For development of the adjoining country Route A would certainly give the Trinity River mining section an opportunity to open to its full extent. Route B would cross a stock country on its western end and timber on its eastern part. In the little Hyampom Valley a small agricultural section would be vastly benefited. Route C would have a western section in a stock country and pass through considerable pine timber

I would decide in favor of Route A for development opportunity along the route.

In number 3 we have a vital contention, which is a great influence in the determination of a route. Means of communication seek the shortest and easiest route, and I might say cheapest for the same reasons although not so generally recognized, a railroad does.

In the matter of distances, grades, and elevations there is a considerable variance. On Route A a fine grade, not exceeding three per cent, may be had between Burnt Ranch and Helena, a six per cent or six and one half per cent from Burnt Ranch to South Fork. The greatest elevation on this part of the route is 3,100 feet.

Route B can be constructed with a six per cent grade from Mad River to the South Fork of the Trinity, then three per cent on to Hay Fork. The greatest elevation is approximately 3,600 feet, at the head of Grouse Creek.

Route C will require a six per cent grade from the Mad River crossing to a point on Post Creek, then about four per cent grade to Peanut. The highest elevation is approximately 4,000 feet, at the saddle crossed on South Fork Mountain. The grades, on the existing county roads on the ends of the connecting link, that go to make up a good route continuous between county seats are the same as the majority of mountain county roads, excessive grades in places with no uniformity. The lengths of the parts of the different routes to be constructed are as follows:

Route A—Helena to Burnt Ranch, 32½ miles by survey. If Hennessey road were used, then add 15 miles of length, perhaps 6 miles to be reconstructed near summit and east side of the summit.

Route B—Hay Fork to Mad River, somewhere near Mountain View, 58 miles to construct.

Route C—Mad River Low Gap to Peanut, 28 miles by survey.

While these distances, grades, and elevations are interesting, yet the following table gives the most important comparison on this subject:

Table of Approximate Distances.

Eureka to Weaverville (Route A)	119 miles.	To build, 32½ miles.
Eureka to Weaverville (Route B)	100 miles.	To build, 58 miles.
Eureka to Weaverville (Route C)	126 miles.	To build, 28 miles.
Eureka to Redding via Weaverville and Route A		164 miles.
Eureka to Redding via Hay Fork and Route B		131 miles.
Eureka to Redding via Peanut and Route C		157 miles.
Eureka to Red Bluff via Weaverville and Route A		199 miles.
Eureka to Red Bluff via Hay Fork and Route B		143 miles.
Eureka to Red Bluff via Peanut and Route C		162 miles.

The comparative value of the Hyampom route in distance to the three county seats on the eastern end should be noted. In fact, from Eureka to Weaverville by Route B it is 19 miles shorter than by Route A.

The character of the ground varies much on the different routes. On Route A a great portion of the part to be constructed is in solid rock and some stretches of talus. There are some places, such as Taylor's Flat and opposite Tinsley's where good road ground is encountered. See table of comparative costs on quantities of different materials to be excavated. Route B, so far as observed when on my trip, would obtain over the greater portion, earth excavation although some solid rock is in the line of road at many places.

Route C is mostly over soil with considerable rock on Rattlesnake Creek. Again, see table of costs given later.

The total lengths of bridges encountered on the three routes are in the following order: Route B, Route C, and Route A—Route A having the greatest number of lineal feet. It appears Route C has the best material over which a road could be built.

The county road approaches must receive the serious consideration due in the selection of a State road. The road from Eureka to Korbel is very good, with few grades, and they only incident to small ridges around Humboldt Bay and up Mad River.

Leaving Korbel, however, the road ascends the mountain and then descends to Redwood Creek crossing. Again ascending steeply up what is known as the Berry hill to descend after reaching the crest to Three Creeks, where one must climb over another ridge to reach Willow Creek. From Willow Creek the road to South Fork is over good ground, with no grades worthy of mention. Crossing the South Fork of the Trinity River we begin the climb over the divide to Burnt Ranch. From here up the river the grade can be made on a 3 per cent basis to Helena. Before reaching Weaverville from the last named point we must climb over a mountain on both sides of which the road is very steep. Between Weaverville and Redding and Red Bluff one main divide is encountered. This makes five ridges to cross to reach Weaverville from Eureka, and six to either Redding or Red Bluff by Route A. It is possible to avoid the ridge between Three Creeks and Willow Creek by making a new road to the south of the present county road, and thus also greatly improve the grade.

Route B presents the Kneeland Prairie hill, the divide at the head of Grouse Creek, and a divide between Hay Fork and Weaverville. To reach Weaverville three divides are crossed, while to reach Red Bluff three mountains must be climbed, and to reach Redding four.

Route C extends up the Eel and Van Duzen rivers to Bridgeville, then over a mountain to again reach the Van Duzen; up the Van Duzen to the Low Gap of Mad River, which can scarcely be classed as a mountain divide. Over this, however, we then cross the Mad River and climb over South Fork Mountain to the South Fork of the Trinity River; thence over the slight divide at the head of Post Creek. To reach Weaverville or Redding we must pass through Hay Fork, across one divide to the former, two to the latter, while Red Bluff requires but to climb the one main divide beyond Peanut.

On the Eureka end Route B would undoubtedly have the best approach, as the county roads leading to the other two routes are poorly located and constructed.

On the eastern end Route B again has the advantageous approach, while Route C has the second best approach.

In regard to the cost of the routes I will give the following table of approximate results in connection with the surveys of the two routes A and C, and an estimated cost from mere observation of Route B.

Table of Materials and Cost from Surveys.

Route.	Earth Cut, Cubic Yards.	Loose Rock, Cubic Yards.	Solid Rock, Cubic Yards.	Bridges, Lineal Feet.
A	101.150	63.000	95,000	3,600
C	111,350	37,000	15,000	2,800

Placing the cost of removing earth, including grubbing, at 35 cents per cubic yard, loose rock at 50 cents per cubic yard, solid rock at $1.20 per cubic yard, and bridge work at $20 per lineal foot, Route A would cost $180,900, with bridges costing $72,000, and Route C would cost $75,470, with bridges costing $56,000.

Route B will cost for the fifty-eight miles, approximately, one hundred and fifty thousand dollars ($150,000).

Route C will cost by far the least to make the connecting link, but will not give the same character of road as Route B.

The three routes are best compared for snow and sun exposure from Eureka to the center of Trinity County. Route A, after leaving Korbel, skirts the shady side of Bald Mountain through considerable timber, and in crossing at present the high divide above Berry's place encounters much snow. Up the South Fork from Willow Creek the road is on the wrong side of the river for sun. Also when the ascent of the Hennessey road is made a mile or two of shady road is traveled. Up the Trinity River, however, the north side of the river could be selected for the location, thus avoiding snow and having a fine sun shine.

Route B would encounter some shady road if the Kneeland Prairie road were made part of the route, but from the Mad River crossing practically to Hay Fork the sunny slope of the mountains is used. The only snow encountered would be the head of Grouse Creek, which, in a hard winter, is considerable.

Route C from Hydesville passes through considerable timber, which retains the moisture, but the road is constructed on the proper side of the Van Duzen River. From the summit above Bridgeville to the Van Duzen the road is on the wrong mountain slope. To get down from the saddle on South Fork Mountain we were compelled to use the shady mountain side as far as the South Fork River. From here on the survey extends on either side of Rattlesnake Creek, thus dividing the road's chances to dry out in the spring of the year. On the South Fork summit there is considerable snow in winter and spring.

It is, therefore, given that route A, if changed on Berry hill, would be freer from snow than either of the other routes, but that Route B would get more sun exposure and consequently an earlier spring road would result.

Route B is the best of the three for sun exposure, and Route A would be the best for snow, if the Berry hill were changed.

On the subject of maintenance, the solid rock bed can not be disturbed by the elements, but the covering to prevent the protrudence of rocks can be washed away and must be always protected. The earth road will cut out by allowing water to run down a slope, but the 6 per cent maximum grade used on State mountain roads keeps the erosion down to a limit of about one third the ordinary county mountain road with the heavy pitches or grades they most always possess. If properly cared for, routes C and B on newly constructed parts would be about even, and Route A would exceed the maintenance cost of either of the above two routes. Again, Route B would have a greater mileage of new road, and, consequently, a better grade than the county roads on the western end of the other two routes.

From the general investigation I have made of the territory through which the road must pass, the Hay Fork route has not received a sufficiently close inspection along Hay Fork River to give a proper decision.

Between Route A and Route C, however, there is little question. Route C is so much cheaper of construction, with distances between the county seats about the same, practically no difference in grades, serving the people equally except locally the Trinity River mines would receive an impetus; county road approaches about equal on west end, but superior on east end so far as Weaverville is concerned, that I can not decide for other than Route C. The comparative cheapness of Route C makes it the most reasonable line unless that part of Hay Fork River proves very easy of construction.

Owing to the request of a survey of Route B after the surveys for Routes A and C had been worked out and compared, the work of construction was necessarily delayed until nothing could be done this winter with any degree of satisfaction. Labor is difficult to hold in tents during the winter, and the swollen streams preclude getting in supplies.

It is, therefore, the intention of the Department to begin work at the earliest possible date of the spring of 1909. However, before the snow melts, I shall make the trip down the Hay Fork River and over the various divides and mountains to ascertain the relative amount of snow. In the construction of this road, a steam shovel could be used with great effectiveness and reduce the cost at least 40 per cent from hand and team labor.

Herewith is given the time and the costs of the survey of the two routes A and C: Survey began August 22, 1907, and ended December 19, 1907, or 119 days were occupied to survey 53.98 miles. Total cost of survey, 53.98 miles, $4,230.94. Cost per mile of field work, $78.38; total cost of office work, $1,722; cost per mile, office work, $31.90.

Office work constitutes platting, the making of profiles for grades, cross-sections for the calculation of cuts and fills, and cost of construction.

ECONOMIC RESEARCH.

From the beginning of its existence the Government of the United States has been engaged in making surveys of its territory. For many years the principal surveys on land were conducted by army engineer officers under the direction of the War Department.

In 1879–80 the U. S. Geological Survey was organized under the Interior Department, with Clarence King as Director. The first comprehensive report was published in 1882, by J. W. Powell, Director, and was devoted almost wholly to the treatment of structural geology. (The first annual report by King, in 1880, only dealt with the plans of organization and publication.)

The report of 1883 took up the subject of paleontology and mineralogy. In 1884 the new subjects treated were topography, artesian wells, and pleobotany. The report of 1885 mentions new methods in silver determinations, reports on swamps and on flora. In 1888 salt making was introduced into the investigation. In 1889 the study of petroleum and gas was taken up, and the researches of the survey reached California in a "Quartenary History of Mono Valley," "Geology of Lassen Peak District," and "Geology of Quicksilver Deposits of Pacific Slope."

The report of 1889 discussed the great Charleston earthquake.

The twelfth annual report, 1890, Part II, was devoted to irrigation. Each succeeding year witnessed the expansion of the system of investigation, until now it includes so many economic subjects that the survey is organized into six branches, subdivided into twenty divisions. Each division is again subdivided into sections according to the subjects to be investigated by it.

So important are the results of these investigations regarded by the public, the distribution of publications of the Survey now amounts to a million copies a year.

COÖPERATIVE WORK.

The Government, through its coördinate branches, including the United States Geological Survey, Experiment Stations, and Forestry Service, is so well prepared, with their organization, experienced staff and complete equipment, for accurate investigation along such extensive lines of economic development, that the reports of its work are sought for by public and private interests, and their accuracy accepted without question.

But the field of operations, embracing the entire country, and even extending into foreign territory, is so large that the appropriations made for them, liberal as they may be considered, are not sufficient to enable as rapid progress to be made as seems to be demanded by the needs of rapidly advancing communities.

To expedite investigations, which otherwise would have to wait for the Survey to reach them in its regular course, many states are coöperating in certain lines of inquiry in which they are most interested.

In the matter of topographic surveys, seventeen states are coöperating, for which $100,000 is allotted out of the general appropriation for the Survey, contingent upon the amount to be expended in each state being met with a like sum from that state.

For several years past the legislature of California has appropriated various sums for the purpose of coöperating with the Government. Contracts are annually made between the State, represented formerly by the Board of Examiners, and now by the Department of Engineering, on one side, and the Federal authorities on the other, as follows:

With the Director of the United States Geological Survey—

A. For the extension of topographic surveys within the State;

B. For investigation of water supply, conservation and utilization;

C. For investigation into the economic quality and purity of the waters of the State.

With the Director of the Office of Experiment Stations, Department of Agriculture—

D. For the investigation of the distribution, use and methods of application of water for irrigation; needs and methods of drainage.

With the Forest Service, Department of Agriculture—

E. For the investigation of the forest resources of the State and methods of forest conservation.

The gathering of information concerning all of the subjects above named is a proper function of the Department of Engineering, but to provide the Department with all the necessary equipment for field and laboratory work, and to maintain the necessary working force would require a large appropriation, and much of the work would necessarily be duplicate of a great deal that has been done before.

The Federal Government is already organized with a corps of experienced investigators, possessing all the best apparatus and instruments. As stated before, the field is so large that when the appropriations of Congress are allotted, the amount of work that can be done in any one state is comparatively small. The policy of the Government, however, is to give preference to those states which make appropriations for the same purposes, and the practice is to allot an amount equal to the State's appropriations for coöperative work.

In addition to other advantages resulting from coöperative work, it should be remembered that for every dollar so appropriated by the state another dollar of Federal money is used, and 90 per cent of the whole is spent within the State.

In conducting the investigations included in the coöperative work, it often happens that conditions arise which demand more extensive investigation along particular lines than had been contemplated, but work can only be carried to the extent of the appropriation for that particular branch.

It is believed that better results will be obtained if the State has a right of selection in conducting coöperative inquiry, and it is earnestly recommended that all appropriations for investigations in coöperation with the Government be made in one sum, and the allotment of the same for the different lines of investigation be left to the discretion of the Department of Engineering.

A.

TOPOGRAPHIC SURVEYS.

The charts or maps issued by the Government as the result of the topographic surveys made by the Geological Survey are marvels of completeness and accuracy of detail. All principal objects, natural or artificial, such as streams, lakes, shore-lines, reservoirs, canals, important wells and springs, railroads, highways, principal houses, villages, towns and cities, quarries, mills and other industrial plants—all are depicted with wonderful clearness and fidelity to position. Variations in the earth's surface are shown by contour lines of five, ten, fifty, or one hundred feet vertical intervals, all being referred to sea level. Elevations above sea level of prominent points are given in figures.

Prior to July 1, 1906, there were 74,948 square miles of the State's surface surveyed, and during the year 1906-7, 4,433 square miles of new area were added, so that on June 1, 1907, there were 79,389 square miles covered, making a little over fifty per cent of the entire State.

Under the coöperative agreement with the State the topographic surveys have been extended to include all of the Sacramento Valley below the 300 foot contour and lying west of the Sacramento River, from Iron Mountain to Suisun Bay, and on the east side of the river from the thirty-eighth degree of latitude which crosses the valley just north of Stockton and extending north to the thirty-ninth parallel near Marysville. This comprises about four fifths of the valley, and includes nearly all of the Sacramento Drainage District.

In the Sierra region the joint survey has covered Yosemite Valley, for which a special map was issued, the headwaters of the Merced River and adjacent streams, San Joaquin, Kings, and Kern rivers, and the mountainous portions of Tulare County.

Along the coast the Salinas quadrangle and part of the San Bernardino region have been surveyed, and east of the mountains Owens River Valley has been covered.

With the exception of the Salinas quadrangle and that portion of the Sacramento Valley lying east of the river, which were surveyed this summer (1908), the maps have been published and copies furnished to this Department. These maps are of inestimable value to all who are engaged in the study of contemplated irrigation, drainage, reclamation or power development enterprises.

Fixed Datum. In connection with the topographic survey, there are being placed on both sides of the Sacramento River, solid concrete monuments, in which are embedded aluminum tablets giving the elevation to the nearest foot, and the recorded notes give the exact location in feet and fractions. The elevations are determined by precise level lines run and checked with the utmost care, and are referred to mean sea level as determined by long series of tidal observations. In addition to these monuments, the survey places permanent iron "bench marks" at intervals all over the territory covered, and the elevations of these bench marks are marked and recorded in the same manner. By this means surveys made in any part of the State can readily be connected with these Geological Survey levels, and all reduced to a common base. The importance of this may be understood when it is stated that in the city of Sacramento no less than six different datum planes have been used, so that an elevation of, say, six feet reported by one survey may be actually higher than ten feet reported by another.

The Department is engaged in reducing all elevations given in the records of the office to the Geological Survey datum, and in conjunction with the local office of the Weather Bureau river gauges are being connected with the Geological datum.

It is intended, if means are available, to continue the coöperative survey until the entire State shall be surveyed and mapped.

The topographic work is being conducted under the direction of Mr. T. G. Gerdine, Geographer in Charge, California Work. The report of Mr. Gerdine for the year ended December 31, 1908, is hereto appended:

REPORT OF TOPOGRAPHIC BRANCH.

By R. B. Marshall,
Chief Geographer, United States Geological Survey,
By Thos. G. Gerdine,
Geographer in Charge Pacific Division.

We have the honor to make the following detailed report of operations in California, for the Topographic Branch, under the coöperative agreements of May 15, 1907, and June 20, 1908, for the fiscal year ending June 30, 1909:

The detailed topographic survey was continued north on the east side of the Sacramento Valley, beginning where the work was stopped at the end of the coöperative year 1906-7, about on a line east and west through the southern shore of Suisun Bay, or, to be exact, on the thirty-eighth parallel of latitude, and has now reached the thirty-ninth parallel of latitude, which is approximately a line east and west through Wheatland. By the end of the fiscal year 1908 (June 30, 1909) all of the above specified area, extending from the Sacramento River to the 300-foot contour running along the edge of the hills east of the river, will have been completed. This, with the previously completed portion of the Sacramento Valley, which includes all the western part of the valley below the 300-foot contour lying between Red Bluff and Suisun Bay, will complete a survey of four fifths of all the valley lands which are susceptible to irrigation under the proposed dam of Iron Canyon, 300 feet above sea level.

The area has been published, as have the other coöperative surveys in the Sacramento Valley, by photolithography on the field scale of 1:31680, or two inches to one mile, with 5-foot contour intervals, each sheet covering an area of about 150 square miles; and the area west of the Sacramento River has been engraved in standard 15-minute quadrangles of about 240 square miles on a scale of 1:62500 with 10-foot contours. The area east of the Sacramento River will be engraved in 7-½ minute quadrangles on the field scale 1:31680, or two inches to the mile, with 5-foot contours, each sheet covering an area of about 60 square miles.

The photolithographs are published primarily for the use of engineers and it is believed in adopting the new scale for engraving that a more useful map, not only to engineers but to the public, will be published which will present all the information necessary in planning in detail for any form of irrigation, railroad development, drainage or construction of county roads, maps, etc.

The horizontal control was determined by triangulation and primary traverse, and the vertical control by level lines, all in closed circuits. The maps are surveyed by the planetable stadia method, using alidade levels for all points obtained in determining the positions of the contours. These positions average about one hundred to the square mile and are preserved on tracing linen sheets, that can be reproduced by transparent negative sheets to fit over the photolithograph, for the use of engineers. All public land lines, houses, roads, railroads, water courses, etc., are shown.

A detailed tracing is made, showing the land classification as to quality of soil as it appears on the surface to the engineer, the kind of crops produced at the time of the survey; also a careful line is traced showing the edge of the overflow and timbered areas.

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PIERS.

Since the report to January 1, 1907, no additional work has been carried on in the establishment of the chain of concrete piers which at that time had been set along the Sacramento River from Collinsville and Antioch to Sacramento. It is recommended that the erection of these monuments be continued along the river from Sacramento to Tehama, from Vernon to Marysville, and from Antioch along the San Joaquin River to the Southern Pacific crossing.

SALINAS VALLEY.

Owing to the urgent demands for topographic maps in the Salinas Valley, and in order that the work could be used in connection with future irrigation development of this valley, detailed coöperative surveys have been started in the vicinity of Salinas By the end of the fiscal year 1908 (June 30, 1909), the Salinas 15-minute quadrangle will have been completed. This quadrangle is being mapped on a scale of 1:31680 with 5-foot contours, and includes all of the valley lying between Castroville and Chualar, containing about 240 square miles.

IN THE SIERRA.

Problems regarding the storage of water and the protection of the forests, to preserve a steady flow of the streams, becomes of more vital importance to the State of California each year. This is especially emphasized by the recent development of power plants and in problems relating to irrigation and reclamation. For these reasons also the demand for maps of the forest, which will show the extent of the forested area and catchment basins, the lakes and possible reservoir sites, the mapping of the Mariposa sheet in the western and the Mount Goddard sheet in the eastern part of the Sierra National Forest was prosecuted in coöperation during the present fiscal year. It is expected that these sheets will be completed during another field season.

The maps show the topographic features of the land, such as mountains, hills, valleys and gulches; all bodies of water, such as lakes, marshes, streams, and springs; the routes of travel, such as railroads, wagon roads, and trails, political boundaries; cities, towns, and permanent buildings; and the names of natural and other features. They also indicate exactly the location of permanent survey monuments and bench marks, whose positions and whose elevations above sea level have been determined by precise methods—monuments that are available as starting points for local surveys. The maps of areas covered by public land surveys show all township and section lines, as well as the boundaries of all land grants.

To the State these maps are valuable in connection with making coöperative agreements with the United States Geological Survey or with other Government bureaus, for making State geological or other surveys, for use in State Agricultural colleges, in good-roads investigations, in connection with legislation involving county or town boundary lines, or regarding granting of charters, rights, etc., where a physical knowledge of the country is desirable or necessary. Engineers find the maps of service as preliminary surveys for locations of railroads, canals, highways, trolley lines, etc.; for providing water supply for municipal use or for power; in connection with problems involving land drainage and irrigation and for sewerage systems. Miners, land investors, travelers, and tourists use the maps as guide maps, which fully represent local conditions, and educational and scientific institutions utilize them in their various courses of scientific study.

The conditions in California, especially in the San Joaquin and Sacramento valleys, are almost ideal for the construction of detailed contour maps, and when these valleys are completely surveyed, the natural advantages will be shown on the maps in such a manner that it is almost impossible to estimate their worth in the development of the State. The maps present concrete examples of the development in the surveyed areas and on them soil surveys can be shown which will not only solve many questions now daily answered by the local committees and railroad agents, but will illustrate the wonderful possibilities of this region.

RESULTS OBTAINED BETWEEN THE EARLY SPRING OF 1907 AND JANUARY 1, 1909.

Counties.	Quadrangles.	Scale.	Area Mapped.	Spirit Levels.		Trigonometric Locations.	Primary Traverse.	
				Miles.	Bench Marks.		Miles.	Permanent Marks.
San Joaquin	Stockton	1:31680		14	3			
Solano, Sacramento, Contra Costa, San Joaquin	Rio Vista	1:31680		31	7	2	2	
Sacramento, San Joaquin	Woodbridge	1:31680	235	72	9	7	27	
Sacramento, San Joaquin	Lockeford	1:31680	235	62	10	10		
San Joaquin, Amador, Sacramento	Hatchville	1:31680	234	94	16	10		
Sacramento, San Joaquin	Galt	1:31680	234	63	7	4	15	
Sacramento, Placer, Sutter	Fairoaks	1:31680	233	80	17	4		
Sacramento, Placer, Eldorado	Folsom	1:31680	98	51	15	4		
Placer, Eldorado	Auburn	1:31680		34	12	1		
Placer, Sutter, Yuba	Lincoln	1:31680	232	66	21	8		
Yuba, Sutter, Yolo	Knights Landing	1:31680	205	54	6	5		
Placer, Nevada, Yuba	Wheatland	1:31680	72	48	16	11	17	4
Yuba, Sutter	Yuba City	1:31680		67	13	5	34	5
Sutter, Colusa, Yolo	Dunnigan	1:21680		26	5			
Sutter, Colusa	Grimes	1:31680		28	7	1	78	10
Yuba, Sutter, Butte	Biggs	1:31880				9		
Monterey *	Salinas	1:31680	240	94	24	8		
Monterey, San Benito, Santa Clara, Santa Cruz	Monterey			46	16			
Alameda, Santa Clara, Santa Cruz, San Mateo	Santa Cruz			25	4			
Alameda, Santa Clara, Santa Cruz	San Jose			71	16			
Mariposa, Madera, Fresno	Mariposa	1:96000		150	30	15		
Fresno, Mono, Inyo	Mount Goddard	1:96000	355					
Totals			2,373	1,176	254	104	173	19

* Will be obtained by June 30, 1909.

The State will have expended in the last two years $30,000, the United States Geological Survey $30,000, a total of $60,000, fully ninety per cent of which has been paid to merchants and employees within the State. Therefore, the State has not only received $30,000 from the National Government, but has received 2,400 square miles of careful survey with 1,200 miles of precise level lines, which are permanent in character and will have a constantly increasing value in developing its resources and which in the instances of the Sacramento and Salinas valleys would not otherwise have been surveyed by the National Government in such detail and could not have been mapped by the State for less than double the amount it has cost the State.

CONCLUSION.

It is believed that the importance of this coöperative work can not be overestimated in its connection with the general development of the State, and particularly from an irrigation point of view. It is earnestly hoped that the legislature will fully appreciate its importance and continue the work until all the forest areas and the Great Valley of California has been completely mapped.

R. B. MARSHALL,
Chief Geographer.
THOMAS. G. GERDINE,
Geogropher in Charge Pacific Division.

B.

WATER SUPPLY INVESTIGATION.

This branch of the work of the United States Geological Survey consists of the collection of data concerning the flow of surface waters, and the conditions affecting their flow, underground water supplies, duration, and magnitude of floods, overflow areas, evaporation, rainfall, water power, conservation and utilization of water resources, etc.

The legislature by act approved March 16, 1903, provided for the coöperation of the State with the United States Geological Survey in its investigations and appropriated funds therefor. This policy has been continued by acts approved March 18, 1905, and March 11, 1907.

Stream Gauging.—In pursuit of investigations on this subject more than 70 gauging stations have been maintained on the streams of the State, and the water flowing at all seasons measured.

In the summer of 1905 the streams throughout the State, north of Tehachapi reached the lowest stage known since systematic observations commenced, and as the low water flow is a strong controlling factor in developing irrigation and power enterprises, the opportunity was seized to obtain reliable records of the conditions. The spring of 1904 witnessed an unusual flood in the streams of the Sacramento Valley, and the records obtained were used by the Board of Engineers employed to investigate river and flood conditions of the Sacramento Valley as a basis for their recommendations of a plan for flood control and reclamation in the valley.

Exceptionally heavy snows in the southern Sierras in the winter of 1905 resulted in unusually high waters, flooding the San Joaquin Valley in the following spring. Although the service was not as well prepared there as in the Sacramento Basin, yet the records obtained will be useful in future studies.

In March, 1907, the State was visited by one of the most destructive floods in its history. The magnitude of this flood greatly exceeded the maximum considered by the Board of Engineers above mentioned, and the value of the records obtained by measuring the streams during the height of the flow far outweighs all that it has cost the State to maintain the coöperative investigations.

A report of the coöperative work in relation to surface waters made under the direction of Mr. W. B. Clapp, District Engineer, United States Geological Survey, is published herewith:

PROGRESS REPORT OF THE WATER RESOURCES BRANCH OF THE UNITED STATES GEOLOGICAL SURVEY.

In Coöperation with the State of California.

I have the honor to submit the following report of progress during the past two years in the work of the Water Resources Branch (formerly Hydrographic Branch) of the United States Geological Survey in coöperation with the State of California. This work has been executed in accordance with the legislative acts providing for State coöperation, approved March 16, 1903, March 18, 1905, and March 11, 1907, under which the State and Federal Government has each contributed an equal sum of money.

The hydrographic work proper of the Water Resources Branch comprehends an extensive study of both surface and underground waters as regards source, occurrence, distribution, accessibility, quality, utilization, etc., but this report is concerned with only the surface waters as they appear in the streams and lakes. During the past two years the collection of data relating to the surface waters and a study of the conditions affecting stream flow have been continued throughout the State. Precipitation records in the different stream basins have been and are being compiled, so far as available for purposes of comparison with the measured run-off from the same areas. The United States Weather Bureau has willingly coöperated to the extent of establishing new stations in several localities, particularly at the higher elevations in basins with deficient precipitation records. Some data on evaporation from lake surfaces have also been collected and compiled. Considerable data of exceptional value on the floods of the State, particularly in the Sacramento and San Joaquin basins, have been collected and analyzed. Special reference to the disastrous flood of March, 1907, will be made farther on in this report. Reconnoissances have been made regarding possible storage reservoir sites for various commercial purposes. Compilations are being made of the developed water powers in the State, and also computations and estimates of the great potential water power now going to waste through the channels of unharnessed streams. In all these investigations the aim has been to determine the surface water resources with a view to their greater utilization in the material advancement of the State.

The physical features of the State are such as to divide it naturally into several distinct and pronounced drainage basins. The largest and most important one of these is the Central Basin, with an area of about 64,000 square miles, or 40 per cent of the total area of the State. This basin receives almost its entire water supply from the western slope of the Sierra Nevada and drains into San Francisco Bay through the Sacramento and San Joaquin River systems. The North Pacific Basin contains about 20,000 square miles and has several large rivers. The South Pacific Basin contains about 23,000 square miles and has no large rivers, but most of the streams are quite important. The rest of the State, amounting to about 51,000 square miles, may be classified as part of the Great Interior and the Colorado River basins. This latter area includes all drainage eastward from the Sierra Nevada and the mountains of southern California. Gauging stations are now being maintained in all the basins, except the North Pacific. The list is as follows:

San Francisco Bay Drainage.

Sacramento River System.

Stream.	*Location.*	*Stream.*	*Location.*
1. Sacramento River	Near Red Bluff	8. Yuba River	Near Smartsville
2. Pit River	Near Bieber	9. Bear River	Near Sheridan
3. Cottonwood Creek	Near Ono	10. Cache Creek	Near Lower Lake
4. Stony Creek	Near Fruto	11. Cache Creek	Near Yolo
5. Feather River	Near Prattville	12. American River	Near Fair Oaks
6. Feather River	Near Oroville	13. Puta Creek	Near Winters
7. Indian Creek	Near Crescent Mills		

San Joaquin River System.

Stream.	*Location.*	*Stream.*	*Location.*
1. San Joaquin River	Near Pollasky	10. Modesto Canal	Near La Grange
2. Tule River	Near Porterville	11. Turlock Canal	Near La Grange
3. Kaweah River	Near Three Rivers	12. Stanislaus River	Near Knight's Ferry
4. Kings River	Near Sanger	13. Stanislaus Canal	Near Knight's Ferry
5. Merced River	Near Yosemite	14. Calaveras River	Near Jenny Lind
6. Merced River	Near Merced Falls	15. Mokelumne River	Near Clements
7. Tenaya Creek	Near Yosemite	16. Cosumnes River	Near Michigan Bar
8. Yosemite Creek	Near Yosemite	17. Tulare Lake	Near Lemoore
9. Toulumne River	Near La Grange		

South Pacific Drainage.

Stream.	*Location.*	*Stream.*	*Location.*
1. Arroyo Seco Creek	Near Soledad	7. Santa Ysabel River	Near San Pasqual Valley
2. Santa Ynez River	Near Santa Barbara	8. San Diego River	Near Lakeside
3. Santa Ynez River	Near Lompoc	9. Sweetwater River	Near Descanso
4. San Gabriel River	Near Azusa	10. Cottonwood Creek	Barrett Dam, near Jamul
5. Santa Ana River	Near Mentone	11. Pine Creek	Barrett Dam, near Jamul
6. San Luis Rey River	Near Pala		

Great Interior Drainage.

Owens River System.

Stream.	*Location.*	*Stream.*	*Location.*
1. Owens River	Near Round Valley	13. Sawmill (Eight-Mile Creek)	Near Independence
2. Owens River	Near Tinemaha	14. Oak Creek	Near Independence
3. Rock Creek	Near Round Valley	15. Independence Creek	Near Independence
4. Pine Creek	Near Round Valley	16. Shepard Creek	Near Thebe
5. Bishop Creek	Near Bishop	17. Bairs (Moffett) Creek	Near Independence
6. Baker Creek	Near Big Pine	18. George Creek	Near Thebe
7. Birch Creek	Near Tinemaha	19. Lone Pine Creek	Near Lone Pine
8. Big Pine Creek	Big Pine	20. Tuttle Creek	Near Lone Pine
9. Tinemaha Creek	Tinemaha	21. Cottonwood Creek	Near Olancha
10. Taboose Creek	Tibbetts	22. Ash Creek	Near Olancha
11. Goodale Creek	Tibbetts		
12. Division Creek	Tibbetts		

Colorado River Drainage.

Stream.	*Location.*	*Stream.*	*Location.*
1. Colorado River	Near Yuma, Arizona	2. Salton Sea	Near Salton (Mecca P. O).

At all the gauging stations measurements of flow are made from time to time and at various stages of the stream and a record is kept of the daily gauge heights. The discharge measurements are used to construct a rating curve for the stream from which a rating table is prepared. The table gives the discharge for all gauge heights covered by the annual range of stage. By applying the table to the daily gauge heights the daily discharges are obtained. The results for any one stream are summarized in a table showing the maximum, the minimum, and the mean discharge in second-feet and the total in acre-feet for each month and for the year. The run-off is also expressed in second-feet per square mile of drainage area above the station, and as depth in inches applied to the entire basin. These latter figures are useful in comparing the relative intensity of run-off in different basins, and also for comparing the run-off with the precipitation in each basin. In every case the foregoing data are accompanied by a brief description of the drainage basin and of the station where measurements are made, in order that they may be the more intelligently interpreted and utilized. All these data for the different streams are finally assembled in one volume and published annually by the United States Geological Survey as a Water Supply and Irrigation Paper, the publication being a progress report on the surface water supply of California. No other state in the Union has a separate report of this kind. The report of 1907, however, has not been published and will not be until after all of the data for 1908 shall have been compiled. The two years' work will then appear in one publication. These reports are for free distribution and may be obtained by application to the Director of the Geological Survey at Washington, D. C.

During the last two years there has been no extremely low water, such as occurred in the summer of 1905. The summer of 1908, however, has been characterized by moderately low water, especially in the Sacramento basin, but no unusual records have been established. For this reason no measurements of low water flow in the mountains have been made since the last report. The large number of low water measurements made throughout the mountains of the Sacramento and San Joaquin basins during the summer of 1905, and previous years have been exceedingly valuable in computations for estimates of the potential water power in the State.

While no extremely low water has occurred during the past two years, there have been some very high stages in practically all the streams in the State. During the winter and spring of 1907, great damage was wrought by general floods. In many localities the damage was greater than had occurred for many years previous; in others, it was the greatest on record. The Sacramento and San Joaquin valleys suffered most. In March, 1907, they were visited by one of the most destructive floods on record, especially so far as financial loss was concerned. The Lower Sacramento River and its two larger tributaries, Feather and American rivers reached the highest stages ever recorded, and record stages were reached by other tributaries.

This flood was remarkable in many respects. In the first place, it was preceded by a period of serious flood conditions caused by heavy precipitation, which had prevailed for several preceding weeks. The earth was already saturated and the flood basins in the valleys were already full. Then followed a period of general precipitation of extraordinary intensity, which prevailed for several consecutive days throughout the entire drainage basin. The storm was accompanied by comparatively high temperature, and consequently rapid melting of snow in the mountains. The Lower Sacramento, Feather, Yuba, and American rivers not only reached the highest stages ever recorded, but they maintained these stages for a moderately long period. Simultaneously with these, all the other streams maintained high stages, and the combined effect was a flood of exceptional height and extent, and of considerable duration. For the four days, March 18th to 21st, the mean rate of flow from the mountains and foothills of the Sacramento Basin alone was about 530,000 second-feet, or more than 22 second-feet per square mile.

During and after the flood, special effort was made to get all the data possible. Nearly all the important tributaries of both the Sacramento and San Joaquin River systems were gauged. The flow from 83 per cent of the mountains and foothills in the Sacramento Basin was measured at eleven stations, and the flow of 41 per cent of the mountains and foothills in the San Joaquin Basin was measured at six stations.

Unfortunately, no gaugings of the San Joaquin itself were made, as no station had been established at that date. Since that time, however, a station has been established near Pollasky.

It is believed that the data obtained during this flood are of sufficient value to fully compensate the State for its generous coöperation with the United States Geological Survey in the study of its water resources. Data are now available for planning a more comprehensive reclamation system for the Sacramento and San Joaquin valleys than has been possible heretofore. The importance of the data now available will be appreciated when it is recalled that the rate of inflow into the Sacramento Valley alone for four successive days, March 18th and 21st, was 112 per cent greater than the rate assumed as a maximum by the 1904 Commission of Engineers, after an exhaustive study of all flood data on record, including those of 1904 flood. Undoubtedly they will be of the highest value in the solution of the intricate reclamation and flood problems to be encountered in the future development of the valley.

At the time of making the last report, the old Tulare Lake bed had just been recently flooded. The first water entered March 15, 1906. The lake level continued to rise until August 4, when the lake had a maximum depth of 12.5 feet, and submerged about 300 square miles. After this date, the water slowly subsided until December 9th, when it began to rise again and continued to do so until July, 1907, when it had a depth of about 14 feet. Since the latter date it has steadily lowered. The exact figures are not yet compiled, but the lake probably has a depth of about 10 feet and an area of about 200 square miles.

It was believed, at the time of the last report, that Salton Sea had reached its greatest depth, but such proved not to be true. Owing to another break in the Colorado River, the sea continued to rise until February, 1907, when it had a maximum depth of 75 feet and submerged an area of about 500 square miles. During the rest of 1907 the water surface lowered 3.7 feet. The inflow from Imperial Valley is considerable, especially in the middle of the irrigation season. In order to determine its quantity, a large number of measurements were made during the first seven months of 1908. Notwithstanding the large inflow, the water surface lowered 4.4 feet during the first ten months of 1908. In November, the sea covered nearly 450 square miles, and had a maximum depth of about 68 feet. Under the supervision of the Weather Bureau and in coöperation with the Water Resources Branch of the United States Geological Survey and the Reclamation Service, an especially equipped evaporation station is being installed for the purpose of studying evaporation from the surface of a large body of water in an arid desert.

During the past two years, several gauging stations have been abandoned in localities where the records have been kept long enough to satisfy the local demand, or where the cost of maintenance was deemed excessive, compared with the value of the results obtained. On the other hand, several new stations have been established on other important streams where greater benefits will accrue to the public. The controlling principle of action in all such cases is that of rendering the greatest service to the greatest number, commensurate with the money expended. Most of the stations maintained at the present time should be continued for several years yet, as the value of the records enhance with their length and continuity. There is need of some new stations in different parts of the State, especially in the North Pacific Basin where no stations are maintained at the present time, but no material extension of the work is possible with the funds now available.

The increasing demand for authentic hydrographic data is the best index of the public interest in the present study of the State's water resources. Frequent requests for stream flow data come from many localities throughout the State. These data are being used as the basis for irrigation enterprises, power developments, and municipal water supplies, and they are invariably accepted by both parties in adjusting conflicting water rights. The relation of the agricultural, industrial and commercial advancement of the State to the water supply—its quantity, distribution, and accessibility—is becoming more fully understood, and it is certain that the future will witness a great demand for all the hydrographic data obtainable.

W. B. CLAPP,
District Engineer.

UNDERGROUND WATER RESOURCES IN SOUTHERN CALIFORNIA.

Practically every drop of surface water is utilized and great attention is given to the development of underground water. Some communities seem to be outgrowing the possibilities of such development; therefore, the survey has devoted special attention to the study of underground supplies in those regions.

The result of this work, conducted by Mr. W. C. Mendenhall, geologist in charge of underground water investigation, is published in Water-Supply Paper No 219, entitled Ground Waters and Irrigation Enterprises in the Foothill Belt, Southern California, 1908.

In this report, which is a volume of 180 pages, with numerous maps and diagrams, Mr. Mendenhall gives an elaborate history of the development of irrigation in that region, and treats of the serious shrinkage of the artesian area within the last two decades, of the lowering of the groundwater level, and discusses the causes of the same. This report may be had by application to the Director United States Geological Survey, Washington, D. C.

In the San Joaquin Valley all of the normal flow of surface water has been appropriated, and even the surplus flood waters, which uncontrolled as they are, can do naught but damage in their race to the sea, are claimed as "property" by certain wealthy riparian owners. Instances are on record where would-be appropriators have constructed expensive works and in their notices of appropriation have specifically declared that they only claim the surplus waters and recognize all prior rights, nevertheless they have been stopped by injunctions, the riparian owners setting up the theory (implied) that it is their own business if they shall be injured, and they are entitled to all the benefits (as well as the damages) that can accrue from their position as bank owners.

The area of the San Joaquin Valley floor is about 7,360,000 acres. The average yearly discharge of water into the valley from all of the streams entering it is about 11,500,000 acre-feet, or enough to cover the entire flow of the valley one foot and seven inches in depth.

Under the wasteful methods used for irrigating from gravity systems, two or three times as much water is used as the above supply would furnish, even if it were all conserved and distributed.

In consequence of the limit having been practically reached for acquisition of surface waters, the unirrigated arid lands must be reclaimed by drawing from the underground supply.

The recent rapid extension of agricultural development in the southern San Joaquin Valley, outstripping the available surface water supply, created an urgent need for accurate information as to the occurence and accessibility of subterranean streams and reservoirs. The Reclamation Service in its search for available reclamation project made some investigations in the valley, but without promise of results, as its energies were concentrated upon other localities which seemed more practicable and the work here was abandoned. The work of the Reclamation Service, however, had furnished some idea of the extent, accessibility, and quality of the underground waters in many parts of the Valley. The continuation of this work was taken up by the Water Resources Branch of the United States Geological Survey, under the coöperative agreement with the State, and in the spring of 1905 parties were assigned to work in this field, who collected some preliminary data, but the funds available were not sufficient to enable the work to be carried on continuously or systematically, so it was suspended in July. Field work was again commenced in the spring of 1906 and continued through the summer of 1907.

Considerable information has been obtained in regard to artesian wells, domestic wells, and pumping plants, as well as the geologic structure of the foothills and their relation to the distribution of the water bearing soils of the valley.

The artesian belt, so called, within which it may reasonably be expected flowing water may be obtained, begins at a point in the southern portion of the valley, about twenty-five miles west of Bakersfield, and extends along both sides of the trough of the valley in varying widths to the junction of the San Joaquin and Sacramento valleys. A small, apparently isolated, area of some 180 square miles, lying south of Bakersfield embraces the former beds of Buena Vista and Kern lakes. The total area of this great artesian belt is about 4,300 square miles. Not all of the artesian water developed within this area is suitable for irrigation, nor does there seem to be any line defining the boundaries of territories yielding pure or impure waters. At least the investigations have not determined such boundaries as yet. In addition to the artesian water shown to be available, the entire floor of the valley is underlaid with water bearing strata, lying at varying depths below the surface.

Pumping, to a limited extent, has obtained throughout the entire valley. The water raised by pumps is used for irrigation, city supply, and for steam boilers. The most extensive use for steaming purposes is at the oil-drilling and pumping plants in the oil fields and the high duty pumping stations along the oil pipe lines to the coast.

In Kern County, more than one hundred pumping plants are installed. Of these, above 40 per cent are gas-engine plants, using gasoline or distillate, 25 per cent are steam plants, and the remainder are operated by electricity. Most of the irrigating plants use centrifugal pumps. In Tulare County, along the eastern edge of the valley, are the famous orange orchards of Portersville, Lindsay, and Lemon Cove. Near Exeter, Tulare County, is found the highest lift yet recorded for an irrigation pumping plant, five hundred eighty-six (586) feet. It goes without saying that none but an orange orchard could pay the price for raising water to such a height.

In the citrous belt of Tulare County, about two hundred pumping plants are in operation, 65 per cent being electric-driven and 35 per cent operated by gas engines or steam.

The range of lift from the water surface to the surface of the ground is from 0 to 100 feet. The ground water level varies greatly during the season. For lifts exceeding 75 or 80 feet deep-well plunger pumps are used instead of centrifugals.

In Kings County are found some of the most reliable gravity systems in the valley, but they do not reach more than 40 per cent of the irrigable lands of the county. The bed of Tulare Lake from which the water has receded has become veritable "desert land," but with water applied is very productive. Since but little surface water is available recourse is had to wells. There are about 100 flowing artesian wells in the county, the greater portion of which are in or near the old lake bed. The flow of some wells is augmented by pumping. Some non-flowing wells, too, are pumped, the power used being steam or gas engines.

The most highly developed part of Fresno County is east of the trough of the valley surrounding Fresno City, and has been made populous and prosperous through the agency of its splendid canal system, which brings water from Kings River.

Only about forty flowing artesian wells have been bored. They are scattered over sparsely settled country of large ranches and are not much used for irrigation.

Madera County has about thirty flowing wells, practically all being used for watering stock. In the vicinity of Borden subsurface waters are pumped from fifteen or twenty wells and used for irrigation. The water table here is 10 to 20 feet below the surface of the ground but the pumps usually lower the water 15 to 20 feet so the total lift ranges from 20 to 40 feet.

Some irrigation is done from canals from the Fresno and Chowchilla rivers, two small, intermittent streams, very erratic in their flow.

Merced County is better supplied by irrigation, both surface and ground water supplies, than is Madera County. There are between 125 and 150 flowing wells in the county, but nearly all are used for stock purposes rather than for irrigation. Outside of the artesian belt some fifty pumping plants are in operation—about half for irrigation, the remainder for domestic and town supplies.

Stanislaus has done but little toward utilizing ground-water resources. The Turlock and Modesto Irrigation District systems and the canals along the San Joaquin River furnish a very reliable source for irrigation. Not more than a half-dozen flowing wells are in the county, and only one is known to be used for irrigation. Ground water is accessible, with moderate lifts, over a large part of the county and will eventually be utilized.

San Joaquin County has not done much to develop her artesian supply. In and around Stockton are several flowing wells of great depth. Some furnish excellent water while others are so strongly mineral that the water is used only for bathing. A number of deep wells have been bored, solely to obtain natural gas, which they produce in abundance. Ground water in abundance is found at shallow depths. A large number of small pumping plants are in operation and their number is being constantly increased.

The possibilities of the development of underground waters throughout the San Joaquin Valley are very great, and it would seem that by adopting intensive farming to compensate for the expense, the territory will be able to support a large and prosperous population.

Water Supply Paper No. 222, entitled "Preliminary Report on the Ground Waters of San Joaquin Valley, California," by W. C. Mendenhall, 1908, covers the investigations made to the close of 1907.

The third region to receive attention in the matter of investigation of underground water resources is the Colorado Desert, particularly in Imperial Valley and about the Salton Sea. In the northern end of the valley ground waters have been developed and through their agency several thousand acres of desert have been reclaimed and placed under intensive cultivation.

The coöperative arrangement with the State has enabled extensive studies of the extent and permanence of the artesian belt of the desert and Imperial Valley, the results of which will soon be issued in printed form.

The report of underground water investigation, conducted by Mr. W. C. Mendenhall, geologist in charge, is published herewith.

PROGRESS REPORT ON UNDERGROUND WATER RESOURCES UNITED STATES GEOLOGICAL SURVEY.

WATER RESOURCES BRANCH,
WASHINGTON, D. C., December 1, 1908.

Department of Engineering, Sacramento, California.

GENTLEMEN: I have the honor to submit the following statement of work done during the past year in California by that division of the Water Resources Branch of the United States Geological Survey that has to do especially with Ground Water Investigations.

The work has been carried out as heretofore by a coöperative agreement between your honorable body and the United States Geological Survey. The thirty-seventh session of the legislature of California in 1907 appropriated $20,000 from the State funds for the investigation of the Water Resources of the State of California. This sum was met by an equal allotment by the United States Geological Survey. Of this total of $40,000 for two years or $20,000 per year, about 25 per cent was set aside for the study of the Ground Water Resources. As a result of this expenditure of $5,000 annually, the investigations reported to you one year ago as under way in the foothill belt of Southern California have been completed and a report has been issued upon this field and is now available for distribution to those of the citizens of California who may be interested. It is known as "Water Supply Paper No. 219" and may be secured by application to the Director, United States Geological Survey, Washington, D. C., or to the Department of Engineering, Sacramento, California.

The studies under way in the San Joaquin Valley where ground waters exist in great quantities and are easily accessible, have not yet been completed but a preliminary report in which such results as are now available have been assembled, has been issued as "Water Supply Paper No. 222." Eventually a more complete report, embodying engineering and purity data that were not available at the time of the preparation of the report issued, will be prepared.

A third report, under way one year ago, has likewise been completed but is not quite ready for distribution. This contains the results of a study of ground water conditions in the Colorado Desert, particular attention having been paid to the artesian basin of the northwestern arm of the desert known as the Coachella Valley. This report, which will be issued as "Water Supply Paper No. 225," will probably be available for the use of the citizens of California early in the year 1909.

The measurements of fluctuations in the level of the ground waters in the important valleys of Southern California, measurements that have been underway for some years past, have been continued under the present coöperative agreement. This part of the state includes the section in which developments of ground waters have been more intense than anywhere else in the Union. Practically all of the irrigations systems that depend primarily upon surface waters for their supply have subsidiary pumping plants, by whose use the necessary supply during the dry season is maintained. So large a capital is invested in the citrus industry in Southern California, and the dependence of this industry upon the ground water supply is so direct, that it has long been evident that more complete evidence than has heretofore been available of the effect of ground water developments upon the under ground supply is desirable. It is to obtain this evidence that these fluctuation measurements were undertaken in 1904 and have been continued to the present. The results of measurements during the years 1907 and 1908 will be submitted for publication about June 1, 1909, and should be available within a few months thereafter.

Two new researches have been undertaken within California during the current year by the use of the coöperative fund. One of these is an investigation of the springs of the State. With the State's increasing recognition as a tourist center, these springs are becoming better and better known as health resorts, and the demand for definite information about them is growing correspondingly. It is to meet this demand that a geologist has been placed in the field, who will examine each of the important watering places of the State and gather authoritative data as to the temperature and quantity of the water and origin of the springs, and eventually make this material available to the citizens of California in the form of a published report.

The second new research within the State is an investigation of the underground waters of the Mojave Desert, lying immediately north of the Sierra Madre and San Bernardino Mountain ranges. It has long been known that in the southern end of this desert certain areas exist in which flowing waters can be secured, and the increasing demand for agricultural lands in California results in a constantly growing interest in the possibility of agricultural development in this section. A careful examination of the conditions which control the occurrence of the underground waters, with a mapping of flowing well areas and of the ground water levels has been undertaken. All of this data will be published with descriptive text and so will become available to the citizens of the State, as studies of other sections have been made available in the past.

Yours very respectfully,

W. C. MENDENHALL,
Geologist in charge Ground Water Investigations.

C.

HYDRO-ECONOMIC.

Inquiry under this head is for the purpose of acquiring information of the quality and purity of the waters of the State for economic uses and the variation from day to day and from season to season of the amount and nature of the ingredients carried in solution or suspension

The investigations being pursued are gathering data upon the following specific subjects:

(*a*). *Sources of water supply best adapted to municipal uses.* Water derived from different geological formations differ widely in their chemical constituents. Some are pure, in a potable sense; others are impregnated with minerals dissolved from the rocks they have passed over, and often to such an extent as to render them wholly unfit for municipal purposes. These investigations in which the State is coöperating will show which waters may be used and which should be avoided.

(*b*). *What waters may be adapted for irrigation.* Some waters contain such quantities of ingredients harmful to plant life that they must be avoided. Others, though containing harmful matters, may be used without harm if properly applied. Probably almost every natural water of California, which is in sufficient quantity for the purpose, may be used for irrigation, if used intelligently. Water containing alkalis in deleterious quantities for some lands may be used with advantage on others, and possibly on both by scientific methods adapted to the conditions.

(*c*). *What waters may be used for industrial purposes.* Many waters are harmful to steam apparatus. The State owns and operates a number of steam plants at its various public institutions, and some of them have trouble on account of the non-adaptability of the water used for the purposes required. More institutions will be established and the State should know what to provide for.

Water suitable for one line of manufacturing may be wholly unsuited for another. The State and Nation, coöperating, should acquire this information for the people and have it ready at hand when needed to guide the establishment of industrial enterprises.

(*d*). *Where systems of water purification may be employed, and the best systems to install for a particular quality of water.* Sacramento City affords an example of the needs of just this kind of investigation. Here is a large city, the capital of the State, arrived at the point where she must provide her people with a supply of pure water, and the need is so pressing that she can not wait for the collection and promulgation of data on the question, but is driven to the necessity of spending large sums in making independent investigations. The State in coöperation with the Federal Government, should acquire this information for all its communities at as early a date as practicable.

Owing to the fact that most of the towns and villages of the State are not situated so as to conveniently discharge their sewage into the living streams, the waters of the State are comparatively free from pollution from that source. But those cities which do dispose of their sewage in the manner indicated are growing in population, and other towns are being established. Communities are increasing which must use of the polluted waters for domestic purposes, and sooner or later the conditions will demand both that the sewage be rendered innocuous, and that the water supplies be purified.

One method of purification will serve for one or many sources of water, while other types must be treated differently. The object of inquiry along these lines is to afford reliable information that will enable intelligent selection to be made.

(*e*). *Whether the water furnished by a given source may be good at one season and bad at another.* Many streams which gather their supply in regions where the rocks and soil are impregnated with soluble minerals, and traverse low lands where the soil is similar, are known to furnish good water during the flood seasons, but as the stream shrinks to the low water stage the waters become so highly charged as to be unfit for use. When all such streams are recorded with their characteristics, physical and chemical, it will be known where improvement may be made by impounding the good water for use while the bad is allowed to escape.

In selecting waters for the preliminary investigation of this subject the State was divided into three districts as comprising so many types of drainage areas, viz., Sacramento Valley, San Joaquin Valley, and the Coastal Region, and several observation stations were established. It was soon found that the streams of adjacent drainage areas possessed characteristics so nearly in common that the selection of one stream would serve as a type of several. Such was the case in upper San Joaquin Valley. The data secured for Merced, Stanislaus, and Tuolumne rivers were so nearly in accord that it was decided to continue observations only on one, and all of the stations were abandoned excepting the Tuolumne.

At each station daily samples of the water were taken and sent to the laboratory of the United States Geological Survey at Berkeley, where the samples for ten days' collection are combined and analyzed so that the analyses represent the composite for ten-day periods.

The data from each station is carefully studied from every standpoint and the resulting report will show the engineer, city official, manufacturer or farmer whatever advantages or disadvantages any particular supply may possess for the purposes for which he desires to use it.

Up to the close of 1908 more than six hundred (600) analyses have been made, and much of the data collected has been prepared for report, which will probably be ready for publication before the end of the fiscal year.

This coöperative work has been conducted under the direction of Mr. Walton Van Winkle, Assistant Chemist, and the analyses have largely been made by Mr. F. M. Eaton, Assistant Analyst, in the laboratory at Berkeley, California.

The report of the operations for 1907 and 1908 are published herewith:

DEPARTMENT OF THE INTERIOR--UNITED STATES GEOLOGICAL SURVEY.

OFFICE OF THE DIRECTOR,
WASHINGTON, November 28, 1908.

HON. N. ELLERY,
State Engineer, Sacramento, California.

SIR: I have the honor to transmit the following report on the quality of water investigations conducted in coöperation with the State Department of Engineering, by the Water Resources Branch of the United States Geological Survey.

During 1905 and 1906, a series of analyses of river waters was made under coöperative agreement with the object of ascertaining the availability of the supplies for municipal and industrial consumption. Daily samples of water were collected for a period of one year at the following stations in California, and united in sets of ten, and the composites thus obtained were submitted to complete mineral analysis:

San Lorenzo River	At Big Trees.
Mokelumne River	At Clements.
American River	At Fairoaks.
Stanislaus River	At Knights Ferry.
Tuolumne River	At Lagrange.
San Joaquin River	At Lathrop.
Merced River	At Merced Falls.
Alameda River	At Niles.
Sacramento River	Above Sacramento.
Yuba River	At Smartsville.
San Lorenzo River	At Felton.
San Benito River	At Hollister.
Santa Ana River	At Mentone.
San Luis Rey River	At Papa.
Santa Ynez River	At Santa Barbara.
Santa Maria River	At Santa Maria.
Arroyo Seco River	At Soledad.
Kern River	At Bakersfield.
Malibu Creek	At Calabasas.

The analytical work was performed by F. M. Eaton, assistant analyst, United States Geological Survey, in the laboratory at Berkeley, and his report on the rivers is now nearing completion.

In 1907, coöperative studies were again commenced to ascertain the quality of the surface waters of the State in special reference to their industrial value. Active field work was commenced in October, 1907, by Walton Van Winkle, Assistant Chemist, United States Geological Survey, whose report on the present status of this investigation is quoted:

"In inaugurating the investigation of 1907, the work previously performed was thoroughly reviewed and a basis for the new examination was determined. Owing to their low mineral content, the waters flowing directly from the Sierras were omitted for further consideration except in so far as a knowledge of their seasonal changes would aid in interpreting analyses of streams which they feed. In the southern part of the State, in the irrigated districts, an accurate knowledge of the quality of the waters seems to be desirable, especially in regard to the effect of seepage and drainage occasioned by irrigation and other uses. It was evident that the problem of irrigation in Salinas Valley could not be solved with exactness without detailed knowledge of the quality of waters in that district. Accordingly, due stress was laid upon these phases of the study. In order to increase the knowledge regarding the general characteristics of the surface waters, the investigation was widened out from these centers so that practically every drainage region is included. With the funds available, only the larger streams could be examined, and as a result the problems attacked are very broad.

Collectors were appointed at the following places to make daily samplings of the water, and to forward them to the Berkeley laboratory for examination:

Stream.	Place.	Collector.
Cache Creek	Yolo	Mrs. C. W. Bigelow.
Cottonwood Creek	Above San Diego	Southern Cal. Mountain Water Co.
Estrella River	Near San Miguel	J. A. Journey.
Nacimiento River	Nacimiento Ranch	A. F. Fenton.
Owens River	Charlies Butte	Roy Bowers.
Owens River	Round Valley	L. Roberts.
Russian River	Ukiah	Gertrude Howard.
Sacramento River	Above Sacramento	Seb. Hemberger.
Salinas River	Paso Robles	C. B. Wieser and J. N. Currell.
San Antonio River	Above Bradley	A. Branch.
San Gabriel River	Azusa	C. S. Woodward, A. Peake, and J. W. Moon.
San Gabriel River	Near Rivera	Mrs. S. E. Pallett.
San Joaquin River	Near Lathrop	O. A. Seamands.
Santa Ana River	Near Corona	Mrs. W. C. Warner.
Santa Ana River	Mentone	Chas. S. Putnam.
Santa Ynez River	Near Santa Barbara	Santa Barbara Water Department.
Santa Ysabel River	San Pasqual Valley	S. F. Potts.
Ventura River	Above Ventura	Ventura County Power Co.

Each of the stations, save that on the Santa Ynez, which was discontinued after about four months' operation, was maintained for one year, the daily samples being combined into ten-day composites and analyzed at the Berkeley Laboratory. Collections were commenced on December 1, 1907, and analytical work was begun the same month.

In addition to these regular stations, seasonal samplings have been made on the following streams, so that their general character may be known and a basis for future detailed work may be obtained.

Stream.	Place.
Carmel River	Above Carmel.
Salinas River	Spreckels Refinery.
San Lorenzo River	King City.
Poncha Reca Creek	San Ardo.
Graviota Creek	Above San Ardo.
Indian Valley Creek	Douglas Ranch.
Cholame Creek	Shandon.
San Juan Creek	Shandon.
Huer Huero Creek	Near Paso Robles.
Mojave River	Victorville.
Eel River	Fortuna.
Mad River	Diversion site.
Pescadero Creek	Hollister.
Otay River	San Diego.

Up to December 31, 1908, slightly over six hundred chemical analyses have been performed, and much of this material has been computed for a report. It is expected that this report will be ready for the printer by the end of the present fiscal year. It will be of great value in giving to the people of the whole State a clever idea of local problems and in aiding in an intelligent, profitable use of surface waters.

Respectfully submitted.

WALTON VAN WINKLE,
Assistant Chemist.

Many local problems of considerable importance have as yet been barely touched upon, owing to the limited funds available. Work is needed along the western tributaries in San Joaquin and Sacramento valleys and in Modoc and Lassen counties. The growing use of irrigation in the Imperial Valley makes it advisable to have more definite knowledge regarding the quality of waters in that region. Mojave River should be examined more fully, with a view toward irrigation possibilities. The vineyard counties should receive attention, as the water problems there are peculiar, though not superficially apparent. Profitable work could be done on the Santa Clara system and in the San Jose district.

Future investigation of the above-mentioned character will require an expenditure of $6,000 during the next two years' period of coöperation; and it is recommended that coöperation to that extent be continued, the State of California and the United States Geological Survey each contributing $3,000 during two years for that purpose.

This will enable the extension of operations, and give all sections of the State due attention. Coupled with the stream flow data, the results of such investigations will make it possible to determine the potability of the waters, their value in industrial processes, and their adaptability in irrigation. The spoiling of arable soils by soaking them with bad waters will be lessened, and thousands of acres will be saved for the farmer. A detailed study of the quality of the subsurface waters will be of extreme value and could undoubtedly be conducted in connection with underground water investigations if a slight increase in funds were available.

Up to and including November 16, 1908, $3,683.50 have been expended in the present quality of water investigation as follows:

Salaries of chemist and assistants	$2,147 69
Traveling expenses	664 19
Supplies and equipment	391 90
Collectors	479 72
Total	$3,683 50
Transferred to California débris investigations from survey allotment of 1908	250 00
	$3,933 50

The projected work for the remainder of the year will expend the balance.

Very respectfully,

H. C. RIZER,
Acting Director.

D.

IRRIGATION INQUIRY.

Under this head coöperative work was commenced in 1905 by Mr. S. Fortier under direction of the Director of the Office of Experiment Stations, Department of Agriculture. The inquiry embraces the following:

(*a*). Investigation of the duty of water used for irrigation and the factors influencing the same.

(*b*). Studies of the preparation of land and the application of water for irrigation with a view of improving methods, both as to efficiency of service and economy of use.

(*c*). Studies of the best methods or organizing communities so as to secure stable supply and equitable and economical distribution of water to users.

(*d*). Studies of the best methods of pumping and the cost of same.

(*e*). Studies of the loss of irrigation water from seepage, evaporation, wasteful methods of application, etc., and ascertaining the best methods of preventing or lessening such losses.

(*f*). Studies of the need of draining surcharged lands and the most practicable methods of accomplishing same.

The United States Geological Survey, through its hydrographic branch, has been for several years collecting data on the duty of water as related to other lines of investigation. This work is still pursued by the survey incidentally to its work in the several divisions of water-supply inquiry. The office of Experiment Stations of the Department of Agriculture began in 1903 special study of the subject by experimentation and by the collection of information in regard to the practical experience of irrigators.

The subject covers such a wide range of inquiry, including character of soil, climate, regularity of supply, kind of crops, method of application. etc., that it has required a large number of reports and bulletins in which to publish the results of the inquiry.

The preparation of the land is almost as varied in method as the number of localities engaged in irrigation. In the San Joaquin Valley the check system is almost wholly used, especially where the supply is from open canals. The size of the checks has undergone a great change since they were first adopted. In other localities the furrow method obtains, while in still other communities other systems are in vogue. The factors which influence the quantity of water used often prescribe the method of its application. These many methods are described in several publications, among which may be mentioned Bulletin No. 145, entitled, "Preparing Land for Irrigation and Methods of Applying Water, 1904." This treatise gives much detail of methods of leveling and smoothing, checking and furrowing the land, methods and appliances for distributing the water. The work is embellished with illustrations of tools and implements for various purposes as used in different sections of the country.

The studies into the systems of organization best adapted to the needs of the irrigators have not yet been formulated into a comprehensive report, though several publications have been issued dealing with the irrigation laws of different states and countries.

Costs and methods of pumping have been quite thoroughly canvassed and tables prepared for different sections having typical conditions of development and operation.

Most irrigated countries, particularly those older in the practice, find that after a few years they are confronted with the problem of drainage.

In Fresno and Kings counties of this State, where the ground water was 50 or 80 feet below the surface before irrigation was introduced, it has risen so that in many places it has drowned the orchards, and often stands in ponds in the lower depressions of the ground. In many localities the water table has risen, and not only drowned trees and vines, but has brought alkali to the surface. Large tracts of land formerly productive have been rendered valueless in this manner, and must remain so unless reclaimed.

Experiment has demonstrated that such lands can be largely or wholly restored to productiveness by proper drainage. (See bulletins and reports of the experiment stations.)

In commenting upon the loss of water in irrigation enterprises a few years ago a well-known authority estimated that the farmers of the irrigated districts of the United States expended annually $50,000,000 for water and its application to the soil, and that fully 70 per cent was wasted.

It is not possible to prevent all of these losses, but scientific construction of works and rational systems of distribution together with sound methods of administration will transfer a large part of this loss to the other side of the ledger. It is the province of the investigations being conducted by the Office of Experiment Stations in coöperation with the State to ascertain and point out the faults and the remedies therefor, and the results of the inquiries along these lines are published as the data are collected and digested.

A report of the coöperative work accomplished in the last two years herewith follows:

REVIEW OF COÖPERATIVE IRRIGATION AND DRAINAGE INVESTIGATIONS BETWEEN THE STATE OF CALIFORNIA AND THE OFFICE OF EXPERIMENT STATIONS, UNITED STATES DEPARTMENT OF AGRICULTURE.

By F. W. Roeding,
In Charge of California District.

In accordance with the terms of the agreements for the fiscal years 1906-1907 and 1907-1908, between the State of California and the Secretary of the United States Department of Agriculture, relating to coöperative investigations between the former and the Office of Experiment Station, United States Department of Agriculture, the scope of these investigations has been conducted as outlined therein, and this review is to present a condensed statement of the work to date, including the period from November 24, 1906.

On this latter date a report for the year 1905-1906 was presented to the Board of Examiners, State of California, by Dr. S. Fortier, then in charge of the Pacific District, and at present Chief of Irrigation Investigations, United States Department of Agriculture, which not only gave an insight into what had been accomplished up to that time, but also outlined the proposed work. This work has been continued and amplified as occasion arose.

Sacramento Valley. The possibilities of irrigated agriculture in this valley have been realized more strongly than ever during the past few years and a great impetus has been given to its development thereby. Grain farming, which has been its dominent industry, has been practiced so assiduously that the yields, as well as the quality, have declined until there is little or no profit left. The farmers are therefore seeking crops which are productive of greater revenues and must resort to irrigation to improve their condition. A study has been made during the past two years of the larger irrigation systems of the valley, as well as its possibilities for irrigated agriculture, and these studies will be included in a bulletin by Dr. S. Fortier, which is now in press under the title of "Irrigation in the Sacremento Valley."

The territory covered in this bulletin represents the Yolo Consolidated Canal System, which is the oldest in the valley, the Government project and private ditches at Orland, the Central Canal, the Butte and Sutter County Canals, the irrigated districts around Oroville, Thermalito and Palermo, the Sierra Valley country, and the pumping plants near Dixon. Its purpose is to furnish data as to the methods of conducting the affairs of these various canals, the use and duty of water under them, the results of experiments conducted on alfalfa fields and orchards, and a general discussion of the future of irrigation in the Valley.

The University Farm at Davis. Arrangements were made with the authorities of the University whereby 25 acres on the University Farm, recently established at Davis, were turned over to the Irrigation Investigations for experimental purposes. These investigations are to be conducted along practical lines and will include the various methods of preparing land for irrigation, types of small ditch structures, methods of applying water, instruments and means by which the water applied can be measured, time of application and quantity used to give best results on various crops, seepage and evaporation losses in ditches and their prevention through various lining materials, the use of soil tanks in the determination of best methods of conserving the moisture applied to the soil, and a practical demonstration of pumping water from wells. This work is largely educational and its features will be under the observation of the students at the Farm in connection with their irrigation course.

Manuals on Alfalfa, Orchard and Sugar-Beet Irrigation. It has been realized for some time that a practical treatise giving methods pursued in the growing of the more important crops was an absolute necessity not only in improving the methods at present in vogue, but also in furnishing information to new settlers who are unfamiliar with irrigation conditions. A study has therefore been made of the practices followed throughout the irrigated sections of the United States in preparing land, constructing and laying out field laterals and applying water, together with a short account of the various processes connected with the planting, growing, and harvesting of these crops. This information, which has been gathered in every irrigated section, is at present being compiled and will appear in the form of manuals, each one of which will be devoted to a specific crop. In presenting such information, it is hoped that the review of the best practices throughout the country will furnish suggestions by which growers of each crop may profit from experience and methods of other sections, while novices may secure information at once which will aid them very materially. California, as the great fruit producing region, was covered pretty thoroughly, the district including the orange orchards and walnut groves of southern California, and the deciduous orchards of the Sacramento Valley, San Joaquin Valley and Santa Clara Valley. Alfalfa growing and the sugar-beet industry were also investigated in various parts of the State.

Modesto and Turlock Irrigation Districts. The success of these two districts after many trials and tribulations is now assured, and fully justifies the wisdom of the Wright Irrigation Act and its amendments, as passed by the legislature of 1897. The many failures of districts which were organized shortly after the passage of the original act tended to retard any further organizations, but the present management and excellent condition of the two districts mentioned above have led to a revival of interest. A number of communities are preparing to take advantage of the State law, and with the experiences of the older districts as a guide, there is no reason why they should not be successful. This office is in receipt of numerous letters asking for information on this subject, so that investigations have been continued since the report in Bulletin No. 158 of this office. These investigations include seepage losses from canals, the duty of water on various crops, and the management and organization of the districts. The rapid rise of the ground-water throughout both districts, due to the porosity of the soil and excessive use of water, has presented the needs of drainage. The act of the last legislature approved March 18, 1907, permitting an irrigation district to become a drainage district also, whenever the board of directors of that district may decide upon the necessity of such drainage, has been a great help in providing for such work. Canals to relieve the high water table are now in course of construction in both districts, and a study of the effects, as well as the method of drainage, is being made by this office. Mr. V. M. Cone agent of the Irrigation Investigation, has had charge of these investigations during the past two years.

Fresno Drainage. Conditions which must sooner or later be faced by all irrigated sections, due to the rise of the ground-water from unrestricted irrigation, have been realized in the older settled colonies of Fresno County for some time. These lands, which in the period from 1880 to 1890 were the show places of the county and the pioneers of the raisin industry in the United States, have largely become an alkali waste, with the attendant decrease in value, until they are to-day practically worthless. That they could be reclaimed and returned to their former productiveness through drainage was never doubted by this office, but it was necessary to furnish a practical illustration in order to convince skeptics of its value and also to demonstrate that unless some steps were taken the balance of the vineyards and orchards would suffer a similar fate. Through the efforts of the Fresno Chamber of Commerce and the coöperation of Messrs. J. S. Dore and Lusius Baker, both residents and vineyardists in the affected districts, their lands were selected for the experiment. A tile system and pumping plant was installed on each farm during the winter of 1906–7, and the removal of the alkali as well as the lowering of the water table to the depth of the tile commenced. This work has been eminently successful, and a detailed description and study of it, including also drainage investigations in the Modesto-Turlock districts, will appear in a bulletin of this office by Mr. V. M. Cone. The results obtained have led to an increased interest in this subject, not only in the alkali belt, but also on those lands where ground-water is so close to the surface that trees and vines can no longer thrive. The formation of a drainage district under the State law of March 20, 1903, is now contemplated, and it is proposed to include practically all of the irrigated lands between Fresno Slough and the foothills of the Sierras, covering an area of about 230,000 acres. This office has been asked to coöperate with the district, if formed, and studies will be made of the effects of the drainage system as in the Modesto and Turlock districts.

Pomona. The great cost of pumping water necessitates economy in its use and furnishes an object lesson in the successful growing of crops under a high duty. A report, which is now in course of preparation, by Mr. C. F. Tait, Irrigation Engineer of this Office, will give not only details of the cost of installing and operating pumping plants, but also a general review of the duty and use of water as well as the agricultural conditions as they exist in this district.

Imperial Valley. Mr. Tait has also continued the study of conditions in this valley, and his report, printed as a Senate Document, during this year is now obtainable. The breaking through of the Colorado River into the valley and the deep cutting of the channels of the Alamo and New rivers caused thereby has furnished a natural drainage for irrigated areas. In order to determine the effect of the drainage, samples of water have been taken along New River at intervals of about five or six miles from Encina Flume to the Salton Sea during the past summer, and also from the irrigation canals in order to discover the quantity of salts carried. Monthly silt measurements on the canal systems have also been made.

The question of keeping the growth of weeds and aquatic plants out of canals and ditches and removing the silt deposits is a serious one in this State. Our mild climate and long growing period are conducive to an extraordinary vegetable growth, which not only retards velocity but increases seepage losses, and canal companies, as well as individual irrigators, are greatly concerned in its solution. The Imperial Valley has suffered more from this cause, due to the unusual climatic conditions and the large quantities of finely divided soil held in suspension by the waters of the Colorado River, than any other section of the State, and therefore methods of removing growth and silt deposits from its water courses have been experimented with to a greater extent than elsewhere. A study of the various schemes applied there, as well as in other sections of California, have been made by Mr. Tait, and the data secured will be prepared n bulletin form during this winter.

Other Work. The canal systems of the Kern County Land Company and the San Joaquin and Kings River Canal and Irrigation Company have also been investigated, and their records for a number of years copied. Under the latter system the losses due to evaporation and the effect of the growth of weeds on seepage loss have been features of the work. It is proposed to use this information as well as various other data which this office has and will collect in a publication on the San Joaquin Valley, similar to the one by Dr. Fortier on the Sacramento Valley. This valley, with more than twice the area of its northern neighbor, has less than half the water supply from natural sources, and it is therefore evident that its development beyond a certain point will depend on means whereby its natural supply may be used to the greatest advantage and a study made of the pumping possibilities to augment same.

A study of the methods of irrigation in the foothills and mountain districts, as practiced along the line of the Central Pacific Railroad between Rocklin and Colfax, is also proposed.

The adaptability of the foothill regions throughout the Sierras for a great variety of irrigated crops needs no advocacy when this rich agricultural region is considered. Its development has been retarded chiefly by its remoteness from transportation facilities. Naturally, irrigation practices must be entirely distinct from those of the valleys, the distribution of water being such as to prevent washing of the soil on the steep slopes. An investigation of the methods practiced will, therefore, be valuable in the extension of irrigation to other mountainous or hilly sections.

The publication of a bulletin on Irrigation in California is also in course of preparation, which will be a general review of existing and prospective conditions.

Pumping for irrigation, which has been a prominent feature of California agriculture and in which it is far in the lead of any of the states in the Union, is to be another feature of prospective work. With large areas still to be developed in the more arid sections of the State for which only the inadequate and intermittent flow of torrential streams is available, it is conceivable that the present area covered by pumping plants (about 300,000 acres) will be very largely increased. The need of a bulletin on this subject, which will enter only in the practical side of this question so as to be understood by those without technical training, is great.

Bulletins of the Office relating to California conditions which are at present available and may be had on application are as follows:

Farmers' Bulletin No. 116, Irrigation in Fruit Growing, by Prof. E. J. Wickson.
Farmers' Bulletin No. 138, Irrigation in Field and Garden, by Prof. E. J. Wickson.
Bulletin No. 86, Part 2, Duty of Water under Gauge Canal, Riverside, Cal.
Bulletin No. 100, Report of Irrigation Investigations in California.
Bulletin No. 104, Part 2, Duty of Water under Gauge Canal, Riverside, Cal.
Bulletin No. 108, Irrigation Practice among Fruit Growers of the Pacific Coast, by Prof. E. J. Wickson.
Bulletin No. 119, Part 2, Subterranean Water Supply of the San Bernardino Valley, by Prof. E. W. Hilgard.
Bulletin No. 133, Part 2, Irrigation Systems of Stony Creek, Cal.
Bulletin No. 145, Preparing Land for Irrigation and Methods of Applying Water.
Bulletin No. 146, Current Wheels, Their Use in Lifting Water for Irrigation.
Bulletin No. 158, Separate No. 2, Irrigation in the Santa Clara Valley, by Dr. S. Fortier.
    Mechanical Tests of Pumping Plants Used for Irrigation, by Prof. J. N. Le Conte.
    Separate No. 3, The Distribution and Use of Water in Modesto and Turlock Irrigation Districts.
    Relation of Irrigation to Yield, Size, Quality and Suitability of Fruit.
    Irrigation Conditions in the Imperial Valley.
Bulletin No. 177, Evaporation Losses in Irrigation, and Water Requirements of Crops.
Bulletin No. 181, Mechanical Tests of Pumping Plants in California.
Senate Document No. 264, Irrigation in the Imperial Valley, by C. E. Tait.
Reprint Year-Book 1907. The Use of Small Water Supplies for Irrigation. By Dr. S. Fortier.

Those which will soon be available are:

Irrigation in the Sacramento Valley, by Samuel Fortier.
The Use of Underground Water Pumped from Wells at Pomona, Cal., by C. E. Tait
Canal Cleaning, by C. E. Tait.
Fresno Drainage Report, by V. M. Cone.
Manual of Alfalfa Irrigation, by S. Fortier.
Manual of Orchard Irrigation, by S. Fortier.
Manual of Sugar-Beet Irrigation, by F. W. Roeding.
Irrigation in California, by F. W. Roeding.
Canal Management, by Frank Adams.
Concrete Irrigation Structures, by B. A. Etcheverry.

The future of the State is bound up in its agricultural development, and it is therefore necessary that its water supply, both surface and underground, be put to the greatest and most economic use. The gradual transition of the immense grain ranches into fields of lesser area, which require more intensive cultivation and yield better returns, is now going on. Accompanying this transition is the ever increasing demand for irrigation water. Its proper use is a problem which will require continued study and a wide range of investigations, for although nearly as old as agriculture itself, irrigation depends on so many varying conditions and the solution is not at present in sight. Therefore it is meet that the State continue the work on which the prosperity of its population, both present and future, will be so largely dependent so that eventually its destiny, the greatest good to all its citizens, may be realized.

The statement of expenditures in accordance with the agreement during the period covered, is as follows:

Fiscal Year, 1906-1907.

Expenditures from State funds	$7,500 00
Expenditures from Government funds	9,158 49
Total expenditures	$16,658 49

State Funds.

Salaries		$4,297 04
Traveling expenses		1,565 52
Incidentals:		
1906.		
Aug —A. R. Carlson, boring and casing wells, Modesto	$229 50	
Dec. —Steiger Pottery Works, drain tile for Fresno	180 07	
Hollenbeck & Bush, lumber, Fresno drainage	267 50	
Donahoo, Emmons & Company, wire rope, etc., drainage	115 60	
1907.		
Jan. —Western Building Material Company, drain tile	145 60	
Niel White & Company, rubber boots	21 00	
Feb. —J. Rasmussen, Woodland, lumber, labor, etc.	75 51	
Mar. —California Hydraulic Engine & Supply Co., Century pump to Fresno	81 30	
Donahoo, Emmons & Company, sewer pipe, Fresno	89 40	
April—Century California Machine Works, Fresno, sundry supplies	20 20	
Donahoo, Emmons & Company, sundry supplies	25 55	
F. Hagemeister, farm work, Modesto, seeding	36 00	
May —F. Hagemeister, farm work, Modesto, seeding	20 50	
California Hydraulic Engineering Supply Co., ball bearing for pump	12 00	
Donahoo, Emmons & Co., pipe and fittings, Fresno	22 70	
		$1,342 43
Sundries		295 01
		$7 500 00

Government Funds.

alaries	$3,962 50
raveling expenses	4,877 99
ncidentals	318 00
	$9,158 49

Fiscal Year, 1907-1908.

xpenditures from State funds	$7,500 00
xpenditures from Government funds	10,532 94
Total expenditures	$18,032 94

State Funds.

alaries	$4,274 60
raveling expenses	1,180 08

Incidentals:

1907.			
July	—B. F. White, photographic work, Berkeley	$31 71	
	G. H. Hecke, drayage of tanks, Woodland, Cal.	21 00	
	Cunningham, Curtis & Welch, San Francisco, note books, etc.	20 00	
Aug.	—Steiger Pottery Works, drain tile, San Francisco	286 40	
	Freight on tile to Fresno	73 60	
Sept.	—F. W. Hansen, Fresno, hauling tile, etc.	39 65	
Oct.	—Fresno Brick and Tile Company, tile base for drain, Fresno.	37 36	
	Valley Lumber Company, Fresno, lumber, cement, etc.	174 36	
Nov.	—F. W. Hansen, Fresno, hauling material and team work	23 90	
Dec.	—F. W. Hansen, Fresno, rent of pump and engine, and pumping	176 12	
	Smith Bros., Oakland, filing cases	44 60	
1908.			
Jan.	—F. W. Hansen, Fresno, pumping	212 35	
	Oakland Furniture Company, roll-top desk	45 00	
	B. F. White, photographic work	16 25	
Feb.	—F. W. Hansen, Fresno, pumping, etc.	92 20	
	Smith Bros., Oakland, filing cases	13 50	
	Oakland Furniture Company, swivel desk chair	14 00	
Mar.	—L. Baker, Fresno, farm work, drainage tract, etc.	24 00	
April	—Winsor California Pottery and Terra Cotta Works, sewer pipe, etc., Davis Farm	108 00	
	Donahoo, Emmons & Co., dynamite, caps, fuse, fencing	67 03	
	Valley Lumber Company, Fresno, fence posts	63 46	
	F. W. Hansen, Fresno, work on tanks, etc.	21 12	
	Pacific Mill and Mine Supply Company, San Francisco, percolating tanks, Fresno	177 81	
			$1,783 42
	Sundries		261 90
			$7,500 00

Government Funds.

Salaries	6,072 09
Traveling expenses	4,031 92
Sundries	428 93
	$10,532 94

FORESTRY RESOURCES.

The State, through the Board of Examiners, entered into agreement with the Forestry Service of the United States Geological Survey in 1903 for coöperative investigation of forest conditions and resources in the State, and a study of the needs of and methods for their conservation and preservation.

Appropriations made by the legislature, approved March 16, 1903, and March 18, 1905, for those purposes enabled researches to be made which resulted in the adoption of the present policy of forestry work by the State and the creation of the Board of Forestry to carry out the policy adopted. This terminated joint relations between the Board of Examiners and the Forestry Service named, and no appropriation was made by the legislature in 1907.

But by act approved March 11, 1907, the sum of $5,000 was appropriated, and the Board of Examiners empowered to enter into an agreement with the Forestry Service of the Department of Agriculture, whereby the State and the Forestry Service should jointly engage in cutting fire-trails or fire-breaks for the protection of timber on the south slope of the San Bernardino Mountains, provided that the Forest Service should expend an equal amount with the State.

Before the time for signing the agreement the duties prescribed for the Board of Examiners in the matter were transferred to the Department of Engineering, and on July 1, 1907, the Department entered into agreement with the Forest Service for the execution of the work. Fire-breaks aggregating 25.9 miles in length, of an average width of 50 feet, have been constructed under the direction of Mr. R. H. Charlton, United States Forest Supervisor.

The work has cost $8,731.61, leaving a balance of $1,268.39 of joint funds which will be expended in the construction of another trail connecting with the coöperative breaks, and in keeping the breaks clear of brush and weeds, next spring.

The report of Supervisor Charlton is as follows:

UNITED STATES DEPARTMENT OF AGRICULTURE,
FOREST SERVICE,
LOS ANGELES, November 27, 1908.

STATE ENGINEER, SACRAMENTO, CAL.

DEAR SIR: I have received your telegram of November 27th asking for report upon the work being done by the Forest Service in coöperation with the State of California. As you probably know the fire-break work was contracted last winter with the Highway Construction Company, of Redlands, Cal., and of the $10,000 available that company's work amounted to $8,731.61.

The following table will show the amount of work done on each break:

Break.	Square Rods.	Rate.	Amount Actually Due.
G	4,775.02	$0.28	$133 70
E	1,562.10	.41	640 46
E	2,050.80	.41	840 83
G	5,021.00	.28	1,405 88
B	293.80	.39	114 58
B	705.90	.39	275 30
D	1,297.90	.39	506 18
G	1,804.60	.28	505 28
C	3,188.80	.28	892 86
D	2,448.10	.39	954 75
A	808.00	.43	347 44
A	3,403.60	.43	1,463 55
C	1,669.70	.39	650 80
Totals	29,028.32		$8,731 61

The above work covers 25 9-10 miles of fire-break with an average width of 50 feet, and which is shown upon the maps enclosed herewith.

There remains an unexpended balance of $634.20 from the State funds and an equal balance from the Forest Service funds. I propose using the Forest Service funds for the purpose of cleaning out these fire-breaks this coming spring, as it is necessary to keep them closely hoed down for several seasons. The unexpended balance held by the State I am now using in the construction of the Daily road trail, which I have likewise shown upon the maps.

Very truly,

R. H. CHARLTON,
Forest Supervisor.

DEBRIS RESTRAINING WORKS.

The effects of the presence of millions of cubic yards of mining débris in the Sacramento River and its tributaries is a matter of common knowledge. The injury caused by this vast deposition of material, both to the lands and to the navigation of the waters of the valley, has been seen for many years. How this injury, already done, may be ameliorated and further damage prevented has been earnestly considered by able engineers.

Some one has estimated that the natural erosion by the elements reduces the Sierra Nevadas at the rate of one foot in height every 1,200 years—one inch in a century. At this rate the Sacramento River has been for ages carrying 13,000,000 cubic yards of earthy matter off the mountains every year. The agency that loosened this material from the face of the earth and started it on its travels was so gentle that its force could scarcely be measured by the most delicate instruments.

But man, learning that gold lay beneath the mountain soil, brought his ditches and flumes, his monitors—machines that could be directed by the touch of a finger and yet so powerful they would carve off the side of a mountain with utmost ease. Swarming over the hills, and into every nook and cranny, for the third of a century, he feverishly dug and washed for gold, unconscious of the devastation his scourings would cause below. Thirty thousand of his kind were said to have been counted on the tributaries of one of the streams alone. Is it any wonder, then, that in thirty years the bed of the Yuba River should have been raised 20 or 30 feet at Marysville, a hundred feet at the mouth of the canyon, and hundreds of millions of cubic yards of rock, gravel, and sand piled between? The Yuba, under natural conditions, in the same length of time, should have brought away 60,000,000 of cubic yards, but it would have been of such character that it would have been carried farther, even to the sea.

All streams, within whose watersheds hydraulic mining has been conducted, have filled more or less with débris.

The farmer who early engaged in his calling along the streams in the Sacramento Valley, soon found that the channels were too small to carry the flood waters, and after having his crops destroyed a few times by the overflowing waters, began building levees to protect them. The bed of the stream was raised and he raised his levees higher to correspond, and so it continued. Finally, the Federal Government took notice that the navigability of its streams was impaired and would surely be ruined. The courts were invoked and injunctions closed down the mines. This was a great hardship on an industry that was supporting a large population, and contributing to the National wealth.

Then Congress, by passing the Caminetti act in 1893, said to the miner: "If you will keep your débris from entering the streams and reaching the navigable waters you may work your mines."

This law created the California Débris Commission and specified its duties to be:

First—To prescribe and enforce such rules and regulations as will permit hydraulic mining to be resumed under such restrictions as will prevent injury to the navigable waters of the United States, and to the lands adjacent.

Second—To provide plans for such measures of improvement and protection for the navigable waters of the United States as appeared necessary to restore them to their former condition.

The California Débris Commission, as created by the Caminetti act, consists of three officers of the Engineer Corps, U. S. A., appointed by the President. Immediately upon being appointed the commission organized and assumed the duties prescribed.

Examinations were made of the conditions in the mining regions and in the valleys, and regulations formulated under which mining might be resumed. To prevent the débris from being carried into the streams, impounding dams were constructed behind which the detritus should be stored. The plans and specifications for these dams were prescribed by the Commission and the selection of sites for them approved before work was permitted. Under these conditions many mines which had long been idle resumed operations. These requirements are yet enforced, and the Commission is still engaged in passing upon the sufficiency of the restraining works proposed and granting permits to mine, where such works are satisfactory.

This, however, only takes care of the detritus newly produced, and does not restrain the great masses of débris which have accumulated along the water courses from being washed down by the annual flood rises, nor does it dispose of that already deposited in the large channels and which interferes with navigation.

The Commission has given much study to devising some means of holding back the loose material named from getting into the valley streams.

The Yuba River, before mining began, it is said, was a clear stream, confined between well-defined banks, lined with trees, festooned with wild grapevines. Passengers landing at Marysville from steamers had to climb up the gang-plank to go ashore. Now, if a steamer could reach there at all, the keel would be several feet higher than the streets of the city. The mass of detritus accumulated along the course of the river between its confluence with Feather River at Marysville, and the mouth of the canyon at Daguerre Point, a distance of eleven (11) miles, is estimated to contain from 350,000,000 to 600,000,000 cubic yards, and to be increasing at the rate of 3,000,000 cubic yards per year. How much more is carried each year into the Feather River and thence into the Sacramento, has never been determined.

On both sides of the river are strong levees extending from the mouth of the stream to the foothills. These levees do not confine the river to one channel, but are wide apart, as much as three miles in some places. The river changes its course with every flood stage, shifting the channel from place to place in the broad space between the levees, sometimes dividing into several channels. Thus it is continually adding to the material already built into a ridge. And this building up process would naturally continue until the stores of débris in the canyons, bars and pockets among the hills, shall be exhausted. Then would ensue the opposite process—the stream would wear down this great ridge, carrying these millions of yards of material into the rivers below.

The Commission after several years of investigation and study, selected the Yuba River upon which to begin remedial measures, it having suffered more than any other stream and presenting conditions most urgently demanding relief.

A plan of treatment was presented to Congress, which it was estimated would cost $800,000.

Congress approved the project and appropriated one half of the estimated amount with the provision that the State of California should provide the other half of the sum required. This was done and the money provided for the first comprehensive attempt at débris control. The storage system inaugurated for the mines had proven so successful that the same plan, together with other extensive systems, was adopted for the work on the river.

Now followed several years' delay while rights of way were being procured.

The project, as approved by Congress, contemplated the following features:

(1). To arrest the heavier materials and hold them from reaching the valley by a series of dams or barriers across the river, and located among the hills. Four of these were first to be constructed, and others later.

(2). To supplement the work of the barriers by a system of settling basins at the sides of the stream after it issues from the hills, the flood waters to be conducted into the basins by proper inlet works. The heavily charged waters coming to rest in the basins would drop their load of suspended matter, and then be drawn off through suitable outlets and returned to the river in a clear state.

(3). The course of the river, after entering the valley, to be controlled and directed from the foothills to its confluence with Feather River by keeping it between strong training walls, situated about 2,000 feet apart. While it is recognized that this third part of the plan will eventually cause the river to cut its channel down to a permanent hydraulic gradient, in doing which it will remove a great deal of material to the valley streams, yet that amount compared to the half billion or more yards of débris that otherwise would surely be carried down is so small it may be disregarded.

Not until 1902 had sufficient rights of way been secured to warrant the expenditure of any funds for construction, but early in that year active operations began. Contracts were let for building barrier No. 1, situated about six miles above the mouth of the canyon. This barrier was to be of brush and rock with sheet pile aprons, but it was found impossible to drive the sheet piling through the mass of rock and cobbles encountered.

This plan was abandoned and another design adopted, consisting of cribs made of brush fascines and filled with rock, and construction went on, but the first high water destroyed it. This design was similar to that used by the State of California in 1881, when barriers were constructed in the Yuba and Bear rivers, but both failed.

The plans were changed and in August, 1903, contracts were let for the construction of barriers Nos. 1 and 2. These dams were to be made of brush mattresses and cribs filled with rock all fastened with wire and cables. By November barrier No. 2, half a mile above No. 1, was completed, and barrier No. 1 constructed about one third of the distance across the stream. A storm caused a suspension of work and breached barrier No. 2 in two places. Further storms completed the wrecking of this dam, and carried away the partially completed work of dam No. 1.

During the summer of 1903, while the barriers were being constructed, work was commenced making the Daguerre Point cut. This cut was intended to be 870 feet wide at its entrance, with an average depth of 25 feet. It is cut through very hard material, the south side being in solid rock. A reinforced concrete sill extends entirely across the floor of the cut with an abutment at the north end made of the same material. This sill is expected to resist erosion which otherwise would be considerable as there may, at times, be 90,000 or 100,000 second-feet passing through. The purpose of this cut is to lead the waters of the river through a stable entrance to the channel to be formed between training walls. Work was begun upon it in 1903 and continued through the summer of 1904.

As heretofore stated, the "bed" of the Yuba River, between levees below Daguerre Point, is two to three miles wide, and filled to a depth of many feet with detritus from former hydraulic mines. At this time (1903), a gold dredging company had obtained possession of a portion of the river bed for the purpose of dredging the gravels for gold. A controversy threatened to arise as to whether they should be permitted to work in the river. An arrangement was made whereby the dredges might work provided they should pile the cobbles, obtained from working for gold, where directed by the Débris Commission, and in such way that they would form training walls and impounding levees. This work to be done without expense to the Commission.

In 1904 work was resumed on barrier No. 1 upon a new plan. It was now to be built of piles and timber framework and rock, capped by a reinforced concrete cover eighteen (18) inches thick. The ultimate height was to be thirty-six (36) feet, but the plans provided for it to be built in steps, and it was intended only to raise it a step at a time as the detritus should accumulate behind it. During this season it was completed to a height of fourteen (14) feet, being two steps of six and eight feet in height, respectively. Some levee work was done on the north side of the river below Daguerre Point.

The high water of the spring of 1905 damaged the barrier somewhat, which damage was repaired during the summer, and another step was added.

In 1906 no addition was made to the height, but some repairing was done. The abutments were raised and extended, and a spillway cut at one end.

Part of the north training wall, below Daguerre Point, was constructed, aggregating some 163,000 cubic yards of embankment.

The spring of 1907 witnessed one of the highest floods in the recorded history of the streams. Yuba River was estimated to be flowing more than 100,000 cubic feet per second on March 19th. The barrier, which had cost more than a quarter of a million dollars, was destroyed, and the large volume of detritus stored above it was liberated. The high water broke the north training wall, washing away about 1,000 lineal feet of it.

The great cost and the complete failure of the barriers to withstand the floods, was certainly a great disappointment to those who had so confidently looked forward to the solution of the problem of holding the débris in the hills.

The failure resulted in the method being abandoned, at least for the present, and attention was concentrated upon carrying toward completion the other features of the project, *i. e.*, the settling basin and training walls.

The dredges heretofore mentioned had continued working, throwing up great dikes of cobbles thirty (30) feet high and several hundred feet in width. These dikes are placed upon the lines selected by the Débris Commission so as to form parts of the great chain of works.

The south training wall, or cobble dike, begins at the inlet gates of the settling basin, at Hallets Point, on the south side of the river, and extends diagonally across the river bed, pointing upstream, to within about half a mile of the north side. It here makes a sharp angle downstream to connect with the headland at Daguerre Point. Its form is that of a large V, with the apex pointing upstream. The effect of it will be to divide the river and turn the water both ways. That running to the south side will be passed through inlet, gates, and thence into the settling basin; that passing toward the north side will be deflected through the Daguerre Point cut into the channel between training walls, and thence to the Feather River.

It should be stated that the dike has not yet been connected with the Daguerre Point head, but an opening is left there for the river until such time as the training walls shall be completed.

From the apex of the V just described, a low barrier across the north channel will cause most of the water to be diverted toward the south side into the settling basin, unless the inlet gates shall be closed, in which case the water will rise, run over the barrier, and all go down the cut.

The break in the north training wall caused by the flood of 1907, has been repaired, and about ten spur dikes constructed, extending from the levee 100 to 150 feet into the stream to ward off the current from impinging upon the embankment. Both sides and the point of all spurs, as well as the face of the levee, have been revetted with brush.

The inlet gates just named were constructed in 1906. They are built of concrete and consist of a number of rectangular openings to be closed by sliding wooden gates.

The settling basin lies south of the river and outside of the levee which is maintained to keep the river from spreading over the lands in that direction. It is about two square miles in area. The east wall of it is the natural high ground sloping up to the hills. The west wall is a levee connecting with the cobble dikes which have been thrown up along the Linda levee, and extending east and south to the high land. The Linda levee reinforced by a cobble dike, forms the north wall. The intake is at the north corner. The south levee was nearly all completed this year.

The outlet works will be located at the west corner. They are to be six large, upright cylinders, eighty (80) feet in diameter and twelve (12) feet high, connected together by conduits, and all discharging through a conduit passing under the dike and discharging into the river. The whole structure is to be of concrete. It is very probable that work will begin upon it before the end of the year.

An inspection of the map, filed in the Department of Engineering, will show that after the settling basin shall become filled with slickens, there are several square miles of the river bed between Linda levee and the south training wall, and between the north training wall and Brown's Valley levee, that can be used as settling basins, so that if the scheme of diversion and settling shall prove to be a success, the Yuba will be under control for many years before this storage capacity shall become exhausted.

Surveys have been made of the Bear and American rivers, with a view of determining some plan or system adapted to their respective needs and conditions. Neither of these streams are navigable for any portion of their length.

Settling basins may be constructed by which large amounts of débris shall be intercepted on its way to the main rivers; training walls can be built to confine the waters of the tributary streams to narrow channels and prevent them from cutting down and transporting the large masses of material accumulated in their beds; but there is still the great problem of dealing with the débris that has lodged in the channels of the navigable waters. It has been estimated that the bed of the Sacramento River, between Collinsville and the mouth of the Feather River, has risen not less than nine feet since it began receiving débris from the mines, and that there are 120,000,000 of cubic yards of such material resting in the channel between the points named.

The reduction of the waterway has progressed to such an extent that boats drawing five feet of water drag the bottom, and are frequently grounded on the shoals during low water.

The Feather River is said to have filled twenty (20) feet in depth at the mouth and fifteen (15) feet at Marysville. No records are available of its condition above Marysville, since it is not officially navigable above that point, no measurements have been made for many years.

The shoaling is so great below Marysville that no boats can go up after the low water season begins.

Mokelumne River is no longer navigable above New Hope.

Other streams are in the same condition of filled channel.

The subject of disposing of the débris in the navigable waters is so intimately connected with the one of flood control that neither can well be discussed without also considering the other.

That the height of flood water is augmented, and the damage from overflow is increased by the reduction of the sectional area of the streams caused by the deposit of silt, is accepted as a fact. Many plans have been advocated for the rectification of the channels and the prevention of damage by overflow.

The question and its early solution is a grave one and is being studied by the Débris Commission as well as by the officers of the Engineer Corps, U. S. A., who have the control and care of all navigable waters.

The Engineer Corps has just completed a survey of the Sacramento and San Joaquin rivers in its researches upon this question, and a report, it is believed, will be submitted to Congress at an early date.

The débris restraining works, on the Yuba River, herein described, are being constructed by the California Débris Commission, consisting of Lieutenant-Colonel John Biddle, U. S. A., Major C. H. McKinstry U. S. A., and Captain Thomas H. Jackson, U. S. A.

This Department desires to express appreciation of the many courtesies received at the hands of the members of the Commission.

FINANCIAL STATEMENT.

Account of Receipts and Expenditures.

ACCOUNT STATE APPROPRIATION FOR DÉBRIS RESTRAINING WORKS.

Receipts.

1897—Appropriation by State legislature	$250,000 00	
1901—Appropriation by State legislature	150,000 00	
		$400,000 00

Expenditures.

May 10, 1908—Expended as per vouchers approved by State Débris Commissioner	$256,742 73
May 11, 1908—Balance unexpended	$143,257 27
Dec. 1, 1908—Expended, including claims dating prior to May 11, 1908	26,790 26
Dec. 1, 1908—Balance unexpended	$116,467 01

WATER RIGHTS.

The almost daily application to this Department for information, regarding the water rights of the State and the laws governing them, has led to the following chapter which gives the law and further makes recommendations for improvement.

The Constitution of the State of California declares—

"The use of all water now appropriated, or that may be hereafter appropriated, for sale, rental or distribution, is hereby declared to be a public use, and subject to the regulation and control of the State in the manner to be prescribed by law." (Article 14, Section 1, Constitution, California.)

The law as it now stands prescribes what a person shall do to make an appropriation, as follows:

"A person desiring to appropriate water must post a notice, in writing, in a conspicuous place at the point of intended diversion, stating therein;

"1. That he claims the water there flowing to the extent of ——— (giving the number) inches, measured under a four-inch pressure;

"2. The purpose for which he claims it, and the place of intended use;

"3. The means by which he intends to divert it, and the size of the flume, ditch, pipe, or aqueduct in which it is to be diverted.

"A copy of the notice must, within ten days after it is posted, be recorded in the office of the county recorder of the county in which it is posted. After filing such notice the point of diversion, or the place of intended use may be changed, if others are not injured thereby. (See Sec. 1415, Civil Code.)

"Within sixty days after the notice is posted, the claimant must begin the work by which he intends to divert the water, and must diligently and uninterruptedly continue the work till completed, unless temporarily interrupted by snows or rain; *provided*, that, if the intended point of diversion is at or near where the Débris Commission has recommended the erection of a dam, the claimant shall begin work within sixty (60) days after the completion of the dam; *and provided further*, that, if the point of intended diversion or any part of the route of intended conveyance of the water shall be within or part of any forest reserve, national park or other public reservation, he must begin work within sixty (60) days after receiving permission from the park authorities to occupy park lands; *provided, also*, that within sixty (60) days from posting notice he must begin survey or other preliminary steps to acquire the permission sought, and in good faith make application for such permission to enter and occupy the park or reservation for the purpose claimed." (Condensed from sections 1414 and 1422, Civil Code, approved March 24, 1903.) Making surveys, and building roads or trails necessarily incident to the diversion of the water is declared to be "commencing the work."

The first need for appropriating water by the people of California, of course, was for mining purposes. Ditches were built and water diverted, at first taken only short distances, but later the water was conducted many miles to the gravels to be washed.

The miners formulated laws and customs for locating a mining claim, wherein a locator was required to give public notice of his possessory right by posting a notice on the ground, reciting that he claimed such land, roughly describing it. As a precautionary measure against its being destroyed, the notice was recorded with the recorder of the district, who was usually elected annually by a vote of the miners. The same procedure was had with water-right claims located.

When Congress enacted statutes to govern the location and sale of mineral lands, the miners' customs were made law.

When the State came into existence and the use of water had extended to irrigation, the same rule was enacted into laws governing the appropriation of water.

When the miner first began appropriating water for his use it was seldom taken far; often diverted from the stream, used, and returned again to the stream without leaving the boundaries of the "claim." A notice posted then at the point of diversion was quite sufficient to inform all who might have any interest in the matter.

The legislator who formulated the laws requiring a notice to be posted at the point of diversion could not have imagined that the water would be conveyed miles away, perhaps out of the county, across another, and distributed in the third, so far away that no one could scarcely be expected to go to the "head of the ditch" to read the notice.

In Bulletin No. 58, Office of Experiment Stations, Department of Agriculture, Mr. Elwood Mead, State Engineer of Wyoming, in discussing these notices, says: "They are of benefit to the proposed appropriator, because they give no definite right nor do they keep any one else from posting other similar notices beside them, if he so desires. They are of no service as a warning to appropriators elsewhere on the stream, because they do not and can not see them."

Taking his further remarks concerning the rivers of Wyoming and applying them to our own, we may say: To search for these notices along the banks of the Sacramento would require a journey of hundreds of miles. Who would think of traversing the banks of the San Joaquin from its mouth to its source, in many places nearly inaccessible, even on foot, looking for notices?

Perhaps the reader will say that the simplest way to find out about water rights is to go to the records. It would take him longer to learn less about the actual conditions by searching the records than by searching the banks of the stream. While the law says that the appropriator must file a copy of his notice for record, it does not require him to record proof that he had gone any further with his appropriations.

The records of every county in the State of California, with the single exception, possibly, of San Francisco, are burdened with notices of appropriations of water, taken for "irrigation, domestic and power purposes"; but nowhere will you find a record of the completion of an act of appropriation, excepting in the records of the trial courts, where litigants have fought long drawn legal battles to maintain their respective "rights."

And the decrees of the courts upon cases that have been tried do not fix the rights which the appropriator has acquired. The judgment only determines his rights as against the other party to the suit, and no other. The writer has in mind one stream in the State from which the first irrigation ditch was taken fifty years ago. In after years other ditches were built, some large, some small. Later litigations resulted, and every ditch, nearly half a hundred in number has had its lawsuits, first with one, then another, and each ditch has proven its rights against some of its neighbors, but no ditch has established its rights as against all of the others.

The aggregate amount of water awarded by all of the judgments and decrees of the courts is several times the average flow of the river, and the cases are not all tried yet. Many of the canals had suits several years ago in the course of which their rights were proven by showing how much water they had appropriated, and a decree taken for those amounts. Years afterward, in suits with other litigants, their appropriations would again be proven, and for two or three times as much as the former case, and yet, according to the testimony no enlargement of the canals had been made.

The statute prescribing the manner of acquiring a right to an appropriation says that the notice must first state the quantity of water claimed in "miner's inches, measured under a four-inch pressure." The best authority on hydraulics gives that as equivalent to 1.2 cubic feet of water per minute of time. Yet another and later act declares: "The standard miner's inch of water shall be equal to one and one half cubic feet of water per minute, measured through any aperture or orifice."

Thirty-five years ago—long before the limit of supply had been reached on any of the rivers of the State—a warning was given that unless appropriations were regulated there would trouble ensue.

The United States Board of Commissioners on the Irrigation of the San Joaquin, Tulare and Sacramento valleys of California, in a report published in 1874, said: "In seasons when there is a great surplus of waters there can be no objection to a more liberal use of it, but it seems to us indispensable that the State should lay down a general rule. There ought to be an established allotment which may vary in different districts. The cultivators who come first should not be allowed to appropriate more water than they require, because if they do, those that come after will not be able to procure a fair supply."

The warning was repeated by the then State Engineer in 1880, and a plea made for the State to define each appropriator's rights and to regulate his exercise of them. Other States, recognizing that the natural resources of the country belong to the people thereof and should be conserved and used for their benefit have done this.

The office of the Department of Engineering frequently receives communications asking for information as to the status of water rights. The inquiries show the need of some central authority to acquire such information, based upon actual facts as to the acquisition and use of the rights of appropriation.

Of all the hundreds of thousands of acres of land that have been and are being subdivided and sold in small tracts "with water rights," how many purchasers know or can ascertain from the records of the State what the "right" amounts to that he is buying with the land? It is safe to say that outside of a small area in southern California, and possibly those lands under Government reclamation, not one landowner in the State knows or can ascertain what his right is.

The states of Wyoming, Colorado, Nebraska and Nevada have, perhaps, laws governing the acquisition and exercise of water rights, more nearly conforming to modern ideas of the conservation and distribution of the waters for the benefit of the public.

In all the states named, appropriators, old and new, have their rights determined and recorded. No vested rights have been interfered with, but their rights have been ascertained, and the holders thereof are permitted to enjoy all their rights but no more.

In order that each may receive the water to which he is entitled and all be divided equitably according to the respective rights there must be some method of exercising public supervision. In seasons of scarcity if the earlier and better rights are supplied, the late comers must be denied, and without public control too often the denial is made by the stronger or more pugnacious party enforcing his claims "at the muzzle of a shotgun."

Colorado was the first to recognize the need of public supervision in the distribution of its water resources. It was followed by Wyoming and Nebraska in adopting irrigation codes.

Colorado fixes the unit of measurement of flowing water as the cubic foot per second, and the cubic foot as the unit of measurement of volume. Wyoming uses the cubic foot per second as the unit in determining the flow of a stream and in distributing the water. Nebraska finds the rights of an appropriator according to the amount of water taken and used without defining a standard. Nevada uses the cubic foot per second standard.

Nebraska fixes the allowance of water for irrigation at one cubic foot per second for seventy acres during the irrigating season. A very indefinite quantity, depending upon the length of the season. Nevada restricts the amount of water that may be appropriated for irrigation to three acre-feet per year for each acre irrigated. This is the correct way to describe the water used. In California where the climate varies so greatly in different localities, and the requirements of irrigation depend so much upon climate, soil, and crops, perhaps an equitable maximum could not be readily determined.

When Congress enacted a law in 1901 providing for the coöperation of the State and Federal governments in the construction and administration of irrigation works for the reclamation of arid lands, Nevada determined to avail herself of the benefits of such coöperation. It was found that before coöperation could be established it must be known just the extent of existing water rights, and she immediately formulated a code of water laws, based upon the experience in other states and the laws resulting therefrom.

These provisions, embody the latest attempts of a commonwealth to administer the distribution of water, which the law of Nebraska defines as "a natural want."

The laws of Nevada, brought down by amendments to February 2, 1908, are epitomized as follows:

"All natural water courses and natural lakes, and the waters thereof, which are not held in private ownership, belong to the State and are subject to regulation and control by the State.

"All existing rights, whether acquired by appropriation or otherwise shall be respected and preserved.

"There is no absolute property in the waters of a natural water course or natural lake. No right can be acquired to such except an usufructuary right, the right to use it or to dispose of its use for a beneficial purpose. When the necessity for the use of water does not exist the right to divert it ceases, and no person shall be permitted to divert or use the waters of a natural water course or lake, except at such times as the water is required for a beneficial purpose."

Section 4 of the act forbids the diversion of more water than required for economical use; forbids wasting and requires that "all surface water remaining after use, unavoidable wastage expected, shall be returned to the channel."

Section 5 fixes the maximum quantity of water that can be appropriated for irrigation at three acre-feet per year for each acre of land supplied.

Section 6 declares the cubic foot per second to be standard of measurement.

Section 7, "The prior right to the use of the unappropriated waters of the natural water courses and natural lakes as defined in this act may be acquired in the manner provided in this act, and not otherwise."

Section 8 creates the office of state engineer, fixes his salary, prescribes his qualifications and manner of appointment, and directs his office to be at the state capitol. Succeeding sections provided for the determination and recording of all rights acquired when the act went into effect, and establishes a board of irrigation to administer the irrigation laws; directs the state engineer to prepare for each stream in the State a list of the appropriations of water according to priority. Claimants are required within sixty (60) days after being notified to do so, to submit a detailed statement under oath, of their respective claims. Blank forms are furnished. Failure to submit the statement called for is a misdemeanor.

The state engineer is required as soon as practicable to examine streams and ascertain: The discharge of stream (measurements made by United States Government may be accepted, if adequate); carrying capacity of various ditches diverting water therefrom; approximate extent of lands irrigated and susceptible of irrigation from the various ditches and canals; to record results of measurements and observations, and make map showing all details. In performing such work the state engineer may avail himself of the works, records, and information of the United States Geological Surveys.

Within thirty days after preparation of such list of priorities of apropriation the state engineer to issue certificate to each person, company, or association represented on said list, setting forth: The name and post office address of appropriator, the priority-number of appropriation, the amount of water appropriated and amount of prior appropriations, and for irrigation the description by legal subdivisions of the land to which said water is to be applied.

The lists to be recorded in the records of the counties in which appropriation is made and used. Within two years after the said list is recorded, parties aggrieved, may bring suit against the state engineer and all persons having adverse interests to the parties sueing to have their respective rights determined. Such action shall be tried as speedily as possible, and the court is authorized to employ an expert upon matters in controversy. The cost of such employment to be charged against the parties to the suit.

The water commissioners shall apportion the waters according to the list of priorities as filed or as corrected by judgment of the court.

It is the duty of the several county recorders to send the state engineer, within sixty days after the passage of the act, a complete transcript of all claims and appropriations on file in their respective offices. And the clerks of the district courts are required to send him within thirty days certified copies of all decrees affecting water rights, filed in the office of their respective district courts. The state engineer also to obtain copies of all decrees of the United States district courts affecting water rights.

The transcripts of county recorders to be furnished at the expense of the respective counties. The transcripts from the Federal courts to be paid for from state treasury.

The state engineer is made a member and the secretary of the state board of irrigation created by a former act, which board was created to coöperate with the United States Geological Survey Investigation of Water-Supply. The duty of the board of irrigation is to divide the State into water divisions or water districts; appoint water commissioners, whose duty is defined to measure and divide among the appropriators the waters of the streams according to the priority of right, and the amount each is entitled to. Make rules and regulations for the economical administration of the waters, and fix penalties for the violation of such regulations.

The board of irrigation to fix the number and compensation of the water commissioners, who shall be under the direction of the state engineer. Their compension to be paid by their respective counties.

To interfere with the state engineer, his assistant, or with any water commissioner in the discharge of his duties is a misdemeanor, punishable by fine of five hundred dollars ($500), three months' imprisonment, or both fine and imprisonment.

The laws of Wyoming require every appropriator to maintain a headgate at the head of his ditch, so constructed that it can be locked and kept closed by the water commissioner, and when required so to do he shall construct and maintain a flume or measuring device near the head of the ditch for the purpose of assisting the water commissioner in determining the amount of water that may be diverted.

Colorado has the same requirements, and the state engineer makes a table of quantities of water that will pass at different stages.

In the latter State four years after a decree of adjudication is entered, all future contests, are barred.

Some states provided for rotation in the use of water in times of scarcity. This is sometimes a good expedient, as a given quantity of water can be much more economically used if delivered with a large 'head" than if divided up into many small parts.

Nebraska provides that "All ditches constructed for the purpose of utilizing the waste, seepage, swamp, or spring waters of the State shall be governed by the same laws relating to priority of right as those ditches constructed for the purpose of utilizing the waters of running streams," and gives to the owner of the land where the water rises the first preference.

Another phase of the appropriation problem in California, which has created an urgent need for a central authority to receive and record claims, collect data in relation thereto, and initiate and prosecute measures to determine the priority and extent of rights of appropriation, is the vast possibility of development of power from the mountain streams. Hundreds of thousands of horsepower may be produced from the waters of the streams, but great as this latent power may be, notices of appropriation have been posted claiming all or more than can be developed. The major portion of these claims are lying dormant or in many cases desultory work is being done, which, in fact, is only a pretense of complying with the requirements of the law.

In Wyoming this matter is in a measure safeguarded by authorizing the state engineer to require an applicant for a right of appropriation to submit satisfactory evidence of his good faith and ability to carry out the proposed diversion. This would prevent "dummies" from locating and holding rights for speculative purposes.

APPENDIX I.

AN ACT PROVIDING FOR THE LAYING OUT, CONSTRUCTING, STRAIGHTENING, IMPROVEMENT AND REPAIR OF MAIN PUBLIC HIGHWAYS IN ANY COUNTY, PROVIDING FOR THE VOTING, ISSUING AND SELLING OF COUNTY BONDS AND THE ACCEPTANCE OF DONATIONS TO PAY FOR SUCH WORK AND IMPROVEMENTS, PROVIDING FOR A HIGHWAY COMMISSION TO HAVE CHARGE OF SUCH WORK AND IMPROVEMENTS, AND AUTHORIZING CITIES AND TOWNS TO IMPROVE THE PORTIONS OF SUCH HIGHWAYS WITHIN THEIR CORPORATE LIMITS AND TO ISSUE AND SELL BONDS THEREFOR.

The people of the State of California, represented in senate and assembly, do enact as follows:

SECTION 1. The board of supervisors of any county in the State, upon receiving a petition signed by freeholders, electors of the county, equal in number to at least ten per cent of the vote cast for governor in said county at the last election, praying that the matter of issuing bonds of the county for highway purposes be submitted to the electors of the county, may appoint a highway commission for such county, who shall perform the duties hereinafter specified.

SEC. 2. Said highway commission shall consist of three members, who shall be, and have been for two years, bona fide residents and freeholders of such county, and shall be especially qualified to have charge of the improvement of highways. Said commissioners shall be appointed to serve for the term of two years, and until their successors are appointed and qualified, and any vacancy in the commission shall be filled by appointment for the unexpired term; *provided, however*, that when the proposition for the issuance of bonds fails to carry at the election held under section seven of this act, or when all the highway improvements for which bonds are voted under said section seven are completed, or, if there is a surplus in the highway improvement fund after completion thereof, when said surplus has been expended on other highways, the existence of said highway commission shall cease. Thereafter another commission may by appointed under section one hereof. Each commissioner shall give a bond for the faithful performance of his duties, to be approved by the board of supervisors, in such amount as said board may require.

SEC. 3. For the purpose of this act a main public highway is defined to be a highway connecting different cities and towns in the same or different counties, or connecting any city or town in one county with the public highway system of another county. Provision may be made under this act for the improvement of any number of such highways jointly, to be paid for with the proceeds of one bond issue.

Sec. 4. Immediately upon their appointment said commission shall proceed with all diligence to investigate carefully the main public highways of the county and the condition thereof, and to have made a map showing said main public highways, their connections, and such other information in regard thereto as the commission may deem necessary for carrying out the purposes of this act, and to ascertain which of said main public highways should be improved by the issuance of bonds, and the kind of improvements to be made thereon, and to estimate the cost of such improvements.

Sec. 5. With the consent of the board of supervisors they may employ a competent engineer or engineers and other experts, at the cost of the county, to make any necessary surveys and prepare said map and assist the commission in determining the best material to be used and the best manner of making such improvements and the cost thereof. All surveys made for the purpose of determining the location of highways shall be approved by the county surveyor before the same is adopted by the commission.

Sec. 6. After having ascertained what improvements should be made, and the estimated cost thereof proposed to be covered by a bond issue, the commission shall make and file with the board of supervisors a report setting forth the main public highway or highways proposed to be improved, by their termini, describing generally the kind of improvements to be made thereon, and stating the estimated cost of the work to be done, and the amount to be raised by bonds therefor, and praying the said board of supervisors to call an election for the issuance of bonds of the county therefor, for the estimated amount.

Sec. 7. If said report is not approved by the board of supervisors they may refer it back to said commission for further consideration. If the board approves the report they shall adopt the same, and shall without delay call an election to determine whether bonds of the county shall be issued in the amount recommended by the commission for the purposes stated in their report. Said election shall be called and held and said bonds issued, sold and paid under and in accordance with all the provisions of law now or hereafter existing in regard to the issuance, sale and payment of county bonds, and all proceedings had in regard to such bonds shall be in accordance with such provisions of law; *provided, however*, that the board may form bond election precincts by consolidating the precincts established for general election purposes to a number not exceeding six for each bond election precinct, and shall appoint only one inspector, two judges and one clerk for each bond election precinct; *and provided, further*, that it shall be sufficient to set forth the purpose of the bond issue in said proceedings by describing the highways to be improved as the same are described in said report of the highway commission. Any defect or irregularity in the proceedings prior to the calling of such election shall not affect the validity of the bonds.

SEC. 8. Said bonds shall not be sold for less than par, and the proceeds thereof shall be paid into the treasury of the county and placed in a special fund to be denominated the "highway improvement fund;" and shall be used solely for the purposes set forth in said report of the highway commission, or such other purposes as are authorized by this act; *provided*, that if there shall be any surplus of funds voted for the improvement of any road or roads after the completion thereof such surplus may be used for the improvement of other main public highways, under the control and direction of the highway commission. The highway commission may receive and accept donations from any person for any work which they are authorized to have done, and the same shall also be paid into the said fund. No moneys shall be paid out of said fund except upon the warrant of the auditor of said county issued upon the order of the highway commission, duly allowed by the board of supervisors thereof.

SEC. 9. The doing of the work for which said bonds are issued shall be under the supervision and direction of the highway commission; *provided*, that the final acceptance thereof shall be by the board of supervisors. As soon as the funds raised by the sale of said bonds are in the treasury the commission shall proceed to prepare detailed specifications, plans, and profiles for the work to be done, or for such parts of it as they deem it advisable to have done separately, if they have not already done so, and for this purpose they may hire assistants, with the consent of the board of supervisors; and they shall then present said specifications, plans, and profiles, with their recommendations in regard to the doing of the work and letting of contracts, to the board of supervisors, who shall either adopt or reject the same as presented. If the board adopt the same they shall thereupon advertise for bids for doing the said work, or any part thereof which the highway commission recommend should be done separately, in accordance with said plans, profiles, and specifications, by publishing a notice for ten days in a daily newspaper or two weeks in a weekly newspaper, published at the county seat. Every contract for doing any part of said work shall be let, after advertisement as above provided, to the lowest responsible bidder, who will give security for the faithful performance of his contract, with sureties satisfactory to the board of supervisors in such amount as they may fix, which shall be stated in said advertisement; *provided, however*, that the board may authorize the highway commission to make contracts, without advertisement, for any part of said work the cost of which does not exceed one thousand dollars; *and provided further*, that the board may reject all bids and may thereupon readvertise for bids for doing any part or the whole of said work, or in their discretion, authorize the highway commission to purchase the necessary material, purchase or hire tools and appliances, and hire laborers, and to do the work or any part thereof without letting any contract therefor. In such case all contracts for materials, tools, or appliances. amounting to more than one thousand dollars in value, shall be let by the commission to the lowest responsible bidder, after advertisement as above provided. Said commission may, with the consent of the board of supervisors, hire all necessary engineers, inspectors, and superintendents to supervise the performance of said contract, or to have charge of the doing of said work without contract.

SEC. 10. All improvements constructed under this act shall be of a durable and lasting character, not flimsy or temporary. The macadamized or paved portion of the roadbed constructed on any highway or portion thereof improved under this act shall not exceed sixteen feet in width, unless donations are made to the highway commission for that purpose, in which case such donations may be used to defray the increased cost of constructing such macadamized or paved roadbed more than sixteen feet wide on any part of such highway specified by the donors; but no part of the proceeds of any bond issue shall be expended for such purpose. No railroad, electric road, or street railroad shall be constructed along or upon any highway, or any portion thereof, improved under the provisions of this act, except for crossings duly authorized by the board of supervisors or other legislative body having control thereof, nor shall any board of supervisors or other legislative body have power to grant any franchise for the construction of any railroad, electric road, or street railroad along or upon any such highway or portion thereof, except for crossings.

SEC. 11. Whenever the highway commission shall deem it necessary, the board of supervisors may, on their recommendation, cause any highway they propose to improve to be widened, straightened, or altered, and for that purpose they may acquire land in the name of the county by donation or purchase; and may order the condemnation of such land, and direct the district attorney to bring an action in the name of the county for that purpose under the provisions of the Code of Civil Procedure in relation to eminent domain. In such action the order of the board of supervisors shall be conclusive evidence of the regularity of all prior proceedings. The cost of purchasing or condemning such land shall be paid out of the highway improvement fund.

SEC. 12. No part of any highway lying within the corporate limits of any incorporated city or town shall be improved under the provisions of this act; but, when any highway which is being so improved shall pass through any incorporated city or town, said city or town is hereby authorized to improve the portion of such highway lying within its corporate limits, and for the purpose of raising the necessary funds therefor, to issue bonds in such manner as may be provided by law for the issuing of bonds by such city or town for public improvements.

SEC. 13. All necessary repairs to any highway improved under this act shall be made by the same officers who may be charged with the duty of repairing other highways of the county, and the cost of such repairs shall be paid out of the general fund of the county.

SEC. 14. Said highway commission shall, at least once in every six months, make and file with the board of supervisors a detailed statement of their proceedings, showing the amount of money in the highway improvement fund at the time of their last statement, the amount of all donations since received, and the purpose for which said donations were made, the amount since expended, with the purposes for which it was expended and the balance remaining, the contracts entered into or other obligations incurred by them and still outstanding, the highways in course of improvement or completed since their last statement, and the condition of the work on each, together with any other information that they may consider of interest to the public.

SEC. 15. Each member of said highway commission shall receive a per diem of five dollars for each day actually and necessarily spent in the discharge of his duties, together with his actual necessary traveling expenses, to be allowed by the board of supervisors and paid monthly. Said per diem and expenses and all other demands against the county which said highway commission are authorized to incur shall be paid out of the general fund of the county until there shall be money in the highway improvement fund derived from the sale of bonds, whereupon the general fund shall be reimbursed from the highway improvement fund for the amounts so expended, and thereafter said per diem and expenses and other demands shall be paid out of said highway improvement fund; *provided*, *however*, that after the preparation and filing of their report and recommendation for the issuance of bonds the members of said highway commission shall not receive any per diem or expenses unless there is money in said highway improvement fund to pay the same.

SEC. 16. This act shall take effect immediately.

APPENDIX II.

SPECIFICATIONS FOR MACADAMIZING MARIPOSA ROAD, STOCKTON, CALIFORNIA.

Location.

The work to be done under these specifications is located at Stockton, San Joaquin County, California, on what is known as the Mariposa road, beginning at the corporate limits of the city of Stockton and extending about two miles therefrom.

Character of Work.

The work herein contemplated will consist of grading the roadway and necessary drains and ditches, and laying thereon oiled macadam pavement.

Plans.

Certain drawings, including plat, profile, and cross-sections of the said Mariposa road, prepared by the county surveyor of San Joaquin County, and approved by the board of supervisors of said county, are hereby referred to and made part of these specifications. Figured dimensions and not scaled dimensions will in all cases be used.

Grading.

Grading shall include all excavating and filling of earth necessary to bring the surface of the road to the required grade and form for the reception of the pavement, the construction of the necessary ditches or drains, excavating and back filling for culverts, and removal of surplus material.

In excavating where mud, sand or other material is found which is not found susceptible of compacting under the roller, the same shall be removed to a sufficient depth, and refilled with selected earth material. All fills shall be made with good earth which will pack well when rolled, and to be free from sticks, roots, sod or other perishable matter.

Embankments must be carried up full width in layers not more than six inches thick, and well compacted by the travel of scraper teams; or, if scrapers are not used, by rolling. The slopes of the embankments to be two to one.

Subgrade.

The form of cross-section of the roadway shall be: a subgrade 16 feet wide rising four (4) inches at the crown, with a shoulder or berm at each side six inches high. Each berm five (5) feet wide, the surface being at true grade and sloping downward, away from the center, at the rate of about one (1) inch per foot. At the outer edge of each berm a drain ditch to be excavated to an established grade; the same to be two (2) feet in width on the bottom with side slopes of three to one.

The subgrade, together with the berms or shoulders, shall be thoroughly compacted in the following manner: After being trimmed to the proper form, the surface shall be rolled until smooth, and all holes shall be filled up. The entire surface shall then be plowed or cultivated to a depth of four (4) inches, thoroughly harrowed, and again rolled until firm and hard, so that no further appreciable compression can be had. The roller used shall weigh not less than 350 pounds per inch width of tire. During these operations, sufficient water shall be applied to the soil to cause it to pack in the most thorough manner. All soft or spongy places must be dug out to a depth not less than eighteen (18) inches and refilled with selected material, harrowed, and rolled as required. In sandy stretches or where the material is of such character that it will not properly pack by rolling, there must be sufficient clayey soil added to render the surface for a depth of four (4) inches, susceptible of thorough packing.

Macadam.

The subgrade, sixteen (16) feet in width between the shoulders, shall be covered with crushed rock macadam pavement, laid in three (3) layers, so that when completed the surface shall be at the established grades and of the adopted form, the completed pavement being eight (8) inches thick at the crown and six (6) inches at the sides, the surface sloping uniformly downward from the center line, falling six (6) inches in the half-width of eight (8) feet.

The first layer shall consist of good hard rock, broken so as to all pass through a 2½-inch ring, and be retained on a screen of 1¼-inch mesh.

The rock for the second layer shall be broken to all pass a 1¼-inch ring and stay on a ¼-inch screen.

The third layer or finish course shall be hard rock screenings, all passing a ½-inch mesh, all free from dust. The first course shall be, when rolled, three (3) inches thick at the center and 2½ inches at the sides, the second course 2½ inches at the center and two (2) inches at the sides, and the finish course 2½ inches at the crown and 1½ inches thick at the sides. This last course shall extend on to and be rolled into the surface of the berms their full width.

The material for each layer shall be evenly placed, either by spreading-wagons, or with shovels, and raked by hand, to an even surface, then thoroughly rolled until firm and hard before the next course shall be laid, or the work completed.

When the second layer has been lightly rolled, screenings, the same as for the finishing course, shall be spread over the surface and swept or raked into the voids until all are thoroughly filled. All surplus screenings then to be removed, and the whole rolled.

The roadway, prepared as above, shall then be sprinkled evenly over the entire surface with crude petroleum oil, in the proportions of 1¼ gallons for each square yard of surface.

The screenings for the finish course shall be spread on the oiled surface immediately after oiling, beginning at the sides and rapidly spread toward the center, raked smooth and rolled.

The rolling of each course shall be continued until the surface is compacted to the extent that no appreciable depression will be made by the wheels of a loaded wagon, and to the satisfaction of the engineer in charge.

The oil to be used hereunder shall be crude petroleum oil, of specific gravity of 12 to 14 degrees Baumé, containing not less than 66 per cent asphaltum, free from adulterations and containing not more than 2 per cent of water.

Culverts.

Wherever required, culverts shall be placed according to the plans and directions furnished by the engineer in charge.

Clearing up.

Upon completion of the work as herein specified, the contractor shall remove all surplus earth or other material from the roadway, and dispose of the same as directed by the engineer in charge. He shall remove from the roadway all tools, implements, or apparatus, and leave the road in a clean and sightly condition.

Safeguards.

The contractor shall provide barriers or signs in daytime and lights at night, plainly marking all excavations or obstructions to travel, and all portions of the work from which traffic should be excluded. He shall so conduct the work as to not obstruct travel on the highway more than absolutely necessary.

APPENDIX III.

Statement of the amounts of Taxes Levied in 1907 in the Several Counties of California for County Road Purposes, to be expended by the Boards of Supervisors during the Fiscal Year 1908-1909.

Counties.	Value of Property Taxed for Road Purposes.	Rate on Each $100 of Valuation.	Amount.
Alameda	$31,960,084	$0.40	$127,843 36
Alpine	505,430	.40	2,021 72
Amador	4,657,700	.33	15,370 41
Butte	14,554,967	.40	58 219 87
Calaveras	6,163,365	.35	21,571 78
Colusa	11,306,629	.40	45,226 52
Contra Costa	17,026,512	.40	68,106 05
Del Norte	3,543,162	.35	12,401 07
El Dorado	4,324,115	.40	17,296 46
Fresno	32,816,609	.40	131,266 44
Glenn	10,055,827	.40	40,223 31
Humboldt	19,845,082	.60	119,070 49
Imperial	3,868,455	.60	23,210 73
Inyo	3,012,670	.30	9,038 01
Kern	22,366,148	.25	55.915 37
Kings	6,326,502	.40	25,306 00
Lake	3,208,721	.50	16,043 60
Lassen	5,604,964	.40	21,419 86
Los Angeles	60,803,458	.60	364,820 75
Madera	6,626,465	.40	26,505 86
Marin	9,190,385	.37	34,004 42
Mariposa	2,178,284	.40	8,713 14
Mendocino	11,500,473	.40	46,001 89
Merced	13,036,764	.40	52,147 06
Modoc	4,905,569	.30	14,716 71
Mono	1,202,925	.20	2.405 85
Monterey	15,258,450	.40	61,033 80
Napa	8,425,485	.36	30,331 75
Nevada	4,637,485	.50	23,187 42
Orange	10,618,761	.40	42,475 04
Placer	6,568,750	.40	26,275 00
Plumas	5,307,460	.515	27.333 42
Riverside	7,669,945	.50	38,349 72
Sacramento	22,990,615	.33	75,869 03
San Benito	5,510,920	.33	18,186 04
San Bernardino	11,344 075	.60	68,064 45
San Diego	6,906,743	.60	41,438 46
San Francisco	No expenditures on county roads.		
San Joaquin	22,645,542	.40	90,582 17
San Luis Obispo	12,292,227	.40	49,168 91
San Mateo	16,455,505	.50	82,277 52
Santa Barbara	13,618,350	.40	54,473 40
Santa Clara	34,010,230	.40	136,040 92
Santa Cruz	6,978,960	.60	41.973 76
Shasta	10,996,106	.35	38,486 37
Sierra	1,651,238	.50	8,256 19
Siskiyou	13,415,688	.40	53.662 75
Solano	13,651,702	.40	54,606 81
Sonoma	22,631,235	.35	79,269 32
Stanislaus	12,088,475	.40	48,353 90
Sutter	5,788,493	.35	20,259 73
Tehama	9,595,425	.38	38,381 70
Trinity	2,830,322	.40	11,321 29
Tulare	18,027,075	.40	72,108 30
Tuolumne	6,158,838	.60	36,953 03
Ventura	8,477,429	.40	33.909 72
Yolo	14,074,535	.40	56.298 14
Yuba	3,771,105	.40	15,084 42
Totals	$664,988,434	----------	$2,832.819 21

APPENDIX IV.

SONORA AND MONO ROAD.

Maintenance.

1907.			
May 31	Pay roll No. 1, labor		$680 51
July 1	Reverted to general fund, labor		5 92
31	Pay roll No. 2, labor		892 25
Aug. 31	Pay roll No. 3, labor		1,060 20
31	Pay roll No. 4, labor		527 50
Sept. 30	Pay roll No. 5, labor		825 35
30	Pay roll No. 6, labor		465 50
30	F. Sayers, board and lodging		2 00
30	J. L. Blackburn, board and lodging		5 00
Oct. 1	Ida E. Hopkins, board and lodging		4 00
	A. D. Waltze, stabling team		2 00
8	N. Ellery, expenses		9 95
31	Pay roll No. 7, labor		795 35
	Pay roll No. 8, labor		492 46
Nov. 30	Pay roll No 9, labor		300 30
	N. F. Pickle, team and driver		44 00
1908			
Apr. 30	Pay roll No. 10, labor		368 75
June 30	Pay roll No. 11, labor (bridges)		719 60
	N. Ellery, expenses		2 15
	Mundorf Mercantile Company, merchandise		26 10
	Chas. Mayer, drayage		27 10
	Conlin Bros., merchandise		19 53
July 7	N. Ellery, expenses		12 80
31	Pay roll No. 12, labor		849 15
Aug. 31	Pay roll No. 13, labor		987 88
31	Pay roll No. 14, labor		167 25
Sept. 30	Pay roll No. 15, labor		941 97
30	Pay roll No. 16, labor		289 50
Oct. 23	Western Building Material Company, cement		101 60
31	Pay roll No. 17, labor		1,006 95
	Pay roll No. 18, labor		409 40
	Total expenditures to November 1, 1908		$12,042 02
1905	Appropriation, balance	$686 43	
1907	Appropriation, maintenance fifty-ninth and sixtieth fiscal years	12,000 00	
			12,686 43
	Balance		$644 41

Bridges.

1907.		
May 31	Pay roll No. 1, labor	$550 50
June 30	Pay roll No. 2, labor	307 50
	Pay roll No. 3 labor	756 85
July 3	M. J. Curtin, use of horse	30 00
Dec. 1	J. L. Blackburn, pipe	16 00
1908.		
April 30	Pay roll No. 4, labor	287 50
May 31	Pay roll No. 5, labor	690 00
	Pay roll No 6, labor	311 00
June 30	Pay roll No. 7, labor	230 50
	N. Ellery, expenses (maintenance)	7 20

SONORA AND MONO ROAD—*Continued.*

1908.		
July 1—	A. D. Waltz, feeding and stabling team	$14 00
	J. P. Hammond, merchandise	5 00
	Mrs. C. A. Wetmore, board and lodging	3 50
14—	Western Building Material Company, cement	184 15
23—	Virginia and Truckee Railway, freight	220 40
28—	The Schaw-Batcher Company, merchandise	1 38
31—	Geo. W. Kimble, expenses	22 80
	City Livery Stable, livery	24 00
	Pay roll No. 8, labor	252 25
July 31—	W. P. Fuller & Co., merchandise	7 90
Aug. 4—	The Schaw-Batcher Company, merchandise	186 37
5—	Judson Manufacturing Company, merchandise	690 91
7—	Jenkins & Wells, expenses	103 15
10—	Eugene Dietzgen Company, tape	5 20
11—	Virginia and Truckee Railway, freight	255 00
15—	Pay roll No. 9, labor	452 45
31—	J. L. Blackburn, board	49 50
	Geo. W. Kimble, salary as inspector	130 00
	Batjer Teaming Company, drayage	786 20
	Pay roll No 10, labor	442 87
	Jenkins & Wells, merchandise	15 00
Sept. 15—	Pay roll No. 11, labor	426 76
Oct. 1—	Batjer Teaming Company, drayage	907 12
15—	Pay roll No. 12 (maintenance)	304 05
	The Schaw-Batcher Company, cutting pipe	2 70
20—	Geo. W. Kimble, salary and expenses (maintenance)	154 35
31—	Jenkins & Wells, expense	107 73
	Western Building Material Company, cement (maintenance)	254 00
	Jenkins & Wells, 10 per cent commission on bridge work	637 70
	Pay roll No. 13, labor	298 37
	Virginia and Truckee Railway, freight	286 50
	Geo. W. Kimble, salary as inspector	80 00
	Geo. W. Kimble, expenses as inspector	40 20
	R. Terry, lumber	307 60
	J. L. Blackburn, board and lodging	44 25
	J. L. Blackburn, merchandise	72 45
	Pay roll No. 14, labor	237 57
	Total expenditures to November 1, 1908	$11,200 43
1905—	Appropriation balance, bridges	13,339 45
	Balance	$2,139 02

MONO LAKE BASIN ROAD.

Maintenance.

1907.		
June 11—	H. F. Hill, labor	$38 51
	L. W. Dechambeau, merchandise	1 50
Aug. 31—	Pay roll No. 1, labor	404 72
	Robert Murray, repair work	14 20
	Joseph Schreck, livery	20 00
	J. B. Anderson, merchandise	4 20
	J. P. Hammond, merchandise	104 88
	Chris Mattly & Bros., merchandise	44 10
Sept. 16—	Wm. Vogt, meats	47 12
28—	Thos. Silvester, merchandise	30 50
30—	John Mattly, livery	20 50

MONO LAKE BASIN ROAD—*Continued.*

1907.			
Sept. 30—	Robert Murray, singletree		$2 00
	E. A. Benedict, notary fees		2 50
	Pay roll No. 2, labor		231 62
Oct. 8—	N. Ellery, expenses		37 00
Nov. 8—	H. F. Hill, salary and expenses		156 27
	J. Swanton, board and lodging		3 25
	F. W. Lane, board and lodging		4 00
	E. L. Brandon, board and lodging		1 50
1908.			
July 31—	H. Vogt, merchandise		17 32
	H. Buggs, livery		15 00
	J. S. Cain, merchandise		21 50
	Adams & Cain, livery		25 00
	T. Silvester, merchandise		20 00
	F. H. Depew, expenses		26 00
	J. B. Anderson, merchandise		2 00
	J. P. Hammond, merchandise		122 03
	Pay roll No. 2, labor		301 47
Aug. 31—	F. H. Depew, expenses		4 75
	W. Vogt, meats		30 00
	T. Silvester, livery		25 00
	J. B. Anderson, livery		12 00
	C. C. Haddan, horseshoeing		3 00
	J. P. Hammond, merchandise		107 24
	Pay roll No. 3, labor		377 37
	Total expenditures to November 1, 1908		$2,278 05
1907—	Appropriation balance, maintenance	$40 74	
	Appropriation fifty-ninth and sixtieth fiscal years	2,500 00	
			2,540 74
	Balance		$262 69

LAKE TAHOE WAGON ROAD.

Maintenance.

1907.		
July 31—	A. S. Lyon, superintendent, salary	$50 00
	Pay roll No. 1, labor	1,053 15
Aug. 31—	A. S. Lyon, superintendent, salary	50 00
	Pay roll No. 2, labor	764 60
Sept. 30—	Pay roll No. 3, labor	1,088 32
	A. S. Lyon, superintendent, salary	50 00
	Pay roll No. 4, labor	249 00
Oct. 31—	A. S. Lyon, superintendent, salary	50 00
	Pay roll No. 5, labor	890 77
Nov. 30—	A. S. Lyon, superintendent, salary	50 00
Dec. 31—	Pay roll No. 6, labor	252 05
	A. S. Lyon, superintendent, salary	50 00
1908.		
Jan. 30—	A. S. Lyon, superintendent, salary	50 00
Feb. 29—	A. S. Lyon, superintendent, salary	50 00
Mar. 31—	A. S. Lyon, superintendent, salary	50 00
April 30—	A. S. Lyon, superintendent, salary	50 00
May 31—	A. S. Lyon, superintendent, salary	50 00
June 30—	A. S. Lyon, superintendent, salary	50 00
	Geo. Marquart, labor	84 00
	A. B. Kyburz, board and lodging	7 00

LAKE TAHOE WAGON ROAD—*Continued.*

1908.		
June 30—	John Titler, board and lodging	$9 00
July 12—	Capital Carriage and Auto Company, auto hire	75 00
	N. Ellery, expenses	2 50
July 25—	Capital Sewer Pipe Works, sewer pipe	205 00
July 31—	Pay roll No. 7, labor	872 24
	A. S. Lyon, superintendent, salary	50 00
Aug. 31—	Pay roll No. 8, labor	964 75
	A. S. Lyon, superintendent, salary	50 00
Sept. 30—	A. S. Lyon, superintendent, salary	50 00
	Pay roll No. 9, labor	1,209 95
Oct. 31—	Pay roll No. 10, labor	700 30
	A. S. Lyon, superintendent, salary	50 00
	Total expenditures to November 1, 1908	$9,227 63
1907—	Appropriation, fifty-ninth and sixtieth fiscal years	10,000 00
	Balance	$772 37

Survey.

1907.			
May 31—	Pay roll No. 1, labor		$834 20
June 11—	A. S. Lyon, superintendent, salary (May 18 to May 31)		22 55
28—	N. Ellery, expenses		53 00
	A. S. Lyon, superintendent, salary		50 00
30—	Pay roll No. 2, labor		635 60
July 23—	McKee, Carr & Company, merchandise		8 85
24—	The Thomson-Diggs Company, merchandise		2 80
	H. S. Crocker Company, merchandise		1 50
25—	Robert Bench, board and lodging		5 00
	Marks & Woodward, drayage		12 00
Aug. 1—	F. A. Gerbade, concrete blocks		44 50
5—	Mrs. N. Titler, board and lodging		51 50
7—	A. S. Lyon, hauling		38 00
9—	A. B. Kyburz, board and lodging		63 60
31—	Wm. Martin, board and lodging		85 74
	Mrs. N. Titler, lodging		4 50
	C. G. Celio & Sons, board and lodging		97 98
	A. B. Kyburz, board		1 50
Sept. 2—	J. A. Raffeto, board		3 00
3—	G. W. Kimble, C.E., salary and expenses		226 40
	Roy M. Fryer, labor		129 99
	H. Phleger, labor and expenses		90 75
	F. M. Jordan, labor and expenses		82 00
	M. J. Dillman, labor and expenses		82 00
	F. H. Short, labor		78 75
	Frank Phelps, labor		189 00
20—	C. G. Celio & Sons, drayage		180 00
26—	Marks & Woodward, team and driver		28 00
Oct. 5—	N. Ellery, expenses		15 50
1908.			
May 1—	Pay roll No. 3, labor		405 55
June 30—	Pay roll No. 4, labor		70 16
	Total expenditures to November 1, 1908		$3,593 92
1907—	Appropriation balance (survey)	$1,595 35	
	Appropriation	3,000 00	
			4,595 35
	Balance		$1,001 43

LAKE TAHOE WAGON ROAD—*Continued.*

Bridges.

1907.		
June 30—	Pay roll No. 1, labor	$363 20
	A. B. Kyburz, board	7 25
July 31—	Joseph Rupley, stage fare	7 50
Sept. 30—	Mrs. A. S. Lyon, fruit and vegetables	10 85
	T. D. Montgomery, labor	97 62
	Mrs. A. B. Randall, cook	60 00
	A. S. Lyon, horse hire	151 50
Oct. 1—	J. S. Creighton, wagon rent and coal	11 45
	N. Fossati, merchandise	140 89
	Total expenditures	$850 26
1905.—	Appropriation, balance	850 35
	Balance	$0 09

ALTURAS AND CEDARVILLE ROAD.

1908.		
July 17—	N. Ellery, expenses	$56 95
Sept. 30—	Pay roll No. 1, labor	89 13
	E. Lauer & Sons, merchandise	7 50
	The Modoc Coöperative Association, merchandise	25
	Frank Kaufman, team hire	5 62
	D. Methvin, team hire	4 50
	P. S. Methvin, team hire	6 00
	C. Godfrey, team hire	4 50
	J. H. Godfrey, team hire	4 50
	H. Putman, team hire	4 50
	L. Estes, team hire	3 00
	J. Denson, team hire	75
Oct. 15—	Pay roll No. 2, labor	472 00
	E. C. Huestis, expenses	2 00
	Ben Tom, gravel	29 28
	E. Lauer & Sons, merchandise	3 00
	Alturas Hotel, board	23 75
	The Modoc Coöperative Association, merchandise	29 70
	T. H. Johnstone Company, merchandise	26 70
	J. H. Godfrey, team hire	17 25
	Frank Kaufman, team hire	12 75
	D. Methvin, team hire	12 75
	P. S. Methvin, team hire	12 75
	C. Godfrey, team hire	14 25
	H. Putman, team hire	15 75
	J. Dinson, team hire	12 00
	M. Chester, team hire	15 75
	T. Carter, team hire	10 50
	G. Griner, team hire	18 00
	L. Estes, team hire	11 25
	L. Porter, team hire	9 00
Oct. 31—	Pay roll No. 3, labor	322 25
	The Modoc Coöperative Association, merchandise	2 31
	The Ash Creek Lumber Company, lumber	36 37
	J. H. Godfrey, team hire	18 00
	C. Godfrey, team hire	16 50
	M. Chester, team hire	18 00
	G. Griner, team hire	18 75
	L. Porter, team hire	28 50
	T. Porter, team hire	15 00

ALTURAS AND CEDARVILLE ROAD—*Continued.*

1908.			
Oct. 31—	J. Porter, team hire		$0 75
	G. Reynolds, team hire		15 75
Nov. 15—	Pay roll No. 4, labor		264 87
	The Modoc Coöperative Association, merchandise		1 75
	E. Huddleson, board		2 75
	Alturas Hotel, board		18 25
	E. C. Huestis, expenses		50
	C. H. Godfrey, team hire		14 25
	J. H. Godfrey, team hire		18 00
	T. Porter, team hire		18 00
	G. Griner, team hire		16 50
	M. Chester, team hire		16 50
	T. Porter, team hire		28 50
20—	Pay roll No. 5, labor		86 25
	N. A. Cornish, notary fees		2 50
	Powers & Bush, labor		1 50
	Alturas Hotel, board		5 50
	Ben Tom, gravel		2 92
	E. C. Huestis, expenses		23 20
	E. J. Green, team hire		6 00
	J. Baurman, team hire		2 25
	G. Griner, team hire		12 00
	C Godfrey, team hire		6 00
	J. H. Godfrey, team hire		7 50
23—	Powers & Bush, labor		14 50
	E. C. Huestis, timekeeper, salary and expenses		201 85
	Total expenses to November 1, 1908		$2,199 65
1905—	Appropriation, balance	$72 33	
1907—	Appropriation	7,000 00	
			7,072 33
	Balance		$4.872 68

TRINITY, TEHAMA, AND SHASTA ROAD.

1907.		
April 1—	H. S. Smith, drafting	$150 00
17—	Geo. H. Thompson, merchandise	137 40
21—	Northwestern Pacific Railroad, freight	3 50
	H. S. Smith, drafting	150 00
	Carlotta Store, merchandise	4 75
28—	G. G. Kesling, lodging	15 75
30—	James Lynch, labor	15 00
	Chas. Robb, labor	16 00
	E. Park, labor	16 00
	J. A. Meyers, labor	16 00
	Hans Erickson, labor	20 25
	Wm. McDonald, labor	18 00
	Chas. Pine, labor	20 00
Sept. 1—	J. N. Lentell, civil engineer, salary and expenses	98 83
Sept. 16—	Sun Tent and Awning Company, tents	54 75
Oct. 1—	Healy Bros., merchandise	37 23
	G. G. Kesling, lodging	4 50
	Louis Espie, merchandise	16 75
	California Iron Works, repairs	2 25
	Hotel Carlotta, lodging	36 50
	H. S. Smith, drafting	150 00

TRINITY, TEHAMA, AND SHASTA ROAD—*Continued.*

1907.		
Oct. 1	Jas. J. Smith, merchandise	$7 55
	R. W. Cuff, merchandise	34 55
	Wm. Prattie, merchandise	55 15
Oct. 31	R. L. Boehne, labor	200 00
	Chas. Pine, labor	143 50
	Wm. McDonald, labor	126 00
	Hans Erickson, labor	129 25
	J. A. Meyers, labor	106 00
	E. Park, labor	106 00
	J. N. Lentell, civil engineer salary and expenses	580 30
	F. Vladyka, livery	13 00
	H. W. Bowen, livery	15 00
	Valley Produce Company, merchandise	166 53
	J. M. McNight & Co., merchandise	35 80
	H. H. Lyon, board and lodging	6 00
	N. Ellery, expenses	39 85
	H. H. Buhne Company, cable	43 75
Nov. 1	Gillette Tea and Coffee Company, merchandise	19 10
	Duck Brothers, tent	13 75
	H. S. Smith, drafting	150 00
	J. N. Lentell, merchandise	12 00
	Fitzgerald, merchandise	8 70
	R. L. Boehne, board and lodging	23 10
9	H. L. Knowles, merchandise	30 80
	Louis Espie, merchandise	2 80
	T. C. Patterson, merchandise	6 57
	James Mullane, meats	25 92
18	N. Ellery, expenses	75
	J. N. Lentell, civil engineer, salary	204 00
30	Pay roll No. 1, labor	494 15
Dec. 1	H. Schlomer, merchandise	5 35
	Geo. H. Thompson, merchandise	4 45
	Goos & Behring, merchandise	12 45
	C. E. Pine, expenses	3 60
	C. O. Lincoln & Co., merchandise	15 70
	J. N. Lentell, expenses	243 45
31	Pay roll No. 2, labor	359 90
	H. S. Smith, drafting	150 00
1908.		
Jan. 1	F. M. Helmke, stage charges	2 70
2	J. D. Cobb, board and lodging	70 80
	J. N. Lentell, expenses	6 85
	E. A. Woldorff, merchandise	107 16
	G. W. Tinsley, merchandise	136 69
Feb. 1	J. N. Lentell, expenses	4 49
	H. S. Smith, drafting	150 00
Mar. 1	H. S. Smith, drafting	150 00
9	W. F. Purnell, merchandise	64 00
July 28	A. L. Machinery Company, one half cost of steam shovel	2,625 00
	W. F. Purnell, merchandise	8 00
Sept. 10	H. S. Smith, drafting	150 00
11	Archie McBride, board and livery	138 50
	N. Ellery, expenses	74 20
	Ben Emerson, labor	35 00
	Gillette Tea and Coffee Company, merchandise	9 00
	Vitzhum Bros., livery	32 00

TRINITY, TEHAMA, AND SHASTA ROAD—*Continued.*

1908.		
Sept. 11—	Geo. H. Thompson, merchandise	$21 30
	Cosgrove & Co., livery	12 00
	G. W. Huestis, stabling outfit	8 00
	Southern Pacific Company, freight	615 43
Oct. 14—	H. S. Smith, drafting	150 00
31—	H. S. Smith, drafting	150 00
	Total expenditures to November 1, 1908	$9,299 35
1907-08—	Appropriation (survey and construction)	50,000 00
	Balance	$40,700 65

DOWNIEVILLE-SIERRA ROAD.

1907.		
July 8—	Paul Oakley, merchandise	$2 10
9—	John Costa Company, merchandise	8 25
	National Exchange Hotel, board	4 00
	J. B. Gurnel, stage fares	26 00
11—	A. A. Meyer, livery	2 00
	R. L. Taylor, brush hooks	2 50
29—	Lavezzola Bros., drayage	3 00
	C. J. York, shop work	2 00
	Benj. Pauly, survey stakes	1 00
	A. A. Meyer, livery	4 00
	N. Ellery, expenses	16 95
	C. S. Scott, expenses	11 90
30—	C. J. York, board and lodging	10 00
	John Costa, board and lodging	9 33
	St. Charles Hotel, board and lodging	94 00
Aug. 1—	J. B. Gray, expenses	18 55
	Pay roll No. 1, labor	335 00
5—	John Costa Company, merchandise	85 56
23—	W. H. Ellmore, labor	10 00
26—	Victor Dondero, labor	2 50
	Mrs. L. Dondero, board	1 00
28—	Chas. Rosasco, board	82 00
29—	Chas. Rosasco, moving camp	3 00
31—	A. A. Meyer, livery	6 00
	A. G. Hunter, board and lodging	4 00
Sept. 1—	J. T. Lavezzola & Co., board and lodging	45 00
	Pay roll No. 2	482 50
2—	C. J. York, repair work	75
9—	Capital Machine and Auto Company, auto hire	75 00
	C. S. Scott, expenses	11 90
21—	Chas. Rosasco, board	18 00
27—	Sun Tent and Awning Company, tents	43 80
30—	Downieville Stage Company, stage fare	8 00
	Ross L. Taylor, merchandise	1 40
	Chas. Rosasco, board	15 00
	J. T. Lavezzola & Co., board and lodging	49 50
	John Costa Company, merchandise	12 70
Oct. 1—	John Costa Company, merchandise	179 39
	J. B. Gray, expenses	50
	Pay roll No. 3, labor	312 50
17—	Meyer, Costa & Co., meats	10 40
19—	J. T. Lavezzola & Co., board and lodging	3 00
	Ernest T. Marvin, board and lodging	52 00
	Geo. W. Kimble, expenses	31 65

DOWNIEVILLE-SIERRA ROAD—*Continued.*

1907.		
Oct. 19—	John Costa Company, board	$6 70
Nov. 1—	J. B. Gray, expenses	14 65
	Chas. Johnston, expenses	17 10
	R. Hawtrey, expenses	19 20
	Pay roll No. 4, labor	464 00
	J. B. Gray, salary (October)	150 00
	J. B. Gray, salary (November)	150 00
Dec. 31—	J. B. Gray, salary (December)	150 00
1908.		
Jan. 15—	J. B. Gray, salary (7 days)	35 00
July 31—	H. E. Quigley, recording	3 40
	N. Ellery, expenses	18 00
	J. T. Lavezzola & Co., board and lodging	9 00
	E. S. Parke, livery	20 00
	A. A. Meyer, livery	53 88
	Benj. Hartling, blacksmithing	9 50
	C. J. York, merchandise	5 50
	St. Charles Hotel, merchandise	8 70
	Louis C. Fortier, merchandise	4 50
	Turner Hadley Company, merchandise	613 99
	John Costa Company, merchandise	462 97
	Pay roll No. 5, labor	386 70
Aug. 31—	E. J. Rubottom, plow	29 65
	Meyer, Costa & Co., meats	156 05
	Latreille Bros., merchandise	6 45
	Andrew Bachels, merchandise	110 29
	John Rosasco, merchandise	5 40
	Benj. Hartling, blacksmithing	1 50
	J. A. May, merchandise	7 34
	John Poñto, merchandise	16 09
	John Costa Company, merchandise	1,029 06
	Pay roll No. 6, labor	1,660 25
Sept. 30—	L. C. Fortier, merchandise	2 50
	Owens Bros., merchandise	24 10
	John Costa Company, merchandise	692 07
	Pay roll No. 7, labor	1,209 00
Oct. 15—	Henry E. Quigley, recording	1 00
	Benj. Hartling, merchandise	7 00
	Latreille Bros., merchandise	4 75
	L. D. Davis, labor	10 00
	Meyer, Costa & Co., merchandise	107 17
	Chas. Rosasco & Co., merchandise	0 34
	E. L. Case, merchandise	15 00
	Wm. Shaughnessy, lumber and freight	24 95
	M. P. Ormsby, salary and expenses	481 10
	J. E. Mitchell, salary and expenses	340 15
	Pay roll No. 8, labor	394 60
	John Costa, merchandise	77 10
	Total expenditure to November 1, 1908	$11,123 33
1907-08—	Appropriation (survey and construction)	12,000 00
	Balance	$876 67

KINGS RIVER CANYON HIGHWAY.

1907.		
Aug. 12	E. J. Rubottom, road plow	$41 15
14	Donahoo, Emmons & Co., merchandise	273 21
	C. J. Sykes, expenses	8 05
22	Matt Simonish, auto hire	8 00
31	Fresno Agricultural Works, road grader	32 00
	Hollands, merchandise	33 45
	N. Ellery, expenses	26 90
	R. O. Kimbrough, merchandise	55
	The Thomson-Diggs Company, merchandise	1 00
	H. S. Smith, drafting	150 00
	G. M. Wilson, labor	58 50
	Mitchell & McHaley, meats	30 69
	Agie & Pool, camp outfit	239 05
	Pay roll No. 1, labor	614 35
	Mrs. Dan Harrigan, board and lodging	20 55
	Donahoo, Emmons & Co., merchandise	134 79
	Kutner & Co, merchandise	119 56
Sept. 1	E. Works, vegetables	9 95
2	Kutner & Co., merchandise	94 23
3	Donahoo, Emmons & Co., merchandise	40 00
	Bill Bailey, labor	6 25
	W. and Mrs. Storms, labor	12 35
4	H. Miller, labor	7 50
	H. Fay, labor	7 50
	Agie & Pool, horse hire	12 00
5	T. B. Parker, labor	6 25
12	S. Whitton, labor	18 75
	L. Reese, labor	17 00
14	Geo. Burgan, labor	13 00
	Joe Neimi, labor	23 00
	Kutner & Co., merchandise	8 63
15	Kings River Stage and Transportation Company, stage charges	65 56
24	W. W. Wooldridge, expenses	10 95
30	Pay roll No. 2, labor	1,245 65
	Hollands', merchandise	121 85
	Donahoo, Emmons & Co., merchandise	333 18
	Kutner & Co., merchandise	116 42
	Anderson & Iverson, merchandise	12 95
	J. E. Mitchell, board and lodging	36 60
Oct. 1	Donahoo, Emmons & Co., merchandise	6 00
	Mitchell & McHaley, meats	70 11
	J. E. Mitchell, merchandise	88 35
31	Pay roll No. 3, labor	961 82
	Mrs. Dan Harrigan, board and lodging	25 75
	P. A. Kanawyer, board and horses	101 35
	Jas. Clay, labor	69 75
	Gale Hammat, labor	85 50
	C. J. Sykes, salary and expenses	109 65
	E. J. Rubottom, plow point	6 00
	Holland & Holland, merchandise	66 80
	Donahoo, Emmons & Co., merchandise	121 66
	Kutner & Co., merchandise	93 60
	C. B. Drake, merchandise	180 55
	Hume-Bennett Lumber Company, lumber	30 51
	County Recorder, recording fees	17 40
Nov. 10	Pay roll No. 4, labor	202 40

KINGS RIVER CANYON HIGHWAY—*Continued.*

1907.		
Dec. 11—	H. Gallagher, vegetables	$9 95
	J. J. Street, board	3 50
	Dan Harrigan, board and lodging	33 95
	Clark Bros., blacksmithing	7 00
	J. E. Mitchell, merchandise	2 75
	W. D. Mitchell, meats	86 85
	M. P. Ormsby, expenses	60 80
	Agie & Poole, horse hire	4 00
	M. P. Ormsby, salary	509 13
	J. E. Mitchell, salary	300 00
	Donahoo, Emmons & Co., merchandise	380 40
	Kutner & Co., merchandise	199 78
	Kings River Stage and Transportation Company, stage charges	152 07
	Hume-Bennett Lumber Company, merchandise	370 76
1908.		
Jan. 15—	E. B. Henderson, salary	450 00
	P. A. Kanawyer, merchandise	81 30
	Joe Reilly, labor	2 00
	J. W. Dodge, labor	12 00
	Carl Anderson, labor	19 12
	Jas. W. Carter, labor	21 66
	Wm. Allen, labor	13 50
	Claude Winsby, labor	100 68
	W. W. Wooldridge, labor	212 50
	Gale Hammat, labor	158 12
	Jas. Clay, labor	182 25
	Sam Barrow, labor	118 68
	Charley Barnum, labor	115 62
	E. B. Henderson, expenses	24 35
Jan. 15—	W. D. Mitchell, meats	9 54
	Dan Harrigan, board and lodging	12 95
	Anderson & Iverson, board and lodging	83 00
	Walker & Brattin, meats	24 42
May 9—	Sam Gebbs, labor	4 00
	John Lisle, labor	8 05
	P. A. Kanawyer, pack stock	495 85
	Kings River Stage and Transportation Company, stage fares	200 00
22—	N. Ellery, expenses	47 00
July 10—	Waterbury Company, merchandise	159 78
	Donahoo, Emmons & Co., merchandise	431 37
	Valley Grain and Warehouse Company, merchandise	68 75
	Millwood Store, merchandise	1 95
	Kings River Stage and Transportation Company, livery	19 50
	I. L. Street, hay	50 68
	Mitchell & McHaley, meats	146 40
	Coblentz Bros. Company, merchandise	125 47
	Pay roll No. 5, labor	194 20
	Pay roll No. 6, labor	1,326 65
11—	Southern Pacific Company, freight	4 93
	Cross Hardware Company, merchandise	10 53
	A. L. Young Machinery Company, merchandise	63 00
	A. L. Young Machinery Company, ½ cost steam shovel	2,625 00
12—	Palace Hotel (Visalia), board and lodging	6 50
17—	Harron, Rickard & McCone, merchandise	540 42
18—	W. F. Cason, drayage	142 50
	N. Ellery, expenses	26 70
	W. R. Spalding Lumber Company, lumber	29 52

KINGS RIVER CANYON HIGHWAY—*Continued.*

1908.		
July 23—	W. J. O'Neill & Co., truck	$145 00
31—	Pay roll No. 7, labor	1,804 90
Aug. 1—	Mitchell & McHaley, meats	113 04
	Cross Hardware Company, merchandise	12 55
	O. M. Burk, hay	60 54
	Ed Walker, board	7 85
31—	Coblentz Bros. Company, merchandise	21 79
	Hume-Bennett Lumber Company, merchandise	505 49
	Donohoo, Emmons & Co., merchandise	601 62
	Pay roll No. 8, labor	1,306 42
Sept. 22—	W. T. Runyon, hay	1 50
	W. J. Eldridge, labor	2 50
	T. A. Hammond, board	41 75
	Mrs. Dan Harrigan, board	7 20
	Mitchell & McHaley, meats	85 44
	Kings River Stage and Transportation Co., horse hire and drayage	510 18
	O. M. Burk, hay	56 76
	Coblentz Bros. Company, merchandise	20 25
	Donahoo, Emmons & Co., merchandise	297 91
Oct. 1—	N. Ellery, expenses	6 30
	K. Cooksey, merchandise	32 95
	T. Deems, drayage	338 00
	W. F. Stafford, hay	12 00
	Kings River Stage and Transportation Company, fare and freight	5 50
	John Arney, drayage	223 47
	R. F. Smith, merchandise	21 80
	C. S. Hedrick, drayage	332 90
	Wing Bros. Company, hay	18 00
	W. H. Canan, hay	18 00
	W. Koehn, labor and merchandise	94 50
	Hume-Bennett Lumber Company, merchandise	300 48
Oct. 1—	E. B. Henderson, expenses	35 95
	Gaines & Smith, merchandise	70 50
	Pay roll No. 9, labor	1,043 20
	Pay roll No. 10, labor	869 50
	O. M. Burk, hay	68 76
	Coblentz Bros. Company, merchandise	18 75
	W. J. O'Neil & Company, (collected in error) (Offset by payment to Kings River Stage and Transportation Company, November, $145.00.)	145 00
	Burnett Bros., merchandise	18 75
	T. J. Clarkson, merchandise	25 00
	Mitchell & McHaley, meats	76 24
	Donohoo, Emmons & Company, merchandise	113 78
	Hume-Bennett Lumber Company, merchandise	350 41
31—	H. F. Hill, salary and expenses	882 85
	J. T. Harriman, labor	221 20
	Southern Pacific Company, freight	615 43
	Total expenditures to November 1, 1908—State and county	$28,301 66
	One third paid by Fresno County	9,433 85
	Two thirds paid by State	$18,867 81
1905—	Appropriation balance—State	22,486 66
	State balance	$3,618 85
	Fresno County balance	1,206 28
	Total balance, State and Fresno County, November 1, 1908	$4.825 13

RECTIFYING RIVER CHANNELS.

Auditing Board Appropriation.

1907.		
April 30	Geo. W. Peltier, advances, account of river trip	$15 00
July 9	J. B. Gray, engineer, salary	20 00
	J. J. McCarthy, chainman, salary	8 75
	Chas. Johnston, chainman, salary	8 75
	W. W. Wooldridge, rodman, salary	6 25
29	N. Ellery, expenses	5 40
31	Hotel Riverside, board and lodging	4 50
Aug. 2	N. Ellery, expenses	5 30
	P. M. Norboe, expenses	27 95
5	J. J. McCarthy, salary and expenses	13 40
Sept. 4	C. J. Rhodin, draftsman, salary	54 00
	J. J. McCarthy, salary	25 00
	The Schaw-Batcher Company, merchandise	2 10
	Veach & Snow, merchandise	2 65
	H. S. Crocker & Co., merchandise	14 99
	The A. Leitz Company, merchandise	13 60
	Palace Restaurant, meals	6 00
27	Edward Goodwin, expenses	2 50
28	Hotel River View, board	10 50
	M. Kuhn, boat hire	12 50
30	Crescent Blue Printing Company, blue prints	5 18
Oct. 1	J. J. McCarthy, salary	52 50
	C. J. Rhodin, salary	9 00
5	N. Ellery, expenses	2 70
8	P. M. Norboe, expenses	46 95
	R. O. Kimbrough, merchandise	1 60
	N. Ellery, expenses	2 10
16	Edward Goodwin, expenses	6 45
17	Geo. W. Tibbetts, auto hire	20 00
23	J. M. Pike, board and lodging	19 05
24	J. M. Campbell & Sons, livery	16 00
25	Sun Tent and Awning Company, merchandise	5 00
31	J. J. McCarthy, salary	27 50
	P. M. Norboe, expenses	32 25
	Silva & Co., launch hire	30 00
	The Sacramento Union, advertising	15 00
Nov. 16	Western Building Material Company, cement	139 70
Dec. 1	M. J. Boggs, expenses	69 80
13	Geo. W. Tatterson, expenses	7 00
	Edward Goodwin, expenses	3 00
15	Pay roll No. 1, Rocky Point	89 10
	Ralph Varuna, boat hire	12 00
	Reclamation District No. 537, dredging	974 55
21	E. B. & A. L. Stone Company, crushed rock	173 07
23	The Schaw-Batcher Company, merchandise	612 40
	Western Building Material Company, freight paid on cement	27 63
	Pay roll No. 2, Rocky Point	328 88
	J. J. McCarthy, salary	35 00
	P. M. Norboe, expenses	20 55
30	Geo. W. Tatterson, expenses	3 50
	Reclamation District No. 537, dredging	1,210 90
31	Bay Development Company, gravel	349 20
	Waterbury Company, wire rope	1,764 38
	The Sacramento Union, advertising	10 80
	Edward Goodwin, expenses	3 70
	Pay roll No. 3, Brannan Island	58 39
	Fashion Stables, livery	2 50

RECTIFYING RIVER CHANNELS—*Continued.*

1908.		
Jan. 3—	Pay roll No. 4, Rocky Point	$170 60
	Pay roll No. 5, Rocky Point	76 50
4—	Pay roll No. 6, Brannan Island	95 50
6—	Reclamation District No. 537, dredging	885 46
	Reclamation District No. 537, dredging	929 09
22—	The Sacramento Union, advertising	10 80
	J. J. McCarthy, salary	67 50
	F. C. Miller, inspector, salary	130 00
	Hugo Frommelt, inspector, salary	245 00
	Western Building Material Company, cement	602 00
	Waterbury Company, wire rope	383 77
	Western Hotel, Marysville, board and lodging	31 40
	A. C. Reed, salary	100 00
	Pay roll No. 7, Brannan Island	181 50
	The Schaw-Batcher Company, merchandise	49 17
	Pay roll No. 8, Brannan Island	57 91
	C. H. Penny, boat hire	5 00
	N. Ellery, expenses	15 45
	J. J. McCarthy, salary	67 50
	P. M. Norboe, expenses	13 80
30—	Pay roll No. 9, Brannan Island	161 25
	Bay Development Company, gravel	183 00
	Southern Pacific Company, freight	25
	Hugo Frommelt, expenses	25
	Waterbury Company, wire rope	56 00
31—	N. Ellery, expenses	7 50
	Pay roll No. 10, Brannan Island	35 50
	Waterbury Company, wire rope	1,120 78
	White, Cooley & Cutts, merchandise	58 60
Feb. 1—	Swift Bros., repairs	2 70
	R. B. Kercheval, expenses	15 50
	Pay roll No. 11, Yuba cut-off	156 00
	Pay roll No. 12, Yuba cut-off	956 00
5—	Western Building Material Company, cement	222 25
	Rio Vista Telephone Company, telephone service	6 15
8—	Pay roll No. 13, Brannan Island	306 72
13—	R. B. Kercheval, expenses	1 30
	Western Hotel, Marysville, board and lodging	14 00
15—	Pay roll No. 14, Yuba cut-off	348 70
	Southern Pacific Company, freight	26 44
	Pay roll No. 15, Brannan Island	347 65
18—	W. F. Harms, drayage	3 00
	Friend & Terry Lumber Company, lumber	80 35
	The Schaw-Batcher Company, merchandise	241 46
	Jenkins & Wells, supplies	90 87
	Jenkins & Wells, for use of pile driver	210 00
	The Schaw-Batcher Company, merchandise	222 00
	McLaughlin Draying Company, drayage	15 08
	The Waterbury Company, wire rope	1,554 57
	Pay roll No. 16, Brannan Island	415 85
Mar. 10—	P. M. Norboe, expenses	2 50
	Fashion Stables, livery	7 50
	J. J. McCarthy, salary	62 50
	Baker & Hamilton, merchandise	18 86
	Kelly Bros, livery	2 00
	W. W. Wooldridge, inspector, salary	130 00
	Pay roll No. 17, Mokelumne River	179 00

RECTIFYING RIVER CHANNELS—*Continued.*

1908.		
Mar. 10—	Phœnix Livery Stable, livery	$30 00
	F. C. Miller, expenses	11 25
	Arthur Thornton, board and lodging	64 00
	N. Ellery, expenses	22 10
	R. B. Kercheval, inspector, salary	116 00
	Sacramento Transportation Company, freight	2 78
16—	The Schaw-Batcher Company, merchandise	94 65
	N. E. McInerney, steamer fare	7 00
	L. H. Brainard & Son, steamer fare	7 00
	Farmers' Transportation Company, steamer fares	14 00
	Dearing and Gilmore, board	5 70
	R. B. Kercheval, expenses	1 45
	H. Hoffman, team hire	2 50
	Pay roll No. 18, Tisdale weir	72 00
	Western Building Material Company, cement	768 25
	The Waterbury Company, merchandise	1,624 60
	Rio Vista Telephone and Telegraph Company, telephone service	2 15
	W. A. Elliott, lumber	5 00
	J. McCormack, merchandise	11 00
	L. H. Church, merchandise	3 00
	California Transportation Company, freight	32 47
	Bay Development Company, gravel	364 80
	Baker & Hamilton, merchandise	12 90
	W. W. Wooldridge, inspector, salary	260 00
	Pay roll No. 19, Brannan Island	431 74
	Pay roll No. 20, Brannan Island	301 68
April 4—	The Waterbury Company, prepaid freight	12 94
7—	E. A. Palm, brush	400 00
	Keuffel & Esser Company, merchandise	43 10
	F. C Miller, expenses	3 30
	Pay roll No. 21, Mokelumne River	326 38
	A. Thornton, board and lodging	84 75
	Phœnix Livery Stable, livery	45 00
10—	B. S. N. Myers, board and lodging	58 00
	F. W. Edson, team hire and feed	22 50
	Bay Development Company, gravel	348 00
18—	The Sacramento Union, advertising	16 80
	The Schaw-Batcher Company, merchandise	228 80
	N. Ellery, expenses	18 50
	Pay roll No. 22, Mokelumne River	56 00
	Pay roll No. 23, Brannan Island	341 40
	Pay roll No. 24, Sherman Island	119 75
	F. W. Edson, livery	20 00
	Don Ray & Co., 1 oar	1 25
	H. D. Shinn, boat hire	10 00
	B. S. N. Myers, board and lodging	45 25
	F. C. Miller, expenses	4 65
	Rio Vista Telephone and Telegraph Company, telephone service	1 80
	John Christensen, launch hire	71 24
	J. T. Brown & Co., merchandise	4 55
	Waterbury Company, merchandise	692 13
	Pay roll No. 25, Sherman Island	180 62
	P. M. Norboe, expenses	16 50
30—	Pacific Telephone and Telegraph Company, long-distance service	7 35
	J. Stern & Co., merchandise	4 00
	Fashion Stables, livery	6 00
	Southern Pacific Company, freight	89 62

RECTIFYING RIVER CHANNELS—*Continued.*

1908.		
April 30—	Mrs. Vera Winchester, typewriting	$2 50
	Eagle Stables, livery	6 00
	Baker & Hamilton, merchandise	9 71
	Jenkins & Wells, labor	12 75
	Waterbury Company, merchandise	909 25
	Sacramento River Supply Company, poles	35 00
	Western Building Material Company, cement	222 25
	N. Ellery, expenses	17 90
	P. M. Norboe, expenses	24 35
	J. J. McCarthy, salary	75 00
	The Schaw-Batcher Company, merchandise	33 95
	Keuffel & Esser Co., merchandise	71 81
	A. R. Vaughn, labor	9 00
	F. C. Miller, salary	150 00
	Pay roll No. 26, Brannan Island	196 24
	Pay roll No. 27, Merkeley	290 85
	Pay roll No. 28, Merkeley	408 93
May 1—	The Sacramento Union, advertising	11 55
	Hotel River View, board	3 00
	Cypress Villa Hotel, board and lodging	11 00
	W. W. Wooldridge, inspector, salary	229 67
8—	Mrs. Geo. Brown, typewriting	2 50
25—	Geo. W. Tatterson, expenses	11 85
June 4—	John Breuner Company, merchandise	15 00
	Pacific Telephone and Telegraph Company, telephone service	7 40
8—	Capital Machine and Auto Company, auto hire	20 00
	Fashion Stables, livery	2 00
	F. C. Miller, salary	150 00
	J. J. McCarthy, salary	77 50
	M. J. Boggs, expenses	34 30
	P. M. Norboe, expenses	21 35
9—	A. R. Vaughn, labor	7 88
	Harry Obitz, labor	12 50
	A. W. Campbell, blue prints	19 95
	Crawford Cox, salary	26 00
	Fashion Stables, livery	4 00
	F. C. Miller, salary	150 00
	J. J. McCarthy, salary	75 00
	Edward Goodwin, expenses	50
10—	N. Ellery, expenses	22 40
	F. H. Depew, labor	2 50
	E. C. Huestis, labor	9 00
	Pacific Telephone and Telegraph Company, telephone service	6 75
	W. W. Wooldridge, salary	17 33
	F. C. Miller, expenses	7 80
	Western Hotel, Marysville, board and lodging	23 70
	Wells, Fargo Company, expressage	16 50
	Rio Vista Electric Engineering Company, repairs	18 80
14—	N. Ellery, expenses	7 85
	P. M. Norboe, expenses	7 90
	E. K. Wood Lumber and Mill Company, lumber	13 82
	California Reclamation Company, dredging	1,094 36
18—	Keuffel & Esser Company, merchandise	20 80
29—	The Schaw-Batcher Company, merchandise	3 00
Aug. 18—	The Schaw-Batcher Company, merchandise	3 50
	H. S. Crocker Company, merchandise	30 85
	J. J. McCarthy, salary	77 50

RECTIFYING RIVER CHANNELS—*Continued.*

1908.			
Aug. 18	Crawford Cox, salary		$27 00
	H. T. Rasmussen, merchandise		1 55
	P. M. Norboe, expenses		12 70
	F. C. Miller, salary		70 00
	W. W. Wooldridge, salary		21 65
	E. K. Wood Lumber and Mill Company, lumber		7 50
	J. T. Higgins, expenses		40 45
	Pacific Telephone and Telegraph Company, telephone service		3 70
19	Marysville Levee Commission, clearing land		339 05
	W. L. Van Guelder, repairs to boat		46 70
31	P. M. Norboe, expenses		15 85
	Pay roll No. 29, Yuba cut-off		669 37
Sept. 5	Pay roll No. 30, Yuba cut-off		771 04
12	Pay roll No. 31, Yuba cut-off		665 00
19	Pay roll No. 32, Yuba cut-off		390 31
	C. J. Rhodin, drafting		90 00
	W. W. Wooldridge, inspector, salary		130 00
	J. J. McCarthy, salary		77 50
	Edward Goodwin, expenses		7 10
	Postal Telegraph Company, telegram		35
	Swift Bros. Planing Mill, stakes		1 00
	California Reclamation Company, dredging		2,489 72
Oct. 5	California Reclamation Company, dredging		1,143 97
13	J. T. Higgins, expense account		110 70
	Western Building Material Company, cement		952 50
	California Reclamation Company, lumber		7 26
	E. K. Wood Lumber and Mill Company, lumber		65 98
	P. Eckelmann, expense		65 60
	The Secramento Union, advertising		19 60
22	Crawford Cox, salary		24 00
	E. Goodwin, expenses		7 15
	Miller-Chapin-Enwright Company, merchandise		1 50
	G. W. Kapp, merchandise		47 00
	W. W. Wooldridge, inspector, salary		130 00
	G. H. Nichols, salary		50 00
	J. J. McCarthy, salary		77 50
	Eugene Dietzgen Company, merchandise		21 10
	Fairbanks, Morse & Co., merchandise		15 85
26	Western Bridge and Construction Company, repairs, Tisdale weir		752 00
	P. I. Welles, 10 per cent on Yuba cut-off work		249 57
	E. D. Griffith, cement testing		18 54
31	Electrical Supply Company, merchandise		3 50
	Kelly Bros., livery		5 00
	N. J. Sligar, livery		5 00
	Miller-Chapin-Enwright Company, merchandise		4 04
	N. Ellery, expenses		24 20
	E. Goodwin, expenses		15 65
	E. D. Griffith, cement testing		11 35
	W. W. Wooldridge, inspector, salary		130 00
	G. H. Nichols, salary		50 00
	J. J. McCarthy, salary		77 50
	G. W. Kapp, merchandise		61 00
	P. M. Norboe, expenses		24 35
	Western Bridge and Construction Company, repairs, Tisdale weir		3,321 42
	Total expenditures to November 1, 1908		$43,498 32
1903	Appropriation balance	$5,227 51	
1907	Appropriation	125,000 00	130,227 51
	Balance		$86,729 19

RECTIFYING RIVER CHANNELS—*Continued.*

Rights of Way Appropriation.

1907.		
April 26	—Southern Pacific Company, steamer service	$200 00
May 20	—Western Union Telegraph Company, telegrams	72
31	—Pacific States Telephone and Telegraph Company, long-distance service	3 20
1908	—Total expenditures to November 1st	$203 92
1897	—Appropriation balance	214 52
	Balance	$10 60

EEL RIVER PROTECTION.

Expenditures, 1907-08.

1907.		
Aug. 19	—B. Emerson, labor	$1 37
	J. R. Williams, labor	1 50
	A. J. Harland, labor	1 50
	J. Reynolds, labor	16 50
21	—E. A. Light, team	13 00
	Richard Sweasey, team, feed	2 00
	Robt. Johnston, livery	21 50
	Mrs. C. W. Kramer, board and lodging	3 00
	G. C. Schilling, auto hire	50 00
	N. Ellery, expenses	32 35
23	—Waterbury Company, wire cable	174 15
Sept. 16	—Wright Wire Company, wire cable	168 19
17	—Western Building Material Company, cement	708 75
23	—Pay roll No. 1, labor	234 12
	W. A. Moore, driving piles	662 00
	F. W. Luther, wire and cement	461 57
	Northwestern Pacific Railroad Company, freight	6 48
	W. Overhulser, teaming	140 00
	Henry Maseman, teaming	145 00
30	—Pay roll No. 2 (east side), labor	862 74
	Pay roll No. 3 (west side), labor	1,103 19
Oct. 3	—Northwestern Pacific Railroad Company, freight	277 78
10	—Pay roll No. 4 (east side), labor	981 76
	Pay roll No. 5 (west side), labor	819 84
19	—Pay roll No. 6 (east side), labor	1,150 10
Nov. 1	—F. O. Grothe, board and lodging	4 00
	G. W. Conners, drayage	33 55
	Western Building Material Company, cement	444 50
	A. Robinson, brush	2,912 91
	Northwestern Pacific Railroad Company, freight	243 11
	H. W. Brown, livery	15 00
	N. Ellery, expenses	34 00
	Pay roll No. 7 (east side), labor	1,354 67
	Overland Freight Transportation Company, cartage	1 50
	Pay roll No. 8 (west side), labor	429 33
8	—Western Building Material Company, cement	444 50
	F. Vladya, auto hire	31 50
	C. W. Kramer, board and lodging	5 25
	Robert Johnston, livery	8 50
	S. A. Frank, board and lodging	3 00
20	—Pay roll No. 9, labor	1,815 65
	Pay roll No. 10, labor	1,146 37

EEL RIVER PROTECTION—*Continued.*

1907.		
Dec. 1—	Pay roll No. 11, labor	$675 09
31—	Steamer "Caroline," freight	2 50
Jan. 6—	W. J. Young, expenses	4 15
Sept. 24—	Pay roll No. 12 (west side), labor	908 85
	A. Robinson, brush	415 00
Oct. 31—	Pay roll No. 13 (east side), labor	994 93
	Frank W. Luther, wire	237 73
	A. Robinson, brush	907 20
	Pacific Lumber Company, lumber	58
	Total expenditure to November 1, 1908	$21,111 78
1907—	Appropriation	25,000 00
	Balance	$3,888 22

TRAVELING AND CONTINGENT.

1907.		
May 17—	N. Ellery, thumb tacks	$0 15
18—	N. Ellery, expenses	7 00
21—	F. W. Hatch, expenses	8 40
23—	N. Ellery, expenses	42 65
	H. E. Sleeper, rubber stamps	3 75
	Pacific Telephone and Telegraph Company, telephone	5 50
	W. F. Purnell, stationery	2 25
	Globe Transfer Company, drayage	2 50
June 1—	C. Alberti, salary	83 33
	G. E. S. Barnes, salary	73 33
	Chas. Prince, salary	26 66
	Wm. H. Davis, salary	26 66
	N. Ellery, expenses	9 25
	Western Union Telegraph Company, telegrams	1 98
4—	N. Ellery, expenses	11 50
8—	N. Ellery, expenses	17 45
	Architect's pay roll No. 1, drafting	253 38
9—	N. Ellery, expenses	3 15
	E. C. Hemmings, expenses	16 25
10—	Geo. C. Sellon, expenses	34 05
	Keuffel & Esser Co., merchandise	440 59
17—	N. Ellery, expenses	23 35
21—	Keuffel & Esser Co., merchandise	3 14
22—	John Breuner Company, merchandise	10 25
	N. Ellery, expenses	12 05
	W. H. Davis, salary	15 00
	B. C. Tarver, expenses	8 00
	Geo. C. Sellon, expenses	21 30
	Architect's pay roll No. 2, drafting	802 79
23—	E. C. Hemmings and W. D. Edwards, expenses	19 45
24—	N. Ellery, expressage	45
30—	Pacific Telephone and Telegraph Company, telephone service	16 65
	Scott, Lyman & Stack, merchandise	6 00
	Adolf Frese Optical Company, merchandise	10 00
	H. E. Sleeper & Co., stamps	19 25
	The A. Lietz Company, merchandise	140 40
	Clark Alberti, salary	125 00
	G. E. S. Barnes, salary	125 00
	Howard Cook, salary	6 66
	N. Ellery, expressage	85
	Chas. Prince, salary	44 00

TRAVELING AND CONTINGENT—*Continued.*

1907.		
June 30	W. Wooldridge, salary	$25 00
	P. M. Norboe, expenses	50 65
	W. Wooldridge, expenses	37 05
	Charles Johnston, salary	47 50
	J. J. McCarthy, salary	47 50
	J. B. Gray, expenses	37 67
	B. C. Tarver, salary	65 00
	N. Ellery, expenses	6 75
	C. H. Kluegel, salary	83 33
	Central California Electric Company, electric lights	1 00
	Mason's Steam Laundry, laundry	3 60
	Keuffel & Esser Co., merchandise	7 80
	Kane & Trainor Ice Company, ice	2 25
	W. F. Purnell, merchandise	35 70
	F. H. Fassett, drafting	25 03
July 2	W. D. Edwards, salary	20 25
	Chas. Prince, towel service	2 25
3	J. B. Gray, salary	95 00
	W. J. Young, expenses	3 90
5	J. E. Mayo, signs	7 00
6	E. C. Hemmings, expenses	13 00
July 7	N. Ellery, expenses	10 55
9	Geo. C. Sellon, expenses	60 70
	Architect's pay roll No. 3	633 77
	N. Ellery, expenses	16 65
15	Scott, Lyman & Stack, merchandise	1 60
	Capital-Sacramento Transfer Company, freight and cartage	4 50
	R. M. Richardson, Postmaster, stamps	10 00
	N. Ellery, expenses	26 65
16	F. H. Fassett, drafting	2 57
18	Keuffel & Esser Co., merchandise	14 70
31	Pacific Telephone and Telegraph Company, telephone service	22 55
	Crescent Blue Printing Company, blue prints	6 80
	Mason's Steam Laundry, towel service	2 00
	The Angelus, lodging	5 00
	Wells, Fargo & Company, express	50
	Francis S. Ott, merchandise	10
	Crescent Blue Printing Company, blue prints	10 00
	Hotel Crellin, lodging	2 00
	W. F. Purnell, merchandise	5 95
	H. E. Sleeper & Co., merchandise	3 50
	E. C. Hemmings, expenses	12 30
	W. D. Coates, expenses	11 00
	Geo. C. Sellon, expenses	15 20
	Architect's pay roll No. 4, drafting	736 27
	The A. Lietz Company, merchandise	140 00
	Chas. Prince, salary	10 00
	Howard Cook, salary	10 00
	Clark Alberti, salary	125 00
	G. E. S. Barnes, salary	125 00
	Mae Lezansky, typewriting	6 00
	Universal Drafting Machine Company, merchandise	36 25
	B. C. Tarver, expenses	3 90
Aug. 2	W. J. Young, expenses	1 80
	N. Ellery, expenses	14 85
	Geo. C. Sellon, expenses	15 16
5	Architect's pay roll No. 5, drafting	941 05

TRAVELING AND CONTINGENT—*Continued.*

1907.		
Aug. 12—	Statutory salaries, May and June	$2,532 65
	Central California Electric Company, electric lights	70
	H. S. Crocker & Co., merchandise	22 60
	The A. Lietz Company, merchandise	313 00
	F. R. Pulford, keys	5 35
	Central California Electric Company, electric lights	1 35
	Kane & Trainor Ice Company, ice	2 60
31—	Clark Alberti, salary	125 00
	Howard Cook, salary	10 00
	Chas. Prince, salary	10 00
	Keuffel & Esser Company, merchandise	82 77
	Western Union Telegraph Company, telegrams	1 63
	Wells, Fargo & Company, express	3 65
	Scott, Lyman & Stack, merchandise	4 70
	Mason's Steam Laundry, towel service	2 00
	Capital-Sacramento Transfer Company, drayage	2 50
	Crescent Blue Printing Company, blue prints	6 00
	Remington Typewriter Company, minute books	16 00
	H. T. Rasmussen, merchandise	4 25
	Scott, Lyman & Stack, merchandise	3 30
	W. F. Purnell, merchandise	35 20
	A. W. Campbell, blue prints	4 76
	Alfred Kuhn, expenses	43 25
	E. C. Hemmings, expenses	23 67
	Geo. C. Sellon, expenses	28 80
	Hotel Baltimore, lodging	3 00
Aug. 31—	R. M Richardson, Postmaster, stamps	5 00
	San Francisco Chronicle, advertising	2 00
	Crescent Blue Printing Company, prints	4 08
	Wells, Fargo & Company, express	1 90
	W. F. Purnell, merchandise	15 15
	Pacific Telephone and Telegraph Company, telephone service	36 85
Sept. 4—	B. C. Tarver, expenses	4 05
	G. E. S. Barnes, salary	125 00
	C. J. Rhodin, salary	60 00
	J. J. McCarthy, expenses	7 50
	J. J. McCarthy, salary	32 50
	Pacific Telephone and Telegraph Company, telephone service	75
	Architect's pay roll No. 6, drafting	45 30
	Western Union Telegraph Company, telegrams	1 25
	Kane & Trainor Ice Company, ice	2 70
	Mason's Steam Laundry, towel service	2 00
	P. M. Norboe, expenses	8 80
	George C. Sellon, expenses	40 10
	N. Ellery, expenses	17 65
	Paul Oakley, merchandise	30
6—	R. M. Richardson, Postmaster, stamps	5 00
7—	N. Ellery, auto hire	15 00
10—	San Francisco Chronicle, advertising	10 00
11—	Sacramento Electric, Gas and Railway Company, gas	10
	Scott, Lyman & Stack, merchandise	8 55
14—	Architect's pay roll No. 7, drafting	48 55
16—	H. S. Crocker Company, merchandise	65
18—	H. E. Sleeper & Co., rubber stamps	6 40
20—	R. M. Richardson, Postmaster, stamps	5 00
24—	H. T. Rasmussen, merchandise	1 00
	W. Wooldridge, expenses	7 20

TRAVELING AND CONTINGENT—*Continued.*

1907.		
Sept. 26	—R. M. Richardson, Postmaster, stamps	$5 00
27	—Keuffel & Esser Co., merchandise	41 54
30	—Wells, Fargo & Company, express	6 22
	W. F. Purnell, merchandise	6 15
	Kane & Trainor Ice Company, ice	2 15
	Western Union Telegraph Company, telegrams	2 95
	Pacific Telephone and Telegraph Company, telephone service	40 85
Oct. 1	—Capital Transfer Company	2 01
	Clark Alberti, salary	125 00
	G. E. S. Barnes, salary	125 00
	Howard Cook, salary	10 00
	Charles Prince, salary	10 00
	B. C. Tarver, expenses	3 95
2	—H S. Crocker Company, merchandise	5 00
	Architect's pay roll No. 8, drafting	83 66
	Chas. Prince, towel service	4 50
5	—N. Ellery, expenses	6 60
	Central California Electric Company, electric lights	1 00
8	—Geo. C. Sellon, expenses	66 65
	A. J. Johnston Company, merchandise	1 50
	Fairbanks, Morse & Co., merchandise	47 50
	Baker & Hamilton, merchandise	4 00
	Cresent Blue Printing Company, prints	6 74
	Mason's Steam Laundry, towel service	2 50
	B. C. Tarver, expenses	4 40
	W. J. Young, expenses	4 40
10	—H. B. Traver, expenses	6 00
	Central California Electric Company, electric lights	1 45
16	—Keuffel & Esser Co., merchandise	68 31
17	—R. M. Richardson, Postmaster, stamps	5 00
28	—Sacramento Auto and Machine Company, repairs	1 65
	Capital Transfer Company, drayage	3 55
	W. F. Purnell, merchandise	5 05
31	—H. E. Sleeper & Co., rubber stamps	24 25
	Wells, Fargo & Company, express	12 69
	Geo. Sellon, expenses	38 74
	E. C. Hemmings, expenses	10 80
	G. E. S. Barnes, salary	125 00
	Clark Alberti, salary	125 00
	J. J. McCarthy, salary	20 00
	Howard Cook, salary	10 00
	Chas. Prince, salary	10 00
	N. Ellery, expenses	11 10
	Pacific Telephone and Telegraph Company, telephone service	34 90
	Elks' Hall Association, rent	40 00
	R. M. Richardson, Postmaster, stamps	5 00
	H. S. Smith, expenses	63 05
	H. S. Crocker Company, merchandise	21 00
	Scott, Lyman & Stack, merchandise	4 50
	Western Union Telegraph Company, telegrams	11 41
	Kane & Trainor Ice Company, ice	1 35
Nov. 2	—Scott, Lyman & Stack, merchandise	16 85
	Mason's Steam Laundry, towel service	4 50
	John Breuner Company, merchandise	11 05
9	—N. Ellery, expenses	67 00
	Capital Transfer Company, drayage	75
15	—R. M. Richardson, Postmaster, stamps	5 00

TRAVELING AND CONTINGENT—*Continued.*

1907.		
Nov. 16—	Kueffel & Esser Co., merchandise	$142 90
	Crescent Blue Printing Company, prints	3 36
25—	American Cash Store, merchandise	35
29—	R. M. Richardson, Postmaster, stamps	5 00
	W. V. Stafford, expenses	7 50
30—	Central California Electric Company, gas and electricity	1 25
	W. F. Purnell, merchandise	9 50
	Wells, Fargo & Company, express	9 42
	Home Transfer Company, drayage	10 00
Dec. 1—	Chas. Prince, salary	10 00
	Howard Cook, salary	10 00
	Clark Alberti, salary	125 00
	G. E. S. Barnes, salary	125 00
	Pacific Telephone and Telegraph Company, telephone service	38 55
	Geo. C. Sellon, expenses	65 52
	Sacramento Electric, Gas and Railway Company, gas	90
	Keuffel & Esser Co., merchandise	336 80
	H. S. Crocker Company, merchandise	12 40
	Kane & Trainor Ice Company, ice	1 25
	F. H. Fassett, drafting	23 11
	B. C. Tarver, expenses	10 35
	Western Union Telegraph Company, telegrams	9 82
	John Breuner Company, merchandise	9 00
23—	W. F. Purnell, merchandise	3 55
	Central California Electric Company, electric lights	90
	R. O. Kimbrough, merchandise	75
	Keuffel & Esser Co., merchandise	84 45
	Bessie Mugford, typewriting	41 25
	Capital Transfer Company, drayage	8 60
	E. C. Hemmings, expenses	32 65
	Geo. C. Sellon, expenses	26 20
	F. P. Walsh, expenses	2 90
	E. C. Huestis, labor	3 75
	Nathan & Michel, rent	30 00
	R. M. Richardson, Postmaster, stamps	10 00
	N. Ellery, expenses	41 55
	Silva & Company, coal and wood	13 00
	B. W. Gardner, keys	60
	A. W. Campbell, blue prints	4 15
	G. E. S. Barnes, salary	37 50
	Clark Alberti, salary	125 00
31—	Charles Prince, towel service	4 50
	Pacific Telephone and Telegraph Company, telephone service	42 47
1908.		
Jan. 3—	H. E. Sleeper & Company, dater	1 00
	Electrical Supply Company, merchandise	75
	McDowell & Harding, merchandise	30
	Chas. J. Noack, repairing clock	50
	B. C. Tarver, expenses	6 60
	Capital-Sacramento Transfer Company, drayage	7 39
	Western Union Telegraph Company, telegrams	1 14
	Eldred & Travers, drayage	5 00
	Pacific Grocery and Produce Company, merchandise	1 25
	McDowell & Harding, merchandise	15
	R. O. Kimbrough, merchandise	40
	C. J. Peters, merchandise	50
	H. S. Crocker Company, merchandise	65

TRAVELING AND CONTINGENT—*Continued.*

1908.		
Jan. 3—	Clark Alberti, salary	$125 00
	G. E. S. Barnes, salary	125 00
	R. M. Richardson, Postmaster, stamps	15 00
	Keuffel & Esser Co., merchandise	89 16
	Mason's Laundry, towel service	4 00
	Hotel St. James, board and lodging	5 00
	P. M. Norboe, expenses	30 75
	Sacramento Electric, Gas and Railway Company, gas	60
23—	F. C. Chinn, merchandise	85
	Miller-Chapin-Enwright Company, merchandise	6 00
	Keuffel & Esser Co., repair work	3 00
	H. S. Smith, expenses	6 95
	McDowell & Harding, merchandise	1 25
	Silva & Company, merchandise	7 00
	Wells, Fargo & Company, express	14 58
	W. F. Purnell, merchandise	13 55
	Pacific Telephone and Telegraph Company, telephone service	34 20
	N. Ellery, expenses	75 80
	Geo. C. Sellon, expenses	120 11
Feb. 4—	F. R. Schaefer, drafting	71 98
	Scott, Lyman & Stack, merchandise	1 95
	W. de Mari, drafting	9 03
	E. Strassle, drafting	6 45
	F. P. Walsh, drafting	16 10
	W. Wooldridge, salary	57 50
	Cresent Blue Printing Company, prints	210 15
	Mason's Laundry, towel service	8 00
	Mugford & O'Leary, typewriting	10 75
	Wells, Fargo & Company, express	6 50
	G. W. Kopp, carpenter work	6 50
	B. C. Tarver, expenses	5 40
21—	Western Union Telegraph Company	2 72
28—	Geo. C. Sellon, expenses	50 67
	W. V. Stafford, expenses	8 50
	Electric Supply Company, merchandise	15 39
	W. P. Fuller & Co., merchandise	60
	Miller-Chapin-Enwright Company, merchandise	35
	Sacramento Gas and Electric Company	2 10
	W. F. Purnell, merchandise	23 85
	P. M. Norboe, expenses	18 80
	D. Dierssen Company, expenses	1 50
	Pacific Telephone and Telegraph Company, telephone service	35 75
	Keuffel & Esser Co., merchandise	19 90
	G. E. S. Barnes, salary	125 00
	Clark Alberti, salary	125 00
	Lynn & O'Neil, merchandise	6 90
	Ben W. Gardner, keys	1 20
	H. E. Sleeper & Co., merchandise	1 60
	R. Crandall, auto hire	4 00
	R. M. Richardson, Postmaster, stamps	15 00
Mar. 5—	N. Ellery, expenses	101 55
	Scott, Lyman & Stack, merchandise	1 95
	Alfred Kohn, expenses	3 60
	Willis & Martin Co., merchandise	15
	Crescent Blue Printing Company, prints	144 56
	G. E. S. Barnes, salary	125 00
	D. Dierssen Company, merchandise	90

TRAVELING AND CONTINGENT—*Continued.*

1908.		
Mar.. 5—	Capital-Sacramento Transfer Company, drayage	$2 56
	Geo. C. Sellon, expenses	41 55
	F. P. Walsh, expenses	6 80
	Robertson Planing Mill, sink	22 96
	H. E. Sleeper & Co., rubber stamps	7 25
	R. M. Richardson, Postmaster, stamps	15 00
	Keuffel & Esser Co., merchandise	41 31
	Electrical Supply Company, merchandise	15 74
	Miller-Chapin-Enwright Company, merchandise	4 34
	C. J. Peters, merchandise	50
	B. C. Tarver, expenses	6 60
	Pacific Telephone and Telegraph Company, telephone service	26 90
24—	N. Ellery, expenses	43 70
July 2—	E. D. Griffith, expenses	5 45
3—	W. P. Fuller & Co., merchandise	35
	F. P. Walsh, expenses	5 05
	H. E. Sleeper & Co., merchandise	1 00
	Tunnison Map Company, map	2 75
	John Breuner & Co., merchandise	6 55
	Keuffel & Esser Co., merchandise	28 75
	Pacific Telephone and Telegraph Company, telephone service	3 85
	G. H. Nichols, salary	100 00
	G. E. S. Barnes, salary	125 00
25—	N. Ellery, expenses	29 05
	R. M. Richardson, Postmaster, stamps	20 00
	Geo. C. Sellon, expenses	70 35
	P. N. Norboe, expenses	35 85
	F P. Walsh, expenses	13 75
	W. P. Fuller & Co., merchandise	1 43
	R. O. Kimbrough, merchandise	20
	Mason's Laundry, towel service	4 00
	D. Dierssen Company, merchandise	90
	Willis & Martin, merchandise	1 90
	Electrical Supply Company, merchandise	12 45
	Miss W. B. Ross, typewriting	9 90
30—	Wells, Fargo & Company, express	39 30
	Western Union Telegraph Company, telegrams	4 10
	Capital Transfer Company, drayage	2 12
	H. S. Crocker Company, merchandise	16 50
	John Breuner Company, merchandise	2 34
	W. F. Purnell, merchandise	5 98
	Eugene Dietzgen Company, merchandise	97 15
	Keuffel & Esser Co., merchandise	114 21
Aug. 1—	Pacific Telephone and Telegraph Company, telephone service	33 50
	Geo. C. Sellon, expenses	51 55
	R. M. Richardson, Postmaster, stamps	30 00
	N. Ellery, expenses	106 25
	Klune & Floberg, repairs	50
	Johnston-Rablin Company, merchandise	75
	Electrical Supply Company, merchandise	2 50
	Mason's Laundry, towel service	4 00
	Wells, Fargo & Company, express	30 97
	G. E. S. Barnes, salary	125 00
	G. H. Nichols, salary	100 00
	F. Chinn, merchandise	1 00
	W. P. Fuller & Co., merchandise	60
	Smith, Emery & Co., merchandise	3 50

TRAVELING AND CONTINGENT—*Continued.*

1908.		
Aug. 1—	The A. Lietz Company, repairs	$2 50
	H. E. Sleeper & Co., merchandise	1 25
	H. S. Crocker Company, merchandise	32 00
	Miller-Chapin-Enwright Company, merchandise	6 54
	W. F. Purnell, merchandise	9 25
	Eugene Dietzgen, merchandise	54 70
	Braun Knecht-Heimann Co., merchandise	1 19
13—	Fairbanks, Morse & Co., merchandise	54 20
	Miller-Chapin-Enwright Co., merchandise	6 88
	Geo. C. Sellon, expenses	117 45
	Miss W. B. Ross, typewriting	1 68
	N. Ellery, stamps	15 00
	Johnson-Rablin Company, merchandise	1 50
	Capital-Sacramento Transfer Company, drayage	3 78
	H. E. Sleeper & Co., rubber stamps	50
	Wm. A. Langley, repairs	50
31—	G. H. Nichols, salary	75 00
	G. E. S. Barnes, salary	125 00
	Mason's Laundry, towel service	4 00
	P. M. Norboe, expenses	42 50
	Capital Auto Company, auto hire	24 00
	John Breuner Company, merchandise	50
	W. F. Purnell, merchandise	4 10
	Kirk, Geary & Co., merchandise	75
	W. P. Fuller & Co., merchandise	1 36
	Willis & Martin Co., merchandise	1 95
	F. P. Walsh, expenses	27 15
	H. S. Crocker Company, merchandise	31 00
	Pacific Telephone and Telegraph Company, telephone service	27 70
Sept. 30—	Wells Fargo & Company, express	30 09
	Western Union Telegraph Company, telegrams	10 42
	Eugene Dietzgen Company, merchandise	26 50
	Keuffel & Esser Co., merchandise	100 05
	Architect's pay roll No. 9, labor	256 38
Oct. 1—	R. M. Richardson, Postmaster, stamps	15 00
	H. S. Crocker Company, merchandise	20 75
	Mason's Laundry, towel service	4 00
	Pacific Telephone and Telegraph Company, telephone service	19 60
	Pioneer Garage, auto hire	12 00
	Wm. A. Langley, keys	70
	Keuffel & Esser Co., merchandise	39 38
	R. O. Kimbrough, merchandise	15
	H. E. Sleeper & Co., ink	50
	W. F. Purnell, merchandise	2 75
	Wells Fargo & Co., express	23 69
	Willis & Martin Co., merchandise	1 00
	Western Union Telegraph Company, telegrams	3 32
	Howard & Morse, merchandise	2 67
	A. S. Penfield, R. R. Blue Book	1 00
	Johnston-Rablin Company, merchandise	1 50
	Mason's Laundry, laundry	2 35
31—	P. H Norboe, expenses	50
	G. H. Nichols, salary	75 00
	Crawford Cox, salary	27 00
	G. E. S. Barnes, salary	125 00

TRAVELING AND CONTINGENT—*Continued.*

1908.		
Oct. 31—	F. P. Walsh, expenses	$9 00
	N. Ellery, expenses September and October	176 65
	Total expenditures	$17,911 22
	Appropriation fifty-ninth and sixtieth fiscal years	20,000 00
	Balance	$2,088 78

PRINTING.

1907, July —	200 Paper boxes (2)		$100 00
Aug. —	1,000 Labels	$3 25	
	2 Lettering books	1 00	4 25
Oct. —	500 Contracts	$69 00	
	2,500 Bill heads, Kings River	10 25	
	250 Pay rolls, Kings River	7 75	
	150 Pay rolls, Eel River	7 50	
	1,250 Bill heads, Eel River	7 00	
	2,000 Manuscript covers	15 75	
	5,000 Engineer inspector's report blanks	42 00	159 25
Nov. —	1,000 Time cards	$8 50	
	1,000 Cement tags	4 25	
	750 Cement test cards	25 00	37 75
Dec. —	5,000 Letter heads, T. W.	$18 75	
	7,000 Envelopes No. 6¼-10s	25 50	44 25
1908, Jan. —	200 Cement order blanks	$6 00	
	3,000 Building inspector's blanks	29 50	35 50
Feb. —	1,000 B. P. record cards	$21 50	
	1,000 Draughtsmen's time cards	8 50	
	3,000 Drawing index cards	14 50	
	5,000 Manuscript covers	35 50	80 00
Mar. —	10 Record books		45 50
April —	500 Salary expense blanks		5 00
May —	5,000 Letter heads, T. W.		22 50
June —	1,000 Draughtsmen's time cards	$8 50	
	2,000 Envelopes, No. 10	9 50	18 00
July —	5,000 Envelopes, No. 6¾	$14 25	$552 00
	2,000 Manuscript covers	16 50	
	2,000 Engineer inspector's reports	23 00	53 75
Aug. —	3,000 Inspector's requisitions	$17 50	
	10,000 Time cards	30 00	
	4,000 Segregation bill heads	31 25	
	5,000 Daily reports	36 00	
	300 Segregation sheets	25 00	139 75
Sept. —	5,000 Letter heads, T. W.		22 50
Oct. —	20,000 Time cards	$55 00	
	600 Monthly records	22 75	
	2,000 Manuscript covers	16 50	
	4,000 Envelopes, Nos. 6¾-10	17 00	111 25
	Total expenditures to November 1, 1908		$879 25
	Appropriation fifty-ninth and sixtieth fiscal years		1,500 00
	Balance November 1, 1908		$620 75

(Cost of printing Biennial Report not yet deducted.)

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THIRD BIENNIAL REPORT

OF THE

BOARD OF TRUSTEES

OF THE

CALIFORNIA POLYTECHNIC SCHOOL

COMPRISING THE

Reports of the Director and Secretary of the Board

1906-1908

SAN LUIS OBISPO, CALIFORNIA
NOVEMBER, 1908

SACRAMENTO:
W. W. SHANNON, : : : : : : SUPERINTENDENT STATE PRINTING.
1908.

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LETTER OF TRANSMITTAL.

December 3, 1908.

To His Excellency, James N. Gillett, *Governor, Sacramento, Cal.*

Dear Sir: I beg to hand you herewith the report of Leroy B. Smith, Director of the California Polytechnic School, which is submitted as the third biennial report of the Board of Trustees of that school.

The Director has treated of the work and policies so thoroughly and satisfactorily to the Board of Trustees that the Board is pleased to transmit his report as its own.

There also accompanies this the report of the Secretary of this Board, showing the principal actions in appointments and permanent improvements, and a statement of receipts and disbursements.

By order of the Board of Trustees.

R. M. SHACKELFORD,
President.

REPORT OF THE DIRECTOR.

To the Board of Trustees.

GENTLEMEN: This is the third biennial report of the Director of California Polytechnic School, and the first which it has been my privilege to submit. The report covers the period from July 1, 1906, to June 30, 1908, the fourth and fifth years in which instruction has been given by the institution. There is also included a classification of students registering for the scholastic year 1908-09. The last biennial period includes but six months of service by the present Director, who began his duties January 1, 1908, upon the resignation of Dr. Leroy Anderson, who left the institution to become professor of Agricultural Practice and director of Farm Schools at the University of California. In taking up the administrative duties of the school, I wish to acknowledge appreciation of well-laid plans for its growth, and of the solid foundation and thorough organization established by Dr. Anderson in his five years of effective service for the institution.

FACULTY.

The following is a record of the resignations and appointments of the last biennial period:

Mr. Sydney S. Twombly, B.S., D.V.S., instructor in Agricultural Chemistry and Veterinary Science, resigned June 1, 1907, the resignation taking effect June 30, 1907.

Mr. Frank E. Edwards, M.S., vice Sydney S. Twombly, appointed June 1, 1907, service to begin July 1, 1907. Mr. Edwards was graduated from the Oregon Agricultural College in 1895, and the following year was a graduate student in chemistry. He later served two years as assistant instructor in chemistry. One year was spent as a graduate student in agricultural chemistry at the University of California. In 1898-99 he served in the Second Oregon Infantry in the Philippines, and was for about five years altogether commandant of cadets at the Oregon Agricultural College.

Mr. James Edwyn Roadhouse, B.S., instructor in Plant Industry and Irrigation, resigned June 1, 1907, the resignation taking effect June 30, 1907. In the sudden death of Mr. Roadhouse, which occurred in November, 1907, the cause of agricultural education on the Pacific coast lost one of its most able exponents.

Mr. Ira Judson Condit, B.S., vice James Edwyn Roadhouse, began his services September 1, 1907. Mr. Condit was graduated in 1905 from the course in Horticulture and Forestry at the Ohio State University. Mr. Condit came to Polytechnic School from Washington, D. C., where he served for a year and a half as scientific assistant in the Bureau of Entomology of the Department of Agriculture.

Mr. Edwin Walter Yount, instructor in Drawing and Carpentry, retired May, 1907, on account of illness.

Mr. Oscar Leslie Heald, vice Edwin Walter Yount, served July 1, 1907, to June 30, 1908. Mr. Heald's resignation was placed to take effect June 30, 1908, in order that he might return to Stanford University to continue his course of study in mechanical engineering.

Mr. Jewett M. Johnston of San Francisco appointed June 12, 1908, to succeed Mr. Heald as instructor in Carpentry, his appointment to begin July 1, 1908. Mr. Johnston is a graduate of the Wilmerding School in San Francisco, and has served as substitute and assistant instructor in the carpenter shops of the Wilmerding and Lick schools. He has also had some two years' experience in cabinet building, mill work, and practical carpentry work in San Francisco.

Mr. Crosby Mitchell Gassaway, a senior in the University of California, served as instructor in Mechanical Drawing from October 1, 1906, to July 1, 1907.

Mr. Frank Lucius Tavenner, C.E., M.E., instructor in Mechanical Drawing and Machine Shop Practice, appointed to begin service July 1, 1907. Mr. Tavenner was graduated from the Montana State College of Agriculture in 1903 in civil engineering, and in 1905 was graduated from Cornell University in mechanical and electrical engineering. He came to Polytechnic School from the Telluride Power Company at Provo, Utah.

Mr. LeRoy Burns Smith, A.B., served as Vice-Director and instructor in History and English from July 1, 1907, to January 1, 1908.

Mr. Herman Bierce Waters, M.E., was appointed Vice-Director January 4, 1908.

Miss Ethel Bancroft Richardson, B.L. (University of California), served as instructor in English from September 1, 1907, to December 30, 1907, when she resigned for foreign travel.

Miss Margaret Chase, A.B., vice Miss Richardson, began service January 1, 1908. Miss Chase was graduated from Dalhousie University, Nova Scotia, in 1899. She has also had normal school training, together with a half-year of graduate work in English at the University of California. Miss Chase's teaching experience in California covers five years.

Miss Grace Fordyce, a graduate of Throop Polytechnic Institute, served from September, 1907, to June 30, 1908, as instructor in Domestic

Art. During this period Miss Harriet Howell was absent from the institution on leave on account of illness.

Mr. Edwin J. Berringer, M.L., instructor in English, History and Economics, vice LeRoy Burns Smith. Mr. Berringer's service began January 1, 1908. Mr. Berringer received both his Bachelor's and Master's degrees from the University of California, the latter in December, 1907. His experience in teaching covers four years in the public schools of Michigan and five years in the Government Indian schools of Arizona.

Miss Edith Richardson of San Francisco, manager of the dormitory and secretary to the Director, appointed September 1, 1906. July 1, 1907, Miss Richardson began her service as librarian and secretary to the Director.

Miss Naomi M. Lake, bookkeeper and librarian, resigned August 1, 1907.

Miss Jane Vaughn Gillett, bookkeeper and manager of dormitory, was appointed, to begin service August 1, 1907.

Mr. Alfred G. Lunn, poultryman and instructor in Poultry Husbandry, resigned June 12, 1908.

Mr. William E. Coleman, vice Mr. Lunn, was appointed, to begin service July 1, 1908. Mr. Coleman has had two years' practical experience in poultry keeping in California, and came to Polytechnic School from the Cornell University College of Agriculture, where he pursued a course of study in the poultry department.

STUDENTS.

The enrollment for the first five years of the institution has been as follows:

1903-4	20
1904-5	60
1905-6	100
1906-7	126
1907-8	141

The following tables show the classification of students as to years and courses of study during the last biennial period:

1906-7.	1st Year.	2d Year.	3d Year.	Special.
Agriculture	11	16	5	2
Mechanics	31	13	4	3
Household Arts	21	11	7	2
	63	40	16	7

1907-8.	1st Year.	2d Year.	3d Year.	Special.
Agriculture	16	15	8	..
Mechanics	41	21	4	1
Household Arts	15	14	6	..
	72	50	18	1

1908-9 (to November 1, 1908).

	1st Year.	2d Year.	3d Year.	Special.
Agriculture	8	9	12	2
Mechanics	32	19	16	..
Household Arts	14	8	12	1
	54	36	40	3

The counties from which students register are widely scattered:

Counties.	1906-7.	1907-8.	1908-9.
Alameda	1	..	..
Amador	1	1	..
Butte	..	..	2
Colusa	2	2	1
El Dorado	1	..	..
Fresno	1	3	4
Humboldt	..	..	1
Inyo	..	..	1
Kern	4	2	1
Los Angeles	6	17	12
Mendocino	1	..	..
Merced	2	2	6
Monterey	3	6	7
Orange	2	4	3
Riverside	2	..	4
Sacramento	3	5	6
San Benito	..	2	2
San Bernardino	..	..	1
San Diego	3	4	6
San Francisco	1	..	..
San Joaquin	..	..	2
San Luis Obispo	64	53	48
Santa Barbara	13	10	9
Santa Clara	1	6	..
Santa Cruz	2	5	5
Solano	1	1	..
Sonoma	..	..	1
Stanislaus	2	..	..
Trinity	..	2	..
Tulare	4	4	4
Ventura	3	5	3
Colorado	..	1	1
Idaho	..	..	1
Minnesota	1	1	..
South Dakota	..	..	1
India	..	3	..
Japan	2	2	1
Totals	126	141	*133

GRADUATION.

Three classes have now been graduated from the institution, diplomas having been awarded as follows:

	Agriculture.	Mechanics.	Household Arts.	Total.
June, 1906	2	2	4	8
June, 1907	5	4	7	16
June, 1908	8	4	4	16
Prospective graduates in June, 1909	10	14	10	34

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* To November 1, 1908.

An enthusiastic alumni association was organized soon after the first commencement, and the loyalty to the institution of this body of forty young men and women has been most gratifying to trustees, faculty, and friends of the school. Of the forty graduates, eight are now continuing their study in other institutions, while several others definitely plan to continue their study in the near future. Of the young women graduates who are now serving as homekeepers, it can be said that their training in domestic science and domestic art is proving most helpful in the practical duties of the home. Graduates in Agriculture are serving successfully in various capacities—one as manager of a fruit farm, one as manager of a ranch, another as instructor in horticulture in a State school of industry, others in the sugar beet industry, and still others as dairymen and creamery operators. These men believe with the faculty of the school that a young man of to-day makes no mistake in entering upon scientific agriculture. Graduates in Mechanics are creditably filling positions in various mechanical and electrical lines, a few already occupying places of considerable responsibility at substantial salaries.

AIM OF THE COURSES OF STUDY.

The aim of the courses of study is to give boys and girls a training in the arts and sciences which deal with the life of the home, particularly the rural home with its farm and farm animals, the orchard, and the shop. Emphasis is laid upon work and service as well as upon scholarship. The courses of study do not lead toward the professions, neither do they yet meet in full the entrance requirements of the universities. The school is, in fact, designed first for the boy and the girl who are not preparing for collegiate work, but who do desire instruction in the essential high school subjects and training in the arts of the home. The truth is, however, that our students during the courses of study in the school are gaining their inspiration for a college course, and they leave the institution to go on with advanced work. Once having made the decision, the road to completion of the college entrance requirements in any standard high school is not long. We have but few years of observation and experience to guide, but indications to-day are that the percentage of Polytechnic School students who will ultimately go on to collegiate work will be nearly as large as that of the average high school whose courses from the beginning are designed to meet university entrance requirements. If the institution can instill the inspiration for higher things, its service to the State is largely accomplished.

THREE LINES OF INSTRUCTION.

Attention continues to be devoted to three main lines of instruction, namely, Agriculture, Mechanics, and Household Arts. The courses of study outlined in this section of the report were given in 1907-1908, and are the result of experience gained in the first four years of the life of the school.

COURSES OF STUDY.

AGRICULTURE.

First Year.	*PERIODS PER WEEK.		
	1st Term.	2d Term.	3d Term.
English	5	5	5
Algebra	5	5	5
Botany and Plant Propagation	8	8	8
Soils and Fertilizers	5	5	5
Poultry	..	3	3
Freehand Drawing and Farm Buildings	5	4	4
Carpentry and Forging	8	8	8
	36	38	38

Second Year.			
English	5	5	5
Mathematics II	5	5	5
Chemistry	8	8	8
Horticulture	..	11	7
Dairying	..	7	6
Animal Husbandry	11	..	4
Drawing	7	..	..
	36	36	35

Third Year.			
History and Civics	5	5	5
Mathematics III	5	5	5
Agricultural Chemistry	5	5	5
Surveying and Irrigation	4	4	4
Animal Physiology	3	3	3
Animal Husbandry	3	3	3
Physics	7	7	7
	32	32	32

MECHANICS.

First Year.	*PERIODS PER WEEK.		
	1st Term.	2d Term.	3d Term.
English	5	5	5
Forge Work	4	4	4
Algebra	5	5	5
Freehand Drawing	5	5	5
Mechanical Drawing	8	6	6
Carpentry	12	12	12
	39	37	37

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*Each school day is divided into eight 45-minute periods.

Second Year.

	*PERIODS PER WEEK.		
	1st Term.	2d Term.	3d Term.
Mathematics II	5	5	5
English	5	5	5
Elementary Physics and Electricity	6	6	6
Mechanical Drawing	4	4	4
Chemistry	8	8	8
Machine Work	4	8	8
Forge Work	4	..	..
	36	36	36

Third Year.

	1st Term.	2d Term.	3d Term.
History and Civics	5	5	5
Mathematics III	5	5	5
Machine Work	8	8	8
Surveying	4	4	4
Physics	6	6	6
Steam and Electrical Machinery	7	7	7
	35	35	35

HOUSEHOLD ARTS.

First Year.

	1st Term.	2d Term.	3d Term.
Algebra	5	5	5
English	5	5	5
Elementary Chemistry	5	5	..
Physiology	..	..	5
Sewing	11	11	11
Freehand Drawing	5	5	5
Sloyd	4	4	4
	35	35	35

Second Year.

	1st Term.	2d Term.	3d Term.
English	5	5	5
Dairying	5	5	..
Gardening	..	..	4
Domestic Science I	3	3	3
Cooking Laboratory	8	8	8
Mathematics	5	5	5
Chemistry	8	8	8
	34	34	33

Third Year.

	1st Term.	2d Term.	3d Term.
History	5	5	5
Botany	6	6	6
Domestic Science II	3	3	3
Cooking Laboratory	8	8	8
Sloyd	4	4	..
Home Management	..	2	5
Mathematics	5	3	..
Sewing	..	..	5
	31	31	32

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*Each school day is divided into eight 45-minute periods.

The faculty is still unanimous in its recommendation of two years ago that each course should be increased from three to four years at the earliest possible moment the necessary equipment and additional instructing staff can be secured. There is already liberal provision for special students in Agriculture, and should the Board indorse the faculty's recommendation for a short course in dairying and creamery operation with the opening of our new creamery building, the extension of the regular course in Agriculture from three years to four will work hardship to none. Similar provision can also be made for students in Mechanics and Household Arts, though experience has taught us that the minimum age of our special students should be at least eighteen years.

It will be noted that English, mathematics, drawing, and American history and government are common to all courses, and must be fundamental in our curriculum since our students are admitted to regular standing upon completion of the eighth grade of the grammar schools. A knowledge of the mother tongue is of first importance, and, accordingly, to English is assigned five periods per week throughout the first two years of the course. In the third year these five periods are allotted to American history and government. Standard high school efficiency in the academic subjects as far as the time allows, as well as in the technical work, is a necessary requirement for graduation.

BUILDINGS.

The household arts building, for which an appropriation of $30,000 was made by the legislature of 1905, was ready for occupancy in April, 1907. The Household Arts Department finds its present requirements splendidly met in this building. Its dimensions are 42 by 103 feet. The well lighted basement contains the sloyd room, equipped with benches and tools for a class of twenty, locker room, lunch room, lavatories, and store room. On the first floor is a small reception room, the sewing rooms, and also a class room and laboratory now used by the botany department. The second floor accommodates the cooking classes. The kitchen, equipped with both wood and gas ranges, provides room for a class of twenty-four girls. There are also on this floor the dining room, pantries, and two large class rooms. The cost of construction of this building was $27,000, and of equipment $3,000.

The greenhouse, 36 by 40 feet, divided into two equal sections, was ready for use early in 1907. The cost, including heating plant, was $1,867.

The plant propagation laboratory, ready for use the spring term of 1908, measures 30 by 42 feet and contains a well lighted work room for the use of classes, a tool room, and a seed room. In this building is done the planting of seeds in flats, transplanting, making of cuttings and the like. Insect incubators here also give the student opportunity to study the life history of the common insect pests. The cost of the building and its equipment was $2,000. In the summer of 1908 a lath house 14½ by 40 feet was added at a cost of $75.

The construction of a concrete incubator cellar is a valuable addition to the poultry plant. The structure measures 24 by 36 feet and cost $800. It is hoped that future appropriation will soon make it possible to add a class room and student work room above the cellar, the walls of which furnish a complete foundation.

The forge shop has been extended from its former dimensions of 40 by 56 feet to 40 by 100 feet. The shop now contains sixteen double down-draft forges of modern type, with other necessary tools for student use. The cost of the forge shop extension was $1,528. The cost of additional equipment was $1,402.

The machine shop, 40 by 100 feet, is uniform in appearance and general structure with the carpenter shop and the forge shop. The equipment of the machine shop includes six iron lathes, polishing lathe, universal milling machine, drill presses, shapers, power emery wheels, cut-off saw, and a variety of high-grade finishing tools and measuring devices. The cost of construction was $5,700, and of equipment $7,295.

Woodworking machinery purchased in the summer of 1907 was installed in the present carpenter shop. Two thousand and seventy-five dollars was expended for four turning lathes, band saw, planer, swinging cut-off saw, and the installation of same with minor accessories. All machinery of the various shops is now motor-driven.

In the power house and electrical laboratory there have been added an 8 by 12-inch Skinner automatic engine, a 30 K. W. Fort Wayne generator, an 8 K. W. rotary convertor, a 5 K. W. A. C. generator, 4 special transformers, 112-cell storage battery, an 8-horsepower horizontal steam engine, steam engine indicator, boiler testing set, and a variety of instruments, tools, and small apparatus. The cost of this equipment was $2,208.

April 15, 1908, a contract was awarded J. Maino & Son of San Luis Obispo for the erection of two five-room cottages, at a cost of $3,846 for the two buildings. One cottage will be occupied by Mr. S. C. Griffith, the farm foreman, and the other by Mr. A. D. Sinclair, the head gardener.

June 12, 1908, contracts were awarded the F. O. Engstrum Company of Los Angeles for the erection of a creamery building and a boys' dormitory, the creamery to be erected at a cost of $9,980 and the dormitory at a cost of $20,765, the State in each instance to make the necessary excavation. The creamery, 40 by 60 feet, with boiler room in addition, ready for occupancy in January, 1909, will house a model plant for instruction in the arts of butter and cheese making. On the first floor are the boiler room, receiving room, separator and churn rooms, together with provision for installation of a complete refrigerating plant. On the second floor are the class rooms, laboratory, reading room, instructor's office, and operator's quarters. The new dormitory contains fifty-two rooms, including matron's suite, large living room with fireplace, tub and shower baths, and lavatories. Heat will be furnished by an independent oil-burning plant located in the basement of the building. This building will not be ready for occupancy before the middle of the winter 1908-09.

Plans and specifications for the propagation house, forge shop extension, machine shop, creamery, and dormitory were received from the State Department of Engineering.

FARM.

A most valuable addition of 30 acres of rich bottom land has been added to the original farm of 281 acres, making a total of 311 acres. While a large part of the old farm was valuable only for grazing and the production of hay, the recent addition gives us opportunity for the production of more alfalfa and other forage crops. The poorer land has been enriched to some extent the past two years by the addition of barnyard manure, and its productivity visibly increased. A yield of two tons per acre of barley hay was realized this year on some of the rolling land where not more than one ton per acre had been procured before in the history of the school. About forty tons of oat hay and fifty-four tons of barley hay, besides eighteen tons of alfalfa, have been harvested this year. No silage has been put up, but we are still feeding from a lot of over 100 tons of corn that was ensiled in 1907. In the spring of 1908 a number of cereal experiments were carried on in connection with the State Experimental Station of Berkeley, together with some grass and forage experiments of our own. Further cereal experiments will be conducted next year in coöperation with the State Station. Mangel wurtzels have proved a valuable crop with us, and several tons have been raised for the dairy cows this year.

The stock equipment has increased in number and value. In horses we have seven pure-bred Percheron mares, two Clydesdales, and five grades, the pure-breds being valuable representatives of their respective breeds. In cattle we have about forty animals, representing the Ayrshire, the Shorthorn, the Jersey, and the Holstein-Friesian breeds, and in swine about forty animals of the Poland-China and Berkshire breeds are on hand all the time.

Our live stock transactions have necessarily been largely of a purchasing nature, though in the cattle and swine departments we have already begun to realize an income from the sale of young stock. This gives promise of material increase in the near future, and we will soon be producing more horses than can be used on the place, which of course will mean material profit.

The farm is very badly in need of a commodious barn, which could be made headquarters for farm operations, and would furnish stable room for stock, storage room for food stuffs of various kinds and farm seeds, and housing for machinery. Such a structure would furnish room where farm machinery could be studied by the students, study of farm crops carried on, and where experiments both in general agriculture and animal husbandry could be handled.

The construction of cottages upon the grounds for the farm foreman and the head gardener is a step in the right direction. These men need to be near their work, for, as has been pointed out, a man with a family in a comfortable home near his work is a far more dependable quantity than a single man who must reside at some distance. In the near future homes should be provided for the dairyman, teamsters, and possibly one or two other employees.

GROUNDS.

When we consider that our first buildings were erected only a little more than five years ago in the middle of a roadless barley field, the improvement of our grounds is a feature of which the institution may well be proud. The trails of 1902 and 1903 have been transformed into more than two miles of crushed rock road, now equally good in winter and summer. About 275 yards of rock excavated from the site of the dormitory now under construction has been used in road-building and grading in front of the shops. The excavation of this rock and hauling cost one dollar per yard, and to this extent our roads were improved practically without cost, except for labor of spreading the rock hauled. Much of our road material has been hauled by our ranch teams at slack seasons in the routine of seeding and harvest. The petrolithic pavement on the roadways immediately surrounding the school buildings is a marked success. The total amount directly spent on roads and culverts in the life of the institution is $3,300, $2,000 of which has been expended in the last biennial period.

The almost treeless fields of 1902 are now growing some three thousand trees and shrubs. The shrubs and many of the trees are small, but the eucalypti make a remarkable showing, a considerable number having grown fifty feet in the past five years. About one half of a grove of two hundred and fifty eucalyptus trees, set eighteen months ago east of the household arts building, have been growing at the rate of a foot per month. Excellent showing is already made by twenty-five Casuarinas. Other varieties of trees are acacias of various species, Monterey pines, Araucaria, pepper, and numerous scattering specimens. In December, 1907, one hundred and eighteen palms of the Phœnix Canariensis variety were set in rows on either side of the driveway leading from the school buildings toward San Luis Obispo. Our policy in tree planting is to put out each season only such a number as we can reasonably expect to care for and get well started, rather than to plant very large numbers and trust to survival of the hardiest for permanent growth. A small number of plantings well cared for, especially the first season, will produce more trees in ten years than wholesale plantings left to battle unaided against the long, rainless seasons.

The beginning of a new group of dormitories on the south portion of the school farm now imposes a new task of road-building and landscape gardening. To meet these new demands together with the maintenance and necessary improvements of the older portion of our grounds $8,000 should be expended in the next biennial period.

WATER SUPPLY.

The water at present available for use of the institution is the supply pumped from a well 28 feet deep, dug near the creek, and that which flows from two small springs. The spring water, stored in a 40,000-gallon concrete reservoir on the hillside 200 feet above the buildings, is the reserve for fire protection and emergency of any kind. While this supply very well met the earlier needs of the institution, additional dormitories, increased number of plantings and extent of grounds, together with more urgent necessity for irrigation, demand a greater supply. This greater supply most fortunately was made possible through the recent purchase of thirty acres of bottom land adjoining the school's original property. A test well put down near the creek bed on the new land proved conclusively that an abundance of water exists. On account of the formation, however, a serious cave-in made it impracticable to proceed with the first well, and a new plan will accordingly be followed out the coming summer. We have proved that water is available for greatly increased domestic needs and for irrigation; the next step must be development. The value of the water supply alone is worth to the institution three times the $15,000 required to buy the desired thirty-acre tract, and future years will only emphasize the wisdom of this purchase at this time.

FARMERS' INSTITUTES.

Each year in May a farmers' institute under the auspices of the State University has been held at the school. Details of arrangement are perfected by the Polytechnic Faculty, some of whom annually take part in the program, with speakers from abroad. In May, 1907, the general topic of discussion was Animal and Dairy Husbandry, and in May, 1908, Agricultural Education and Intensive Agriculture. Institute day is also a general exhibition day of the school's equipment and the handiwork of the students. Visitors spend the entire day on the grounds, the noon hour being the occasion of an enjoyable basket picnic. The day is now looked upon as an established feature of the school year, furnishing as it does excellent opportunity for "extension work" in agricultural education among residents of a large community.

PUBLICITY.

An annual catalogue issued in the spring is the principal method of placing information before the public. The edition of 1907 numbered eight thousand 24-page booklets, and that of 1908 five thousand of the same size. The cost at the State Printing Office was $221.50 for the first and $144.25 for the latter. Through the coöperation of county superintendents the catalogues have each year been mailed to the grammar school graduates of from twenty to thirty counties. The remainder of the edition each year is mailed to teachers and to the constantly increasing number of applicants for information. News letters are also sent from time to time to various newspapers and publications of the State.

The school's exhibit at the State Fair of 1908 was adjudged the best educational exhibit, and was the means of advertising the advantages of the school to people from widely scattered sections of the State. The stock exhibit consisted of five Percheron mares and one Clydesdale filly two years old. Five first premiums and two seconds were awarded the animals, the cash prizes amounting to $86. The educational display consisted of carpentry and forge models, and a large collection of photographs illustrating the work of the school.

During the summer of 1907 Instructors William F. Ewing and LeRoy B. Smith visited the coast counties from San Francisco to San Diego, Riverside and San Bernardino, and part of the San Joaquin Valley, personally presenting to county superintendents, teachers, and residents the work of the school. Photographs and literature aided our representatives in disseminating information. Both report cordial reception in all localities visited. This kind of advertising is undoubtedly the most effective that has been done in the interests of the institution. Should the question be asked, "Why advertise a public institution?" we may point to the fact that various educational agencies of both the National and State governments are unused by large numbers of people because of lack of knowledge of the very existence of means of education for which support is drawn from public taxation. The advertising which our representatives did in about fifty days of work covering the area mentioned cost the school $121.30.

THE SCHOOL LIFE.

The social life of students centers at the school just so far as such a condition can exist without a complete dormitory system. Frequent receptions and social affairs on Friday evenings are held in the assembly hall, members of the faculty always being present and joining in the evening's program. Receptions to new students and in the spring entertainment of the senior class by the juniors are established social features. Commencement week of 1908 was made particularly enjoyable by the return of a large percentage of the graduates of the earlier classes.

Last year thirty-three per cent of our students not residing in their own homes in San Luis Obispo earned a considerable part of their living expenses during the school year. The school offers to students such employment as janitor service, dairyman's assistant, occasional kitchen service, etc. The power and lighting plant is operated by students under the direction of the Mechanics Department. The student engineer who is on duty part of each school day and every other evening is paid $45 per month. A second student engineer is paid $22.50 per month. Compensation allowed student janitors and assistants in various capacities ranges from $5 to $20 per month, only one or two being employed at the higher figure.

Outside of the school students find good homes in the community, where opportunity is given to exchange their services for room and board, or both. Student service, in the main, has been very satisfactory, and thus far the demand for this service active.

As my predecessor has well pointed out in his last report the unity and completeness of school life would be greatly enhanced were it possible for a majority of the married members of the faculty to occupy residences upon the grounds. I am aware that the legal right of our governing board to issue a lease of land does not now exist. Were this right to be secured by the necessary legislation, I believe that faculty members would soon be inclined to purchase leases for the building of homes in close proximity to their work. The presence upon the grounds of the homes of at least a portion of the faculty would do much to lend a home atmosphere to the entire institution and to unify the interests of the school and its workers.

DEMAND OF PATRONS FOR DORMITORIES.

Our urgent call for dormitory accommodations for students is not based upon a theory of the faculty that students ought to live in dormitories, but is made first because of the insistent demand of parents who are sending, or are contemplating sending, sons or daughters to this institution that their children while away from home live at the school and under its supervision. It is true also that the faculty believes from actual experience that the majority of our students should be housed at the school for its more perfect school life, and for the reason that students living in our present dormitory have in the past profited more from their school work than the average nonresident student boarding outside. Many good homes in San Luis Obispo are open to students, but it must be remembered that a large proportion of our students are from fifteen to seventeen years of age, hence a natural disinclination on the part of many parents to send the young son or young daughter away from home to board with families in a strange town. Our letter file shows constant inquiries of which the following is a good example: "Will you kindly let me know whether or not it will be possible for my son to live at the school? I should prefer it so if it can be arranged." Others of more decided opinion ask if the young man or young woman can reside at the school, and then state that if dormitory accommodations are not available they will find it necessary to consider some other institution. The inquiry for dormitories for girls has always had to be met with the reply that no dormitory accommodations were as yet provided for young women. Our one dormitory now provides for fifteen per cent of our students, while demand for residence at the school is made for approximately sixty per cent of the enrollment. Some prospective students have been kept away entirely owing to unwillingness of parents to allow children to reside away from home without immediate supervision of the school authorities. A portion of our students nonresident in San Luis Obispo will always desire to live outside of the school, since a considerable number find opportunity to exchange their services for room and board in private homes in the community.

It is to be earnestly hoped that a liberal allowance for dormitories will be made by the coming legislature. The announcement of increased dormitory accommodations will immediately increase the enrollment very materially as soon as the buildings can be occupied. The dormitory now under construction will provide for fifty students. The cost of this building, including partial furnishings, will be $500 for each person accommodated. In common with my predecessor, I am convinced that several small dormitories will render the discipline and the problems of school life much easier than a massing of five hundred students in two or three buildings. The school life will be much more satisfactory in every way if the maximum number of residents in each dormitory never exceeds seventy-five, or one hundred at the outside. A central dining hall may accommodate the occupants of a number of dormitories. If the coming legislature will provide dormitories for two hundred boys and girls, students will be ready to occupy as soon as the buildings can be made ready for use. The fifty-room dormitory for which the contract is already let will not be large enough to provide for one half the number of students desirous of residing therein upon its completion.

STUDENT ACTIVITIES.

Much credit is due the student body for the very helpful service their well-organized reception committees have rendered in welcoming new students at the beginning of the school years. These committees, made up of older students, on opening days meet the trains for the purpose of assisting new students in finding their way to the school and to their new homes and in becoming acquainted with their new surroundings. This service, together with an opening reception planned by old students for the new, does much to make the young strangers feel at home from the start.

The continued publication by the students of "Polytechnic Journal," established in 1906, has served as an incentive to students to put forth some effort along literary lines, and has been from the beginning very helpful as a means of advertising the school. Practically all matter published is written by students, and the business management of the enterprise is entirely in their hands. Mr. E. J. Berringer is the faculty representative on the staff.

A debating society fosters interest in debate and encourages a desire to gain efficiency in public speaking. Debating contests with other schools in this section of the State resulted in the winning of the season's championship for the Polytechnic, both in 1906-07 and in 1907-08.

The faculty believes in the encouragement of athletics, and constant faculty coöperation with student interest in athletic sports has guided the various contests along safe and rational lines. The San Luis Bay Athletic Association is the organization of secondary schools of San Luis Obispo and northern Santa Barbara counties for the promotion of inter-school athletic contests at tennis, basketball, football, baseball, and track events. Near the opening of the fall term in 1908 there was organized by Instructor I. J. Condit a class in physical culture for those students not taking part with the school athletic teams.

Other student organizations are Glee Clubs for boys and girls and an Agricultural Club fostered by the efforts of Instructor C. W. Rubel.

Regular religious instruction is not permitted by law in any State school. To meet the need of training in religious work and life, no better non-sectarian organization has been found than the Christian Association, branches of which are found in nearly all institutions of higher learning, both State and private. The faculty believes that every encouragement should be given an organization of this kind among the students of Polytechnic School.

COST OF VOCATIONAL TRAINING.

Vocational education must of necessity be expensive. The training which vocational teachers must have makes them especially valuable in the industrial world. School boards, therefore, if they would retain the competent teachers, must offer as much compensation as these technically trained men can demand and can secure in the industrial world. The vocational teacher must ordinarily have smaller classes than the usual grammar school or high school, and he must devote a longer class period to his students than is necessary with purely academic subjects. It is entirely possible, for instance, for an instructor in history to meet three or four classes of twenty-five or more members each, while the instructor in carpentry, machine shop practice, or stock judging should spend the entire three or four periods with his one class of twenty-five in the shop or on the stock farm. Shop practice, field, or laboratory work can not profitably be divided into the usual forty-five-minute class periods. The equipment necessary for the farm, the shop, and the various laboratories is expensive, and there must be constant outlay for materials. Professors Dutton and Snedden in their recently published book, "Administration of Public Education in the United States," in summarizing the results of their investigation, say, "In general—vocational education of all sorts is highly expensive. * * * Full time vocational training (as opposed to continuation or evening work) requires an expenditure of from $75 to $300 per year for each student. In some lines of technical instruction, and in trades' instruction employing materials extensively, the cost may be even greater."

In Polytechnic School last year the cost to the State for actual running expenses was $275 per pupil for the year. This figure will decrease as enrollment increases; however, for comparison it is gratifying to note that the cost per pupil here last year was no greater than in some similar older institutions having a greater number of students.

TECHNICAL FEATURES OF THE COURSES.

Agriculture.

The principal features of the course in Agriculture are here reported in brief by the instructors in the various lines. Mr. Frank E. Edwards of the Chemistry Department here describes a part of the work he has been conducting the past year.

The instruction in agricultural chemistry is for five periods each week throughout the third year of the agricultural course. One period is devoted to lecture and class work along the lines of plant and animal chemistry, with occasional reference to the present day application of chemistry to the manufacturing industries closely related to agriculture. Each student is required to do thorough library research work on some particular topic and prepare a paper for delivery before the class. Three or four papers are prepared by each student during the year. Four periods are utilized in agricultural analysis in the laboratory. The student spends this time in the careful analysis of soils, fertilizers, grains, forage crops, foods, milk, butter, cheese, and other agricultural materials in which he may be interested. The course seems to be quite popular, and there is a general demand from the students for additional time for analytical work. As soon as it can be accomplished without interfering with the work of the other branches, I recommend that the time be increased to eight or ten periods each week.

Advanced students are encouraged and aided in taking additional analytical work on soils and agricultural products. This year one student is in addition to the regular outlined course taking about ten periods each week in the chemical and physical analyses of soils. Two other students are making some soil studies outside their regular class work.

The course in general chemistry is for all second year classmen and runs for eight periods throughout the year. Three periods are utilized in recitation and lecture work, and five periods in laboratory practice supplementary to the class-room instruction. During the spring term considerable time is devoted to instruction in elementary qualitative analysis. The ground covered is fully equivalent to the State high school course in chemistry.

The instruction in soils and fertilizers is for five periods each week throughout the first year of the agricultural course. The course is necessarily somewhat elementary, as it precedes the study of chemistry and physics, both of which are valuable prerequisites to soil study. Two periods are devoted to class-room instruction and three to field and laboratory practice. The course includes elementary instruction in the chemistry of the soil, agricultural mineralogy, soil formation, tillage, conservation of moisture, irrigation and drainage, use of fertilizers, rotation of crops, dry land farming, alkalis, and other related topics. The laboratory and field practice includes soil sampling, mineral collecting, moisture and temperature studies of soil plats, the effect of fertilizers, mulches and manures on various soils and crops, tillage effects, alkali effects, elementary chemical and physical soil tests, and other similar experiments.

In general, the equipment for all the classes in the department is excellent. I believe we have more and better equipment than most schools of like scope and character throughout the country. The equipment for agricultural analysis has been largely accumulated during the last two years, but the class has doubled in the time and the equipment is not yet as extensive or complete as it should be. It is the wish of the instructor that we may increase the apparatus as much as possible within the next year, so that we may be able to fully meet the growing demands for special work along agricultural chemistry lines. This year we have added an excellent Sartorius analytical balance, a large hand mill for grinding grain and forage samples, and an electric crucible furnace, besides many of the smaller species of apparatus usually found in an analytical laboratory.

The present laboratory space is much too small considering the size of the classes and the different kinds of work being carried on at the same time. It is impossible to get the best results in a laboratory which is used also for general chemical experiments. I would suggest that at the very earliest possible day another laboratory be fitted up for agricultural chemistry and soils. This should accommodate, if possible, two sections of twenty-five men each. The department is also very much in need of a large store room for chemicals and apparatus.

A very large portion of the students show a marked interest in the various studies and apply themselves diligently, but I am of the opinion that a four-year course, with more culture studies in the first two years and several electives in the senior, would increase many fold the power of the student to assimilate the technical studies and in like ratio increase his usefulness as a citizen.

The report on our work in plant propagation, botany, and horticulture has been prepared by Instructor Ira J. Condit.

The work in botany for the first year students in Agriculture covers eight periods during the week, three in the class room and five in practical work in the laboratory, garden, and propagation house. In the laboratory the boys study the germination of seeds; seed testing; dispersal of seed; the young plantlet as it comes from the ground; functions and form of roots, stems, and leaves; source and method of assimilation of plant food; minute structure of the plant body under the compound microscope; study of flowerless plants including bacteria, yeasts and moulds; formation of flower and fruit; and the relationships which plants bear to one another. The work includes a short course in forestry, in which the important timber trees are considered, with the best methods of conserving and utilizing the present lumber supply of the United States as well as providing for future needs.

The practical work consists in the propagation of plants by cuttings of hard and soft wood, by seed, by bulbs, by layering, division, etc.; the propagation and care of ornamental plants in the greenhouse; experimental work in crossing and breeding plants; growing of mushrooms; selection of varieties, planting, cultivation, irrigating, and harvesting of garden vegetables; study of weeds in the field and methods for their eradication; and the value and use of cover and green manure crops. The garden work this season will include variety tests of peas and lettuce, about fifty varieties of peas and forty of lettuce being tested as to quality and yield in our conditions of soil and climate.

Especial attention is paid to the raising and planting of young trees such as eucalyptus, pine, acacia, catalpa, etc. The department has been quite fortunate in receiving several different lots of plants and seeds from the Department of Agriculture at Washington as follows: forty-eight living specimens and twenty packets of seed of economic and ornamental plants; ten species of eucalyptus seed from Australia; twenty-five herbarium specimens of plant diseases; eighteen packages of seed of forage crops for experiment; as well as a large number of specimens of economic and interesting insects. There are now twenty-two species of eucalyptus growing on our grounds and the seed of several more ready to plant soon. A few cuttings of spineless cactus have just been started growing, while several young trees of Burbank's hybrid walnut will be ready to set out in the spring.

The botany work for the third year students in Household Arts is similar to that of the other course for the first term; in the second term the study of flowerless plants is taken up, beginning with the single-celled algæ, through the fungi, mosses and ferns to the most highly developed form of plant life. The third term is spent in getting acquainted with and making collections of native wild flowers, studying the relationships of plants and the environment in which they live and grow.

In the second year of the Agricultural course eleven periods during the second term and seven during the third term are devoted to the work in horticulture. The selection of orchard soils and sites, and the principles of orchard management are first considered, followed by a more thorough, detailed study of the various orchard fruits, their propagation, planting, pruning, care, and varieties. The practical work consists in budding and grafting nursery stock, top working old trees, pruning, planning and laying out of orchards, judging varieties of fruit, spraying for injurious insects and diseases, and the planning of, and selection of plants for, ornamental grounds. A small orchard of citrus trees, consisting of lemon and orange trees, was set out last spring and is growing rapidly.

Animal and dairy husbandry is in charge of Instructor C. W. Rubel, who reports as follows:

The Department of Animal Husbandry has made several strides of development the past two years. The library has been increased by the addition of herd books of some horse and swine breeders' associations, as well as new works along the lines of judging, breeding, feeding, and management of live stock. The increase in quantity and quality of the live stock on the farm and the increased willingness of local stockmen to coöperate have both helped very much in making the courses in animal husbandry more efficient and practical. Courses of study in judging, breeding, feeding and management of live stock are all given, and this includes both class room and practical work. Efforts are made all the time to keep the students interested in their work, and to this end testing and feeding experiments are inaugurated and put under student control. Last winter feeding experiments to determine rate and cost of gain, as well as relative value of food stuffs, were carried on with four lots of swine. The dairy herd tests began two years ago, are still being carried on, and exact records of the production of the herd are being kept by the third year students in Agriculture. The new creamery will aid this work by providing increased class room facilities, but we are sorely in need of a judging pavilion in which to carry on the work of live stock judging. The installing of stock scales has been of great help in handling our animal husbandry experiments, but more room is badly needed, and it is hoped that by the erection of a commodious barn room will be provided where animal husbandry work may be carried on in connection with the work in general agriculture.

In the Dairy Department courses of study are given in milk production, composition, testing, separation of cream, manufacture of butter, cheese, etc. The laboratory work has heretofore been carried on in rooms in the basement of the main building, using a main creamery 20 by 45 feet, and a small cheese curing room and store room. The creamery is equipped with Babcock test apparatus, four cream separators, two combined churns, a 50-gallon vat, cream ripener, and apparatus for the manufacture of cheese, as well as apparatus necessary for testing milk and milk products for adulterations.

The new creamery, for which money was appropriated in 1907 and which is nearing completion at the present time, offers greatly increased facilities for instruction along dairy lines. In addition to furnishing class rooms and a home for the Dairy Department, we will have a modern creamery, fitted with all the apparatus found in large commercial creameries, including cold storage rooms and refrigerating apparatus as well as an independent heat and power system.

It is our intention to operate the creamery on a commercial scale, and students will be required to do the work and to meet and solve problems such as they would find in a large creamery. Owing to limited facilities in the past we have never run a special creamery course. The opening of the new plant, however, will provide excellent opportunities for such a course, and it is the intention to run a special six months' course for young men desiring special work in creamery operation, beginning the course January 1st. This course will include instructions in handling engines and refrigerating apparatus as well as in creamery work.

The Department of Poultry Husbandry offers instruction in the principles of establishment and maintenance of a commercial poultry plant on scientific principles. Mr. William E. Coleman, who took charge of this department July 1, 1908, has written of his plans for the development of this work.

The object is to make the Department of Poultry Husbandry self-supporting, and to demonstrate that scientific principles may be carried out advantageously from a commercial standpoint. We also hope to carry on experiments in incubation, brooding, and other phases of the poultry business with the object in view of some day being able to publish the accumulated data, thereby giving the general farmer the advantage of our experiments.

The needs of this department at present are an additional story to the incubator cellar to be used for a class room, feed room, and office. Also proper and permanent houses for the breeding and laying stock, colony houses for the growing chicks, a residence for the attendant, and enough money to grade and level the poultry ground so that it might all be planted to alfalfa, as we hope to be able to do this year.

We are in need of more incubators so that we will be able to fill our brooder house with chicks from one hatch. This brooder house was remodeled this summer and fitted with a hot water system for heating, and will accommodate 1,200 chicks.

The school's work in animal husbandry, dairying, and horticulture is well established and good results have been obtained. Mr. Edwards is also conducting splendid work in agricultural chemistry, but it is recognized that the school has never had a trained agronomist. The recent acquirement of an additional thirty acres of rich level land will furnish a splendid field laboratory for a department of agronomy, and it is sincerely hoped that the trustees may next year find it possible to secure the right man for this highly important department. The Agriculture Committee has submitted to the Director a proposed third-year course of study, outlining required and elective work under four groups, viz.:

I. Agronomy.
II. Horticulture.
III. Animal Husbandry.
IV. Dairying.

Poultry Husbandry may become a fifth major with future development of the poultry department.

Mechanics.

Vice-Director Waters reports for the Mechanics Department as follows:

The object of the course in mechanics is to give to men having grammar school training a three-year course that will continue the study of the necessary academic branches and give the most complete practical training along mechanical lines that the limited time permits. While not making a finished tradesman of the student, the course gives the foundation training that enables him to work easily into his chosen line. Throughout the course the time is equally divided between class room and practical work, the morning being spent with the various studies and the afternoon devoted to shop and laboratory.

Mathematics and English or history are carried five hours a week for the three years. Freehand drawing during the first term teaches simple and accurate sketching. Mechanical drawing, given throughout the year, takes up plain, neat lettering, the important problems of geometric drawing, and working out complete detailed drawings of various mechanical models, as shaft hangers, engine parts, valves, etc. The student takes all the dimensions direct from the model and works out sections, elevations, and details. This work is not designed to fit men for the commercial drafting room, but rather to give a thorough understanding of working drawing and the ability to make neat and clear drawings of machine parts.

Most of the afternoon time of the first year is devoted to forge and carpentry work. In the carpenter shop the first few months are devoted to special exercises in which the student learns the use and care of the various tools, and the accurate cutting and fitting of the joints commonly used in carpentry and cabinetmaking. One requirement is the making of a complete model of the framing of a house, all cuts for the rafters being laid out with the square. The shop is equipped with a planer, band saw, rip saw, swing cut-off saw, and five turning lathes, all of which are constantly employed by the students in the latter part of their work. This is work in which the boys take great interest, many finishing the required exercises in much less than the allotted time. In the remaining time they build special pieces for the school, such as laboratory cases, tables, and lockers, or desk and writing tables for themselves. The work in forging takes up the accurate sizing of iron, welding, tempering of tools, etc. Each student makes a complete set of chisels and lathe tools for use in machine shop the following year.

Work begins in chemistry and physics during the second year. In chemistry special emphasis is laid on those points of first importance in mechanical lines. Physics is taken up earlier than would be otherwise advisable, to prepare for the work in electricity and mechanics of the third year. Special attention is paid to mechanics, heat and electricity. The class room work is supplemented by a thorough course in laboratory work, paralleling the lines followed in the class.

Machine shop work begins with the second year. A variety of exercises at the bench requires the accurate use of the chisel and file. A fairly complete though limited equipment of the shop affords practice in lathe work, drilling, shaper work, milling and grinding. This work runs through the second and third years. The building of new machines and equipment in the shop is limited, due to our having no foundry or suitable machines for handling large parts. The students expect to build two small gas engines this year, the castings for which have been shipped from the East.

The study of steam and electric machinery and electric wiring begins in the last year of the course. The text work holds strictly to the practical side, and is supplemented by a laboratory course of one afternoon per week throughout the year, giving work in general wiring, testing, and installing motors, checking meters, care and handling of steam boilers and engines, setting valves, and determining horse power. The mechanical laboratory occupies part of the school power house, where electric power for driving all the shops is generated. All the students have work under the regular engineer in running the plant. This is one of the most valuable features of the course.

One afternoon per week during the third year is devoted to surveying. Only the simpler problems of the subject can be dealt with in this limited time. At the end of the course, however, the student understands the laying out of ditches to grade, calculating the earth to be removed, determining the area of fields, staking out foundation plans, giving the necessary levels for building work, and transferring field notes to neat map form. Some knowledge of the use of surveying instruments is of such value in mechanical lines that this one afternoon per week is devoted to this work in the crowded schedule of the three-year course.

Throughout the mechanics course the aim is to keep the theoretical and practical sides so adjusted that each may strengthen the other.

The interest of the student is keener and his work better when he is given the opportunity to apply at once in the laboratory or shop the principles and processes he has studied. We insist on accuracy and quality of work in the shops rather than amount. The student is given help only when necessary. This develops initiative and the ability to follow printed directions accurately. We adhere to work of the same class that the student will be most likely to encounter in practice.

While our graduates are not finished tradesmen they can do well all common carpentry work, and are experienced in forge and machine shop practice. They understand the care of boilers, handling of engines, and keeping them in order. In the electric line they can put in house wiring, can set up and test out generators and motors and do ordinary repair work. Such a training enables them to learn readily the details of whatever mechanical line they may later select. Boys entering trades as apprentices would earn moderate wages much earlier than our graduates, but would soon find a fairly definite point beyond which further rise would be well nigh impossible without the same knowledge our course gives. Our graduates have proved the value of their work here by their ability to step rapidly into positions of responsibility and trust. Our work does not offer a young man the shortest road to become self-supporting, but does fit him to take advantage of opportunities for self-advancement that would otherwise be closed to him.

A part of our graduates decide to enter college. In three years' time it is impossible to give technical work and meet college entrance requirements. The principal subjects our course lack are French and German. One year in a good high school enables our graduates to meet all ordinary college entrance requirements for courses along mechanical lines. No endeavor is made here to fit men for college, the aim being to have the course as complete as possible in itself and best adapted to men who can not afford the time and expense of a college course.

The training we can give in mechanical lines would be much more thorough and efficient if the three-year course was extended one year. Just at the time the student is making the greatest progress his work ends, falling short of a fair preparation for his chosen vocation. The majority of graduates would welcome the opportunity to continue their work a fourth year. Such a change would make the time required for this course the same as ordinarily spent in high school. Another serious hindrance is the lack of opportunity to specialize on some mechanical line. At present all mechanic students take the same general work because of lack of necessary space and equipment. If a boy could spend four years devoting half his time to study and the remainder to his chosen trade, he would have mastered it to the point where he would command good wages. To make this change we would have to increase our shop accommodations and number of instructors, as the variety of the work would necessarily be greater. Pattern making, plumbing and foundry work are important trades we can not touch at present. Each of these needs a special building, with an instructor in charge free to devote his whole time to the men specializing in his line.

The most serious problem confronting us in giving the course as it now stands is lack of room. All shops and laboratories are so crowded with regular students that it is now impossible to give all the work of the course as scheduled. The capacity of the shops and laboratories would be doubled if an instructor could devote his whole time to the work of each. At present all the shop instructors have their mornings occupied with classes. With these conditions we can offer no inducements to special students. If the shop room and time of instructors were available many students, older than the regular men, would be glad to take short courses along special lines.

The most pressing needs now are further equipment in the machine shop and a larger electrical and mechanical laboratory. Plenty of space is available for additional machines in the machine shop. An iron planer would add greatly to the variety of work possible in the shop. Several additional lathes, drills and shapers are needed for the proper accommodation of the men.

The present electrical and mechanical laboratory shares a small room 36 by 36 feet with the school power house. As all the senior mechanics have regular work here the quarters are very crowded. A great deal of electrical apparatus that should be placed in permanent position for convenient work must be put up and taken down constantly to economize space. It is advantageous to have the mechanical laboratory and power plant in the same building. The two could be comfortably housed in a structure 40 feet by 100 feet similar to the present shops.

The students show great interest in all the work of this course, notwithstanding the crowded condition and limited equipment. Many are self-supporting and specially anxious to get every possible benefit of the course. As the enrollment grows, further equipment must be provided to hold the work at the present standard. We trust, however, that provision will be made to strengthen and broaden the course in mechanics.

Household Arts.

The following statement prepared by Miss May Secrest, instructor in domestic science, outlines the work of her department:

During the past biennial period the Domestic Science Department has been for a little more than a year in the newly completed household arts building, having moved in March, 1907. Previous to that time a small room in the administration building was occupied by the department, and the work was much hampered because of extremely crowded quarters. While in this room, however, during February, 1907, the junior and senior girls prepared and served a four-course luncheon to a delegation of assemblymen and the trustees and faculty of the school—one hundred and fifty people.

Since being housed in the new building the department is probably as complete as any of its kind on the Pacific coast. The second floor of the building, with the exception of the girls' rest room and a class room occupied by the English department, is used for domestic science work. The department now consists of a large, excellently equipped kitchen laboratory, a dining room well arranged for serving meals, a butler's pantry, store pantry, class room, instructor's office, and in the basement of the building a store room and a laundry. The kitchen laboratory will accommodate twenty-four girls—each with a two-burner gas stove and equipment complete. A fireless cooker, a bread mixer, and other modern helps and conveniences have been added as object lessons for the students.

The girls in the second year have made a study of the composition, production, manufacture, and preparation of foods. This was done by means of lectures, reference reading and a study of the Government bulletins bearing upon such topics. In the laboratory a course in plain cookery was followed—vegetables, fruits, eggs, meats, breads, salads, and beverages.

The senior girls study the canning and preserving of fruits and vegetables, and take advanced and fancy cooking, and cookery for the sick. They have made and worked out dietaries for an adult, a child, and for a family of six. Each girl prepares and serves a luncheon or dinner to members of the family or other invited guests. The senior girls prepare and serve luncheon to the trustees at their regular meetings, thus acquiring additional experience in serving meals.

Instruction has also been given to the seniors in house construction and sanitation, marketing, care of food in the home, household accounts, and home nursing and laundering.

Miss Harriet Howell, instructor of the department, outlines the work in domestic art as follows:

All first-year girls are assigned to work in the department for eleven periods a week. The second-year girls spend time not otherwise employed in the sewing department. In the spring term the senior girls who desire it are given an opportunity to make their class day and graduation dresses.

The course of work consists of thorough drill in fine handwork. The student makes a set of small models, which are placed in a book, together with a written description of the work. After the handwork has been completed the use and care of a machine is taught. Patterns for undergarments are drafted, and the garments are cut and made. The use of a tailor system is taught and each student is required to draft patterns, cut, fit, and make a woolen dress skirt, fitted lining and shirt waist for herself.

In the third term several weeks are devoted to work in millinery. Students are taught to renovate old hats and materials, wire, bind, face and line hats, also to make and cover both wire and buckram frames.

Although it has not been the purpose of the department to train professional dressmakers and milliners, yet we find that several of our graduates are now employed in shops or private homes and are entirely self-supporting. In the spring of 1907 we moved into our comfortable and convenient quarters in the new household arts building. During the spring of 1907 the classes in millinery were taught by Mrs. Roadhouse, and the following school year Miss Grace Fordyce had charge of the department. and did excellent work.

Training in sloyd is afforded girls one afternoon each week throughout the year. Mr. L. E. Pearson, instructor in charge, has outlined the course as follows:

Sloyd consists of a course in cardboard construction during the first six weeks. followed by wood work. which occupies the remainder of the year. The six cardboard pieces attempted, as napkin ring, portfolio, and box with hinged lid, have been carefully chosen to bring in the various processes and to show the necessity for neat, accurate work. As far as possible throughout the year's work, attractive, useful models have been selected rather than mere exercises. The exactness of the cardboard work has proven very helpful in obtaining careful results in wood. A progressive series of models is required, ranging from a rectangular block to be squared up to more complicated, interesting models made up of several pieces, as the sleeve board, picture frame, keyed book rack, and salt box. These are made from blue prints, blackboard sketches, or student drawings. In the last five of the exercises, while the general proportions and measurements are given, the shape of certain parts are to be designed by the student, and at least one of these to have some appropriate decorative design carried out in carving, pyrography, stain, or hammered copper, according to the choice and ability of the student.

THE LIBRARY.

The library, in charge of Miss Edith Richardson, contains 1,400 volumes, classified as follows:

Agriculture.
Astronomy.
Botany.
Building.
Chemical technology.
Chemistry.
Domestic economy.
Drawing.
Education.
Engineering.
Geology.
Horticulture.
Literature.
Mathematics.
Philology.
Philosophy.
Physics.
Physiology and hygiene.
Religion.
Sociology.
Zoölogy.
History.

Bound volumes of magazines, dictionaries, and encyclopedias are included in the number of volumes mentioned above. Thirteen weekly, twenty-five monthly, two semimonthly, and two quarterly magazines are being received regularly. These magazines are along the lines of work done in Polytechnic School. United States Department bulletins and reports, Experimental Station bulletins and reports, and Library of Congress reports and documents are sent to the school. During the summer of 1908 the school library was recatalogued according to the Dewey decimal classification, a standard system. The great need of the library is more provision for its administration. It has been suggested by several instructors that a short library course be given to freshmen students each year, a course covering such points as a workable knowledge of the system of classification and cataloguing in use in the school library, the care and handling of books, how to use reference books, and, in general, to cultivate an acquaintance with and a love for books which will lead the student to independent work along this line. The present librarian, by reason of other duties, can devote only about one third of her time to the library.

FINANCIAL NEEDS.

In order to meet the demands that are already upon us or immediately before us, appropriations for the following purposes should be made by the next legislature:

Dormitories for 150 students, including dining hall	$80,000 00
Completion of barn and equipment	17,000 00
Poultry houses and equipment	4,000 00
Development of water supply and irrigation system	6,000 00
Sewer system	5,000 00
Two cottages for employees	5,000 00
Creamery equipment, including refrigerating plant	4,000 00
Mechanical and electrical laboratory	15,000 00
	$136,000 00

In response to the request of the State Controller for a statement of amounts needed for maintaining the school during the next biennial period, beginning July 1, 1909, the following estimate has been submitted:

Support and maintenance, including purchase of stock and equipment for farm and laboratories	$32,000 00
Salaries of officers, teachers, and employees	64,000 00
Care and improvement of grounds	7,000 00
Library	1,000 00
Expenses of Trustees	800 00
Printing, binding, etc.	1,000 00
	$105,800 00

Respectfully submitted,

LEROY B. SMITH, Director.

REPORT OF THE SECRETARY OF THE BOARD OF TRUSTEES.

To the Board of Trustees:

The Secretary has the honor to submit herewith a record of the more important transactions of the Board during the biennial period ending June 30, 1908.

BOARD OF TRUSTEES.

Ex Officio.

His Excellency, James N. Gillett........................Sacramento.
Governor of California.
Hon. Edward Hyatt..................................Sacramento.
Superintendent of Public Instruction.

APPOINTED TRUSTEES.

F. A. Hihn, Esq..Santa Cruz.
Term expires, 1909.
Prof. E. J. Wickson, A.M..................................Berkeley.
Term expires, 1910.
R. M. Shackelford, Esq...............................Paso Robles.
Term expires, 1911.
Paul M. Gregg, A.B..............................San Luis Obispo.
Term expires, 1911.
Thos. J. Field, Esq.......................................Monterey.
Term expires, 1912.

OFFICERS OF THE BOARD.

R. M. Shackelford....................................President.
Paul M. Gregg..Vice-President.
Leroy B. Smith.......................................Secretary.
Commercial Bank of San Luis Obispo...................Treasurer.

FINANCE COMMITTEE.

Trustees Shackelford, Gregg, and Field.

Vacancies in the Board were filled as follows:

R. M. Shackelford, Esq., term expired January, 1907, and reappointed for a term of four years.

George S. Edwards, A.B., term expired January, 1907. Paul M. Gregg, A.B., appointed 1907 for a term of four years.

Hon. Warren M. John, term expired January, 1908. Thomas J. Field, Esq., appointed for a term of four years.

FACULTY.

The record of appointments and resignations constitutes the first section of the report of the Director, appearing on page 7.

CONSTRUCTION OF BUILDINGS.

Domestic Science Building.—The following statement shows the use of funds appropriated by special act of 1905 for building and equipment:

Appropriation		$30,000 00
Mason work contract	$3,315 16	
Mason work extras	240 75	
Carpenter and iron work contract	14,665 00	
Carpenter and iron work extras	195 14	
Plumbing contract	1,616 45	
Plumbing extras	110 85	
Plumbing extras	52 75	
Plumbing extras	10 00	
Plumbing extras	9 00	
Tinning and roofing contract	1,700 00	
Painting contract	1,313 90	
Painting extras	98 60	
Heating and ventilating contract	1,590 00	
Heating and ventilating extras	65 00	
Architect's fees	1,240 00	
Equipment and furniture	2,378 79	
Miscellaneous claims, construction and equipment	1,269 49	
		29,870 88
Balance June 30, 1908		$129 12

Out of the Improvement Fund of $39,000, act of 1907, there were erected by day labor a forge shop extension, 40 by 44 feet, a machine shop 40 by 100 feet, and a plant propagation house 30 by 42 feet. This work was done between July, 1907, and February, 1908, and was under the supervision of the State Department of Engineering. For a detailed account of the cost of this work see Improvement Fund in the Financial Statement for the year ending June 30, 1908.

Cottages.—Bids for construction of two cottages were received and opened at a special meeting held April 15, 1908. Proposals on entire work were as follows:

J. Maino & Son, San Luis Obispo	$3,846 00
Rasmussen & Parsons, San Luis Obispo	4,190 00

The contract was awarded to J. Maino and Son.

Dormitory and a Creamery Building.—Proposals for the erection of a dormitory and a creamery building were opened April 15, 1908, but all bids were rejected on account of being too high.

June 12, 1908, there was opened a second set of proposals covering construction of these two buildings under somewhat modified specifications. Bids on entire work of erection of a dormitory and a creamery, in accordance with plans and specifications, were as follows:

Bidder.	Dormitory.	Creamery.
F. O. Engstrum Co., Los Angeles	$20,765 00	$9,980 00
Lindgren Co., San Francisco	27,990 00	10,940 00
Kuck & Smith, San Luis Obispo	24,555 00	10,875 00
Healy-Tibbitts Construction Co., San Francisco	27,980 00	11,900 00
W. N. Concanon Co., San Francisco	26,987 00	11,482 00
J. Maino & Son, San Luis Obispo	26,400 00	10,554 00

Healy-Tibbitts offered to do the entire work for $38,800 if awarded both contracts.

Concanon offered to deduct $500 from creamery figures if awarded both contracts.

The lowest bids were submitted by the F. O. Engstrum Company of Los Angeles, and they were awarded both contracts.

The bids received on parts of erection of buildings appear in the regular minutes of the Board.

FINANCIAL STATEMENT.

FOR YEAR ENDING JUNE 30, 1907.

Salaries.

Appropriation for year	$20,500 00	
Balance July 1, 1906	787 24	
		$21,287 24
Leroy Anderson, Director	$2,400 00	
S. S. Twombly, Instructor in Agriculture, Chemistry and Veterinary Science	1,800 00	
Leroy B. Smith, Instructor in English, History and Economics	1,500 00	
E. W. Yount, Instructor in Carpentry and Drawing (10 months)	1,250 00	
O. L. Heald, Instructor in Carpentry and Drawing (¾ month)	81 00	
H. B. Waters, Instructor in Physics and Electricity	1,500 00	
J. E. Roadhouse, Instructor in Plant Industry and Irrigation	1,500 00	
W. F. Ewing, Instructor in Mathematics	1,250 00	
Harriet Howell, Instructor in Domestic Art	1,200 00	
May Secrest, Instructor in Domestic Science	1,200 00	
C. W. Rubel, Instructor in Animal and Dairy Husbandry	1,099 92	
L. E. Pearson, Instructor in Freehand Drawing, Sloyd and Forging	1,020 00	
C. M. Gassaway, Instructor in Mechanical Drawing	900 00	
Naomi M. Lake, Clerk and Librarian	900 00	
Edith Richardson, Director's secretary, and Manager of Dormitory (10 months)	550 00	
S. C. Griffith, Farm Foreman	780 00	
A. D. Sinclair, Gardener	840 00	
A. G. Lunn, Poultryman (2 months)	120 00	
Dairyman	670 00	
Teamsters	707 90	
		21,268 82
Balance June 30, 1907		$18 42

Support.

Appropriation for year	$11,150 00	
Balance July 1, 1906	862 20	
		$12,012 20
Agriculture and chemistry	$50 83	
Animal husbandry	454 17	
Botany and horticulture	524 49	
Carpenter shop	184 16	
Chemical laboratory	130 60	
Creamery	166 71	
Drawing, freehand	25 67	
Drawing, mechanical	19 05	
English, history and economics	44 40	
Farm	893 50	
Fencing and farm improvement	427 88	
Forge shop equipment	76 27	
Irrigation and surveying	576 85	
Janitors and other assistants	1,219 80	
Mathematics	6 00	
Office expenses and stenographer	1,057 65	
Physics	690 47	

Poultry fencing and houses	$314 44	
Poultry attendant	484 50	
Power, heat and light	1,006 42	
Publicity	137 75	
Purchase of horse	150 00	
Repairs	559 42	
School furniture	722 53	
Support of horse	80 69	
Stock (animals)	1,563 61	
Tools and machinery	442 19	
		$12,010 05
Balance June 30, 1907		$2 15

Grounds.

Appropriation	$2,500 00	
Balance June 30, 1906	40 70	
		$2,540 70
Labor	$1,160 65	
Planting	231 05	
Reservoir	127 00	
Road building and repairs	744 81	
Water pumping	109 31	
Water piping, hose, etc.	157 11	
		2,529 93
Balance June 30, 1907		$10 77

Library.

Appropriation	$500 00	
Balance July 1, 1906	19 95	
		$519 95
Books	$450 00	
Periodicals	43 14	
Freight and express	4 51	
Book slips and envelopes	10 50	
		508 15
Balance June 30, 1907		$11 80

Trustees' Expenses.

Appropriation	$400 00	
Balance July 1, 1906	185 65	
		$585 65
Traveling, hotel and meals	$108 66	
Livery	118 50	
Supplies	28 92	
Labor	8 50	
Pavilion rent	25 00	
		289 58
Balance June 30, 1907		$296 07

Printing.

Appropriation	$400 00	
Balance on hand July 1, 1906	96 75	
Additional amount allowed	200 00	
		$696 75
Disbursements		696 75

PERMANENT IMPROVEMENTS.

Domestic Science Building. (Special appropriation, act of 1905.)

Appropriation		$30,000 00
Mason work, contract	$3,315 16	
Mason work, extras	240 75	
Carpenter and iron work, contract	14,665 00	
Carpenter and iron work, extras	195 14	
Plumbing, contract	1,616 45	
Plumbing, extras	120 85	
Tinning and roofing, contract	978 75	
Painting, contract	886 88	
Painting, extras	98 60	
Heating and ventilating, contract	1,590 00	
Heating and ventilating, extras	65 00	
Architect's fees	1.240 00	
Equipment and furniture	1,569 23	
Miscellaneous claims, construction and equipment	1.012 37	
		27.594 18
Balance June 30, 1907		$2.405 82

1905 Improvement Fund. (Special appropriation, act of 1905.)

Balance July 1, 1906	$2,314 67	
Balance of $15,000 released by Governor Pardee, November, 1906	4,000 00	
		$6,314 67
Balance paid on bull and calf barn	$187 60	
Bridges	259 11	
Balance paid on carpenter shop equipment	113 55	
Balance paid on electrical equipment	773 57	
Feed barn	415 70	
Balance paid on forge shop equipment	47 95	
Green house	1,035 60	
Green house heating	831 17	
Harness room, horse stalls and tool shed	251 53	
Hay shed	217 78	
Horse shed	462 25	
Manure shed and tool shed	200 12	
Swine houses	107 34	
		4.903 27
Balance June 30, 1907		$1.411 40

CONTINGENT FUND.

Dormitory.

Balance July 1, 1906	$204 16	
Receipts—Student and faculty, board and room	4.397 30	
		$4.601 46
Disbursements—Supplies	$3.161 68	
Supplies from other school departments	533 72	
Service	936 65	
		4.632 05
Deficit June 30, 1907		$30 59

Laboratory.

Balance July 1, 1906	$165 13	
Receipts—Student fees	1,254 00	
Income from other sources	74 75	
		$1,493 88
Disbursements—Laboratory supplies		1,367 27
Balance June 30, 1907		$126 61

Dairy.

Balance July 1, 1906	$40 14	
Receipts—Sale of milk, butter and stock	986 70	
Sale of milk, butter and stock to other school departments	487 06	
		$1,513 90
Disbursements—Labor and supplies		999 28
Balance June 30, 1907		$514 62

Poultry.

Balance July 1, 1906	$11 94	
Receipts—Sale of products	45 78	
Sale of products to other school departments	130 97	
		$188 69
Disbursements—Labor and supplies		339 84
Deficit June 30, 1907		$151 15

Power House.

Balance July 1, 1906	$1 65	
Receipts	14 50	
		$16 15
Disbursements		6 59
Balance June 30, 1907		$9 56

FINANCIAL STATEMENT.

FOR THE YEAR ENDING JUNE 30, 1908.

Salaries.

Appropriation for year		$26,000 00
Leroy Anderson, Director (½ year)	$1,350 00	
Le Roy B. Smith, Director (½ year) and Instructor	2,025 00	
H. B. Waters, Vice-Director and Instructor	1,624 99	
F. E. Edwards, General and Agricultural Chemistry	1,600 00	
J. E. Roadhouse, Instructor in Plant Industry and Irrigation (2 months)	250 00	
I. J. Condit, Instructor in Botany and Horticulture (10 months)	1,000 00	
W. F. Ewing, Instructor in Mathematics	1,500 00	
May Secrest, Instructor in Domestic Science	1,500 00	
C. W. Rubel, Instructor in Animal and Dairy Husbandry	1,320 00	
O. L. Heald, Instructor in Carpentry and Architectural Drawing (9½ months)	1,045 00	
F. L. Tavenner, Instructor in Mechanical Drawing and Machine Shop Practice	1,200 00	
E. J. Berringer, English, History and Economics (6 months)	600 00	
L. E. Pearson, Instructor in Freehand Drawing, Sloyd and Forging	1,140 00	
Ethel Bancroft Richardson, Instructor in English (4 months)	340 00	
Margaret Chase, Instructor in English (6 months)	510 00	
Grace Fordyce, Instructor in Domestic Art (9 months)	900 00	
Edith Richardson, Director's secretary and librarian	900 00	
Jane Vaughn Gillett, Bookkeeper and Manager of Dormitory (11 months)	825 00	
Naomi M. Lake, Clerk and Librarian (1⅓ months)	100 00	
A. D. Sinclair, Gardener	900 00	
A. G. Lunn, Poultryman	900 00	
S. C. Griffith, Farm Foreman	840 00	
J. M. Duffy, Dairyman	720 00	
Teamsters	1,281 50	
Gardener's assistant	620 00	
Engineers	579 00	
		25,570 49
Balance June 30, 1908		$429 51

Support.

Appropriation		$12,500 00
Animal husbandry	$519 71	
Botany and horticulture	187 68	
Agricultural experiments	169 78	
Carpenter shops and sloyd	180 00	
Chemical laboratory	386 36	
Creamery	67 95	
Domestic science	36 19	
Drawing, freehand	23 19	
Drawing, mechanical	102 35	
Farm	1,394 79	
Fencing	127 45	
Freight and express	81 42	
Janitors	2,008 45	

Lath house	$77 04	
Mathematics	28 34	
Office	1,146 02	
Office furniture, including safe	279 67	
Poultry equipment	299 06	
Poultry stock	89 45	
Poultry, finishing incubator cellar	100 13	
Power, heat and light	933 69	
Repairs	1,069 77	
Reserve (fighting fire)	106 35	
School furniture	589 06	
School supplies	133 87	
Stock	164 75	
Stock propagation	89 50	
Surveying	118 72	
Tools, machinery and harness	243 53	
Underground pipes relaid	308 05	
		$11,080 32
Balance June 30, 1908		$1,419 68

Grounds.

Appropriation		$3,000 00
Labor	$590 50	
Planting	325 62	
Play grounds	370 10	
Pumping water	163 61	
Road building and repairing	1,259 65	
Water piping, hose, etc.	192 60	
		2,902 08
Balance June 30, 1908		$97 92

Library.

Appropriation		$500 00
Books	$339 05	
Periodicals	65 00	
Freight and express	4 95	
Supplies	10 80	
Library cards	18 60	
Librarian's expenses at State Library Association	20 75	
		459 15
Balance June 30, 1908		$40 85

Trustees' Expenses.

Appropriation		$400 00
Traveling, hotel and meals	$270 10	
Livery	49 75	
		319 85
Balance June 30, 1908		$80 15

Printing.

Appropriation	$375 00
Printing July 1, 1907, to June 30, 1908, inclusive	369 50
Balance June 30, 1908	$5 50

PERMANENT IMPROVEMENTS.

Land and Water Supply. (Special appropriation, act of 1907.)

Appropriation	$15,000 00
Disbursement, 30 acres of land and water supply	15,000 00

Dormitory. (Special appropriation, act of 1907.)

Appropriation		$25,000 00
State Architect's fees	$797 40	
Typewriting copies of specifications	28 10	
Advertising for bids	46 50	
Cement	196 85	
Labor	4 00	
		1,072 85
Balance June 30, 1908		$23,927 15

Improvement Fund. (Special appropriation, act of 1907.)

Appropriation			$39,000 00
Cottages, apportionment		$5,000 00	
Disbursements—			
State Architect's fees	$207 58		
Advertising for bids	15 00		
Freight on cement	28 50		
Labor	2 90		
		253 98	
Balance June 30, 1908			$4,746 02
Creamery apportionment		$12,000 00	
Disbursements—			
State Architect's fees	$533 32		
Typewriting copies of specifications	25 30		
Advertising for bids	26 50		
Freight on cement	104 08		
Express	30		
		689 50	
Balance June 30, 1908			11,310 50
Propagation House, apportionment		$2,000 00	
Disbursements—			
State Architect's fees	$57 83		
Cement	52 07		
Freight	60 30		
Plumbing	200 00		
Materials	771 91		
Labor	663 20		
		1,805 31	
Balance June 30, 1908			194 69
			$16,251 21

Shops, apportionment		$20,000 00	
Disbursements—			
Machine, construction, State Architect's fees	$107 39		
Materials and labor	5,589 26		
Equipment	7,294 37		
Forge, construction	1,527 86		
Forge, equipment	1,401 92		
Carpenter, equipment	2,074 63		
Electrical, equipment	714 72		
Power house, equipment	489 19		
Engine	1,014 44		
		20,213 78	
Over expenditure			$213 78
Balance June 30, 1908			$16,037 43

Domestic Science Building. 1907-08.

Balance July 1, 1907		$2,405 82
Tinning and roofing contract	$717 75	
Painting contract, final payment	427 02	
Plumbing, extra	61 75	
Equipment and furnishings	809 56	
Miscellaneous claims	260 62	
		2,276 70
Balance June 30, 1908		$129 12

1905 Improvement Fund.

Balance July 1, 1907		$1,411 40
Balance paid on bull and calf barn	$3 13	
Balance paid on feed barn	46 30	
Balance paid on green house	3 12	
Balance paid on harness rooms and stalls	12 80	
Balance paid on hay shed	304 00	
Balance paid on horse shed (students)	342 10	
Incubator cellar	699 95	
		1,411 40

CONTINGENT FUNDS. 1907-8.

Dormitory.

Deficit July 1, 1907	$30 59	
Receipts—Student and faculty, room and board		$4,919 41
Disbursements—Supplies	3,122 54	
Supplies from other school departments	631 06	
Service	1,109 22	
		4,893 41
Balance June 30, 1908		$26 00

Laboratory.

Balance July 1, 1907	$126 61	
Receipts—Student fees	1,451 00	
Income from other sources	384 97	
		$1,962 58
Disbursements—Laboratory supplies		1,775 66
Balance June 30, 1908		$186 92

Dairy and Farm.

Dairy balance July 1, 1907	$514 62	
Farm deficit carried from July 1, 1906	68 13	
Actual balance July 1, 1907	$514 62	
Receipts—Sale of milk, butter and stock	816 95	
Sale of milk, butter and stock to other school departments	633 68	
Miscellaneous farm receipts for year ending June 30, 1908	37 00	
		$1,934 12
Disbursements—Labor and supplies		1,780 15
Balance June 30, 1908		$153 97

Poultry.

Deficit July 1, 1907		$151 15	
Receipts—Sale of products	$186 49		
Sale of products to other school departments	157 11		
			$343 60
Disbursements—Labor and supplies		328 16	
			479 31
Deficit June 30, 1908			$135 71

Power House.

Balance July 1, 1907	$9 56	
Receipts	30 50	
		$40 06
Disbursements		28 30
Balance June 30, 1908		$11 76

TWENTIETH BIENNIAL REPORT

OF THE

STATE BOARD OF HEALTH

OF

CALIFORNIA

FOR THE

Fiscal Years from July 1, 1906, to June 30, 1908

SACRAMENTO:
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1908.

STATE BOARD OF HEALTH.

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ARCHIBALD R. WARD, D.V.M., *Director*,
University of California, Berkeley

STATE FOOD AND DRUG LABORATORY.

M. E. JAFFA, M.S., *Director*, - University of California, Berkeley

LETTER OF TRANSMITTAL.

Office of California State Board of Health,
Sacramento, September 15, 1908.

To His Excellency, James N. Gillett,
Governor of California.

Dear Sir: In accordance with the State law, I herewith transmit to you the twentieth Biennial Report of the State Board of Health of California for the fifty-eighth and fifty-ninth fiscal years, including the reports of the Departments of Vital Statistics, of Hygiene, and of Pure Foods and Drugs.

Yours, very respectfully,

N. K. FOSTER,
Secretary of State Board of Health.

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REPORT OF THE BOARD.

REPORT OF STATE BOARD OF HEALTH.

Since our last report the Board has had a very active biennial season. This awakening has been in no small degree caused by the activity of the Board in calling the attention of the people to the dangers of unsanitary conditions, and by a sincere effort on its part to enforce the State laws relating to sanitation.

We have endeavored to educate the people, believing that better results could be gained by showing them the right way than by prosecuting them for doing the wrong, when they knew no other. In a vast majority of cases our efforts have been met with kindness and a willingness to remedy wrong conditions. This has been manifested by the many calls upon the Board for aid. Such aid has been given to the best of our ability, never neglecting where possible to go to the relief of a community when requested to do so. Oftentimes, where sanitary conditions were bad, we have instigated investigations, which have resulted in their betterment.

Weekly, and sometimes almost daily, we have received calls from some part of the State to go and abate some nuisance which is limited in its extent, affecting but one or two families. These calls have been so numerous that, coming as they do from remote parts of the State, it has been impossible to respond in person. The nuisances complained of are generally real and should receive attention, but it is not uncommon to receive the same day a call from Siskiyou and San Diego, and when it is considered that the Board has but one executive officer whose duties cover such work, in addition to the general supervision of the office, it can be readily seen that to respond in every case is quite impossible.

The work of abating nuisances, as well as much other work we are called upon to do, is primarily that of local officials; but for many reasons it is necessary that much of it be done under the immediate supervision of State officers. Comparatively few of our cities have properly organized health departments. Nearly all the counties are deficient in this respect, and many of the towns have no such department or officer whatever. Also, in many cases the local health officer is unsalaried, and will not, nor can he be expected to, devote the time necessary to a performance of his duties. Moreover, the matter of preventing the spread of disease is of more than local concern. The existence of an epidemic in one community is a menace to all parts of the State, and it is proper, if not essential, that the State through its officers should interest itself in the work.

In addition to the immense amount of work imposed on the executive officer of this Board by calls made upon him for attention to nuisances, epidemics, and matters of sanitation in various parts of the State, he has upon his hands the supervision of the work done under the pure foods and drugs act, the department of vital statistics, and a large correspondence. The point has now been reached when it is impossible for one man to attend to these duties. In order that the work may be continued with anything like the desired efficiency, it is absolutely necessary that provision be made for an assistant—not a clerical assistant, but a professional man qualified in all matters to act in the place and instead of the secretary of this Board. We strongly recommend that provision for the appointment of an assistant secretary be made by the next legislature.

The Board feels satisfied that great progress has been made during the last two years in bringing California to the position which her locality, her resources, and her splendid climate entitle her—that of being the most healthful and sanitary state in the Union. There is still much to be done, and the want of proper organization throughout the State hampers the work. This organization, which must be local, can be acquired only by exciting a desire for better conditions and a demand by the people for more efficient local health departments.

POLLUTION OF STREAMS.

The condition of our streams has been and still is a menace to health, but has been somewhat improved. Several towns which have been emptying their sewage into streams, regardless of the health and rights of those below, have put in sewage destruction plants. There is a State law strictly forbidding the pollution of streams and lakes of the State with sewage, and the attention of the principal offenders has been called to it, with a request that they change their methods. Not in all cases have they complied with the request, but most of them have shown a disposition to do so, some have already complied, and others have taken the first steps toward the solution of what is, in some cases, a serious problem. The rivers are not natural sewers, but are intended to conduct pure water through the land.

Our unnatural mode of living in large communities, where the accumulated waste is great, makes it necessary to provide means for its disposal. Science has done this, and no person or community has a moral or legal right to contaminate the streams which are and must be used to a greater or less extent for domestic purposes. This contamination in the past has caused a vast amount of sickness and many deaths, and it is a satisfaction to see that the facts are coming to be appreciated.

Some of the most advanced Eastern states require cities and towns to report all plans of sewer systems and water supplies to the State Board of Health for inspection and sanction. In California the State Board has no authority in this matter, but it has numerous calls to give advice and aid, and it has been instrumental in protecting some local supplies of water from gross pollution by sewage. Provision for a consulting engineer to be attached to this Board for the purpose of having general supervision over the construction of sewer systems, to the end that there may be uniformity in such work and that one part of the State may be protected from the results of ill-considered action in another, is a matter worthy of consideration. There is no escape from the proposition that the public health is a matter of general and not mere local concern.

We recognize the benefit and desirability of a vacation spent in the mountains by those who have passed the year in hard work, but we see the danger of those same parties polluting the streams on which they camp or live, and spreading disease and death to those below. We have tried to remedy this by authorizing the posting of printed notices quoting the law forbidding the pollution of streams. As the camping habit is extensive and the streams are innumerable, the ground has not by any means been covered; but the work has been begun, and how many lives saved no one can tell.

In the protection of our lakes and streams California should take a lesson from the older Eastern states where now vast sums of money are being expended to provide other means of disposing of waste. Their streams have, in some cases, become mainly open sewers, which are sickening to sight and smell, and in which fish will not live. As yet ours are comparatively clean, and if modern methods are adopted now, when land is comparatively cheap and the towns not large, much trouble and enormous expense will be saved.

The health of the State has, as a rule, been good. No extensively fatal epidemic has existed, and the death-rate has decreased during the past year. When we consider that the report of deaths is vastly more complete for 1907 than for 1906, the decrease in the death-rate will be still more marked.

BUBONIC PLAGUE.

After more than five years of freedom from that disease, on May 27, 1907, a case of bubonic plague was discovered in San Francisco. No further cases were discovered until August 12th of that year, but thereafter the number increased rapidly until, on September 4th, the situation was found to be of such gravity that Mayor Taylor applied to the President for Federal aid. At his request the United States Public

Health and Marine Hospital Service was given full charge of the measures taken for the suppression of the disease in that city. Passed Assistant Surgeon Rupert Blue, whose experience in combating the plague especially qualified him for the work, was detailed as the commanding officer, and continues to this time in charge.

Under his directions the Federal, State and local authorities have carried on a relentless campaign, the features of which have been the mathematical accuracy with which all operations have been conducted, the broad scientific principles applied, and the constant endeavor to preserve the health and the commerce of the State.

As a result of this work San Francisco has been thoroughly cleansed, the number of rats has been greatly reduced, and much permanent work for the prevention of the introduction and spread of the disease in the future has been done. Other counties about the bay, particularly Alameda, have likewise profited by the campaign for sanitation and extinction of rats.

The largest contributor to the expense of this work has been the Federal Government, its outlay being as much as $50,000 monthly. The cities of San Francisco and Oakland each appropriated large sums; other cities and some of the counties also contributed. Out of what is known as the Contagious Disease Fund, the State has spent in the neighborhood of $2,000 per month. Thus the expense of this fight may conservatively be estimated at $500,000, and the end is not yet. This costly experience is likely to be repeated at almost any time unless the preventive measures taken and recommended are persisted in.

The type of the disease is virulent. In San Francisco 159 cases were identified. Of these 77 were fatal. In Alameda County 14 cases were identified, and 9 were fatal. In Contra Costa County there were 3 cases and 2 deaths. In Los Angeles County one case only has been discovered, in which a complete recovery was had.

A detailed statement of the work done would require more space than can be given in this report, but it may be well to indicate in a small way some of the measures taken to prevent the spread of the disease.

Coastwise and deep-sea vessels, and such of the bay craft as were brought to the station established, have been fumigated at regular intervals, under the direction of Dr. Hobdy, United States Quarantine Officer. Other bay and river craft were fumigated at their wharves. The purpose of this fumigation has been to prevent vessels from carrying infected rats. With the beginning of the work nearly all vessels were found to be infested with these rodents, but their number gradually decreased until the craft fumigated were virtually rid of the pests.

At Dr. Hobdy's station, from September 2, 1907, until August 30, 1908, 2,796 vessels were fumigated, at the total expense of $34,794.84, all met by the Federal Government. In the early days of the work it was not uncommon to find one hundred dead rats on one vessel; in one case more than five hundred, and in another case more than three hundred, were found.

Fumigation at the docks and wharves was conducted under the supervision of Dr. A. Berg and Dr. A. P. Kaelber, inspectors employed by this Board. These inspectors fumigated 626 vessels, all bay craft, a large portion of them being passenger ferryboats. On these vessels very many less rats were found, the total accounted for being 461. The expense of these fumigations, outside of the inspectors' salaries, was borne by the owners, who preferred this to losing the time necessary to visit Dr. Hobdy's station.

This work of fumigation, as well as the use of measures to prevent rats passing between vessels and the wharves at which they were tied up, necessarily caused some annoyance, loss of time and expense to the owners. But when it is considered that during all of this time numerous infected rats have been taken along the San Francisco water front, and that, although traffic between that city and other ports has been interrupted, no case of plague elsewhere has been traced to San Francisco, the importance of the work is easily seen. Had not these and like precautions been taken there is no doubt but that foreign and coast ports would have established a quarantine against San Francisco and other bay ports, our commerce would have suffered an irreparable injury, and in all human probability the plague would have become epidemic throughout a large portion of the State. Therefore, while the work done has been exceedingly costly, that cost is merely a drop in the bucket when compared with the damage and expense that would have resulted in the absence of proper precautionary measures.

It has now definitely been ascertained that in addition to the rat, we have also the ground squirrel to contend with as a purveyor of the plague. Infected squirrels have been found in Contra Costa County and Los Angeles County. In each instance these infected animals were found in the immediate vicinity of the human cases, and in Los Angeles County the only case of plague yet discovered was that of a child bitten by an infected squirrel.

These rodents are so numerous in the country districts and so hard to eradicate that the spread of the disease through them to all parts of the State is a danger most serious and threatening. This Board believes that the importance of devising, through legislation, an effective means of ridding the State of these pests is of the very greatest importance.

Of equal importance is the problem of destroying the rats. That they are the vehicle for the spread of plague is fully demonstrated, and there is good reason to believe that they are also the means of disseminating leprosy, trichinosis (when eaten by hogs), scabies and tapeworm. In fact, the great bulk of many thousands of rats examined in San Francisco has been found to be diseased, and a large part of them with maladies communicable to man. Moreover, their depredations in warehouses and granaries mean a yearly loss of thousands of dollars.

One effective method of ridding the State of rats is the proper handling of garbage. The incineration of garbage by municipalities throughout the State should be made mandatory by general laws. This is necessary not only for the purpose of depriving the rat of his favorite feeding ground, but for reasons of general sanitation, one of the most important of which is that the garbage dump is the natural breeding place of the fly, an insect which is most active in spreading typhoid fever and tuberculosis.

Additional measures taken by this Board to prevent the spread of disease were the systematic inspection of the dead throughout the bay counties, the regulations forbidding the transportation of manure, rags, and waste materials, until after sterilization and inspection, and vigorous measures taken to awaken local authorities to a realization of the importance of precautionary measures. Inspectors have been kept at work in San Francisco, and Alameda, Contra Costa, Solano, Napa, San Mateo, Santa Clara, Marin, and Sonoma counties. If no other results had been obtained, the prompt discovery by the local inspector of the latest cases of plague in Contra Costa County would fully justify the total expense incident to the employment of these inspectors.

Some of the measures suggested in connection with the fight against plague will be difficult in execution; all will be expensive; but when we realize that this is the most to be dreaded of all the maladies to which our citizens are subject, and the enormous cost of abating it when once the disease appears, surely there should be no question in the mind of any sane man. The eradication of plague and the minimizing of the possibilities of it again appearing in our State are cheap at any price.

SMALLPOX.

Before its virulency was modified by resort to vaccination, this disease was the most terrible with which man had to contend. In modern times its form has been milder, and the frequency and extent of epidemics of the disease have been materially lessened. These facts have caused the people to become careless in respect to the matter of vaccination, and in many communities we have now an unvaccinated generation. The result is that the depredations of smallpox have correspondingly increased. During the last two years numerous epidemics have occurred, some of them of alarming extent, and many lives have uselessly been sacrificed.

It is of the utmost importance that more serious consideration be given to this disease by health officers and school boards. The laws of our State confer upon health boards and officers ample powers to quarantine, but through ignorance, lack of moral courage or inaction, in many instances the power has not been exercised. Cases have repeatedly been brought to our notice in which afflicted persons have been permitted to expose themselves on the street and in public conveyances, and thus the disease has been spread to distant localities.

The compulsory vaccination law makes it the duty of school boards to exclude unvaccinated children from the common schools, and their failure so to do is punishable as a crime. Yet we find this mandate obeyed in but few instances. In at least one instance the school board has refused to obey the law, although at the time smallpox was prevalent in the community. Such a stand taken by school trustees is more than a statutory crime; it is morally outrageous. Happily public opinion is so overwhelmingly in favor of obedience to this law that such things can not long endure.

TYPHOID FEVER.

Typhoid fever claimed 558 victims in 1907, sacrificed mostly to carelessness. This is a preventable disease, and is spread always from some preceding case. Frequently this is through water polluted by the drainage of some city, house, or camp, but dirty milk and flies are also active factors. With a clean water supply the number of case will decrease; but the most efficient preventive is the destruction of the germs as they leave the diseased person in the excretions. This is the duty of physician and nurse, and they should materially reduce this death-rate.

The locality in which this disease is found should always be carefully examined by an expert from the State Board of Health, for generally one case is followed by more. Such an expert, if attached to the Board, would save money to the people. An example of this occurred during the past year. Typhoid broke out in a certain locality and several cases occurred. The owners of the industry where it occurred paid an expert $1,000 to examine and report upon the source of trouble. It was easily run down and remedied. Shortly thereafter the Board was requested to go to an infected town, and sent an expert, where a like work was done at an expense to the State of $43—a difference in cost of $957. The industry paying the $1,000 was no doubt able to pay the amount, but most small towns are not, nor has this Board means to hire experts on all occasions. Sufficient expert help should be attached to the Board so this work can be done.

DIPHTHERIA.

Diphtheria has claimed 380 victims, most of whom could have been saved had antitoxin been used early and in sufficient quantities. The expense of this remedy has been and is so high that it could not be secured by those of very limited means. To obviate this, the State Board of Health has made arrangements with the Cutter Laboratory at Berkeley whereby local boards of health or health officers can secure antitoxin from any druggist, at a minimum price, for the use of indigents.

The dislike to be known as an indigent should not prevent any one from saving the life of his child. Unfortunately, however, many are cursed with pride. It would save many lives if the State would buy, and distribute gratis, antitoxin for all cases of diphtheria. This is done in some of the Eastern states, and the disease is but a small fraction of what it was before.

TUBERCULOSIS.

This preventable disease, which is cutting down our men and women in the prime of life, killed 4,607 of California's people during 1907—a useless slaughter of more than one every two hours of each day, a sacrifice to superstition and misinformation.

This disease is *not* inherited, but is infectious, and it can be cured if taken in season. Neither is it necessary to contract it. A simple life, with nourishing food, pure air all the time, plenty of rest and abstinence from stimulation, will defeat the most persistent attacks of the germs. The last Legislature, appreciating the need of beginning the fight against this, our most fatal disease, appropriated $2,000, and placed it in the hands of the State Board of Health to be used in the dissemination of knowledge as to means of prevention and cure. There are more than 2,000,000 inhabitants in the State. Taking that figure as correct, $2,000 means one tenth of one cent for the education of each person. Or, allowing five per family, one half cent per family. The cheapest postage is one cent, so to reach them all, or even a majority, was manifestly impossible. Still we have distributed 250,000 leaflets to the school children of the State, and 15,000 eight-page circulars to the teachers. This could not have been done had we depended on the mails; but Mr. Hyatt, Superintendent of Public Instruction, kindly requested the various county and city superintendents of schools to have them distributed. The Board bought the printed matter and sent it by freight to the various superintendents, in this way reaching a great number of homes.

In many of the smaller cities of the State, where the people have less opportunity for information than in the large ones, stereopticon lectures illustrating the cause, means of prevention and cure of the disease have been given. The lectures have been attended by hundreds of people and have been the means of spreading information where needed most. At the State Fair of 1907 a series of stereopticon lectures was given, and at the Fair of 1908 an exhibit illustrating the subject was made. These were visited by a great many and aroused much interest.

We have placed upon the tables of all the public reading rooms on our mailing list the very excellent prize essay of 100 pages by Dr. Knopf, and are sending to reading rooms, labor organizations, and clubs 200 subscriptions of the Bulletin issued bi-monthly by the California Association for the Study and Prevention of Tuberculosis. This literature will reach a class of people much in need of the information. There is still left one half the appropriation, for use the coming winter and spring. The appropriation was small when compared with those made in Eastern states, where in some instances hundreds of thousands of dollars were appropriated for like purposes; but we feel that much good has been done, and earnestly advise that further appropriations be made to continue the needed work.

REPORTING CONTAGIOUS DISEASES.

The last Legislature passed a law requiring that any one having knowledge of a person sick with contagious, infectious, or communicable disease should report it to the local health officer. This duty, of course, falls largely upon the physicians. We regret to state that this law has been obeyed but poorly. In many places it is entirely disregarded and in others only partially complied with. It is difficult to see why this should be so, for physicians are, as a rule, law abiding and good citizens. In order that a health department may control contagious disease, it is the first requisite that they know its location, and many epidemics have got beyond control through such neglect on the part of physicians. Should another die from disease contracted from an unreported case, the physician has good reason to charge his conscience with causing that death. We believe that it is largely a matter of carelessness, but a neglect that has caused many a painful scene beside a little casket. Probably no more legislation is needed on the subject, but a more healthy moral tone is demanded among the people at large, who not only submit, but even urge the physician not to report, and sometimes threaten him if he does.

DEPARTMENT OF VITAL STATISTICS.

The important department, upon which much of the science of preventive medicine is founded, has, during the past two years, not only continued its former good work, but has improved. There are very few deaths in the State that are not properly recorded, and the same is true of marriages; but the recording of births is very far from complete. There has been, however, a marked improvement in the birth record, and it is not too much to hope that in the near future physicians and midwives will report them all.

They certainly have no more important duty than to record the first and most important event in a person's life. The record may be of the most incalculable benefit in the future in establishing citizenship and the right to vote, settling estates, enforcing child labor laws, and military service. The State has a right to know its children, and we appeal to the physicians to give this matter their earnest support. The report of this department is appended.

DEPARTMENT OF HYGIENE.

This Bureau has done a vast amount of beneficial work on the small appropriation of $2,000 per year, but it is manifestly impossible to cover the State and do all that is needed.

Diphtheria has claimed a large share of the time, and the appended report demonstrates what has been accomplished in this regard.

The epidemic of diphtheria at the Southern California State Hospital and the work done by the department shows the necessity of a more extended equipment. In the early stages of the epidemic the tests were made by private parties and cost $1.50 each. This is a reasonable charge for a private laboratory, but the State succeeded in doing the work for six cents each, thus saving to the State in this one epidemic, where 6,000 examinations were made, more than the $4,000 appropriated for the maintenance of the work for two years.

This department should be housed in the same building with the State Pure Food Laboratory. At present the work is conducted under the most adverse circumstances on account of the very small room allotted. Provision should also be made for the employment of a bacteriologist to work in connection with this department in Los Angeles.

DEPARTMENT OF PURE FOODS AND DRUGS.

As early as 1850 a statute was enacted forbidding the sale of adulterated foods and liquors. (Statutes of 1850, page 244.) Another act, forbidding the sale of adulterated liquors and beverages, was adopted in 1860. (Statutes of 1860, page 186.) A third act, forbidding the sale of adulterated foods and liquors, and prescribing rules for the labeling thereof, was adopted in 1862. (Statutes of 1862, page 484.) A further act, forbidding the sale of adulterated milk, was adopted in 1870. (Statutes of 1870, page 298.) In 1872, provisions based upon the above-mentioned statutes were embodied in sections 380, 381, 382, and

383 of the Penal Code. Other statutes, pertaining to the same subject-matter, were enacted in 1878 (Statutes 1877-78, page 535), in 1881 (Statutes of 1881, page 14), in 1883 (Statutes of 1883, page 20), in 1901 (Statutes of 1901, pages 324, 458, 459, 460), in 1903 (Statutes of 1903, page 351), and in 1905 (Statutes of 1905, pages 168, 169, 769, 770).

The provisions of the statutes above noted were quite as strict, in most respects, as those of the acts of March 11, 1907, now in effect, and the penalties imposed were even more severe than those fixed by the present laws. For their enforcement, however, no special machinery was provided. The matter was left to the complaint of individuals or the voluntary action of local peace officers and prosecutors. The result was that these acts virtually became "dead letters," and so little attention was paid to them that comparatively few persons knew of the existence of any law on the subject.

In recent years many of the Eastern states have adopted laws designed to prevent the adulteration of foods and drugs, and to protect the public against fraudulent and deceptive labeling. Upon the principle that the public health of the people of a commonwealth is a matter of general concern, not of local interest merely, and because the enforcement of such laws can be accomplished only by some board or officer having jurisdiction throughout the State, the administration of these laws generally has been given over to the State health officers.

Responding to a demand, almost universal in its extent, Congress, in June, 1906, passed a similar law, the enforcement of which was imposed upon the Department of Agriculture. For many years a corps of experts had been at work, under the direction of the Secretary of Agriculture, endeavoring by experiment to ascertain the exact effect of certain well-known adulterants, and to establish standards of purity for foods, liquors, and drugs. Since the adoption of that act these experiments have been continued. These investigations have been most extensive; the conclusions reached are based upon the effects produced by actual experiments with perfectly healthy human beings, and the department is not compelled in any case to rely upon the opinions of experts or others, but is able to make absolute proof as to the effect of the adulterant in question. The advantage of these investigations is not to the Federal Government only. They have resulted in the accumulation of a vast amount of exact knowledge, equally available to State authorities.

In 1907 two acts were adopted by the Legislature of this State, one covering the subject of drugs, and the other that of foods and liquors. The scope and provisions of these acts are virtually uniform with the Federal laws. Taking advantage of the opportunity offered, the Legislature of this State made provision that the standards of purity of foods and liquors proclaimed by the Secretary of Agriculture should be those required in the enforcement of our law. The adoption of this feature of the act was most wise. It relieves the State of the expense of an enormous amount of expert work, and expedites the enforcement of the law to a degree that is surprising.

The statutes of March 11, 1907, did not go into effect until January 1, 1908, and were so drafted that manufacturers might correct their labels and adjust their methods of manufacture correspondingly. The principles underlying this legislation being perfectly simple—that foods and drugs must not be adulterated, and that labels must speak the truth—there seemed to be no good reason why nine months should not be ample time for the purpose. Particularly, in view of the fact that we had had similar laws for more than fifty years and the Federal law had been in operation for some time.

In addition, this Board gave as much publicity to the law as possible; but, in spite of all, nearly every person accused has entered the plea of ignorance. Deeming it to be for the best interests of the work the Board has recommended leniency in the punishment of first offenders, but has adhered strictly to the provision of the act requiring it to refer every case to the proper district attorney, when a violation is established.

In all 158 cases have been certified to the Board by the Director of the State Laboratory. Of these 158 have been heard, as required by the act, and with but a few exceptions the findings of the Director have been sustained. Cases have been referred to district attorneys for prosecution as follows:

District Attorney of Los Angeles County	50
District Attorney of Alameda County	55
District Attorney of City and County of San Francisco	41
District Attorney of Marin County	5
Total referred for prosecution	151

Reports from these cases received at this date are incomplete, many of the cases having been recently referred, but in no case reported has there been an acquittal. The convictions reported are as follows:

County.	Convictions.	Total Fines Imposed.
Los Angeles	37	$1,185 00
San Francisco	2	50 00
Alameda	3	75 00
Marin	No report.	
Totals	42	$1,310 00

The results of the Board's activity in this matter are most gratifying. As soon as the accused manufacturers were brought to a realization that the new laws were to be enforced, they expressed a willingness to comply with them, and in most instances it is believed that they are now making an honest effort to do so. Moreover, our correspondence and inspections show that many who have not been accused are making the necessary changes in their labels and methods of manufacture.

It must be remembered, however, that the jurisdiction of the Board in this matter covers the entire State, and that the work of inspection is scarcely well begun. The appropriations for this work are wholly out of proportion to its extent. There have not been more than four inspectors in the field at any one time, and their work has been confined to taking samples of articles which there was reason to believe were not being prepared or labeled in accordance with the law; yet the State Laboratory has received more samples than could be handled.

The present quarters are too small, the number of assistants that the Board is able to employ is inadequate, and the number of inspectors not sufficient to cover any considerable part of the State within a reasonable time. The State Laboratory should be located in a building for that purpose and large enough to accommodate three times as large a working force as we now have. This building should also be the home of the Bacteriological Laboratory.

If suitable quarters were obtained, and an appropriation were made for the work large enough to enable the Board to proceed more rapidly, we firmly believe that before the date of our next report the adulteration and mislabeling of foods and drugs would be a thing of the past in California. And when the State has once been well covered, subsequently the work of keeping manufacturers up to the standard will be comparatively simple and inexpensive.

It is believed that the enforcement of these laws is a matter of vital importance to the public health, that the people are equally entitled to be protected against fraud in the labeling of products, that honest dealers and manufacturers will be materially benefited thereby, and that the confidence in the integrity of local products which will be established at home and abroad when it becomes generally known that these laws are being enforced, will itself more than compensate for the total outlay by the State.

SANITARY INSPECTION OF STATE BUILDINGS AND INSTITUTIONS.

The State Board of Health has carefully and diligently observed the sanitary conditions of the various State institutions and has, from time to time, made suggestions to the different superintendents as to needed improvements. These suggestions have been invariably received with attention and, where possible, the improvements have been made.

There are, however, many imperfections which are not the fault of the management, such as worn-out or out of date plumbing, cow stables built before the necessity of cleanliness was fully understood, and decayed wooden basement floors, under which rats find an ideal home. These, as a rule, require an appropriation by the Legislature, and recommendations have been made in dealing with the different institutions. Without an exception the different superintendents or managers have displayed both interest and judgment in the sanitary conditions of their respective institutions, and as a rule too high praise can not be given to them.

The freedom from disease and offensive odors which tell so strongly of filth and carelessness is evidence of the constant watchfulness which alone will insure good conditions.

State Capitol.

It is a satisfaction to speak of the fine condition of our State Capitol. The building is clean, well ventilated and heated, and sanitary conditions are perfect. It is an honor to the State, and is unsurpassed by any like building in the country.

State University.

The former good sanitary condition of the University has been maintained, and when all contemplated improvements are made there will be little to be desired.

California Polytechnic School, San Luis Obispo.

The buildings are clean, orderly and tolerably well ventilated. The system of sewage disposal is bad, as it is allowed to accumulate in a slough, where it must become a nuisance. It should be cared for by conducting it on to the land and using for irrigation, or better, by distributing it beneath the surface of the ground by means of unglazed tile. The new building should have a similar system.

Institute for the Deaf and Dumb.

This institution is, as usual, clean and in a healthful condition. The location is all that could be desired, and the care given it by the superintendent makes it one of the best of our State institutions.

Industrial Home of Mechanical Trades for Adult Blind.

This institution is perhaps harder to keep in a perfectly clean and sanitary condition than any other because of the physical condition of the inmates, and the fact that there is more independence in their action. They can not be kept under the same strict regulation that is possible in the others. The buildings are old and wanting in many of the modern appliances; still, the total absence of zymotic diseases is proof that the best of care is taken.

A thorough inspection of the buildings revealed almost nothing for which the management could be criticised. The new building will be a much needed addition, as the present kitchen is small and inconvenient, and the dormitories above will be a welcome change from the crowded and poorly ventilated ones occupied by the women at the present time. The new workshop has removed a great source of danger, and its clean, safe, and healthful condition helps to put this institution on a par with others.

Veterans' Home of California.

The sanitary conditions are fair considering that the buildings are old and much of the plumbing worn-out. This was not entirely remedied by the appropriation of the last Legislature and more is needed. The inside of the dormitories needs renovating, as they have been long in use.

While an effort has been made in the past to keep the tubercular patients isolated, it was impossible entirely to do so owing to the want of a proper hospital. We recommend an appropriation for this necessary improvement.

Like other institutions with old cow barns, this is in great need of improvement. The floors and feeding troughs should be of concrete, with a milk house entirely closed from insects and dust.

The general health of the old soldiers is good, and the management is doing everything possible for their welfare.

Preston School of Industry.

There is probably no institution in the world with an equal number of inmates—328—which can show such a clean bill of health.

For eight years there has been no death and no case of contagious disease has developed, although several have been brought into the institution.

This is comment enough on the care and sanitary conditions, but it is not safe to rely entirely on the past.

The State should provide a hospital separated from the other buildings where the sick can be treated and cared for. No institution like this should be without such a hospital, for some time, in spite of care, contagious disease will gain a foothold.

We earnestly recommend that such a hospital be provided.

Whittier State School.

The conditions of this school have been improved in a great degree since the last report.

The stables and pigpens have been put in an excellent condition, so that they are no longer an offense and source of danger. A new tank for the disposal of sewage has been put in in the girls' department, thus removing a long continued nuisance.

There is much more to be done, but the superintendent and trustees are working earnestly to perfect the sanitary conditions.

State Normal School at San José.

The new buildings which the last Legislature provided for this institution are not yet constructed, and the school is conducted in the one modern structure which was left and temporary ones which were erected. These latter are one-story wooden buildings without ornamentation or extra expense, but being well ventilated and clean are, from a sanitary standpoint, unobjectionable.

Not so with the one remaining building of the old group. While the rooms above are as good as the average classroom, the basement is simply a disgrace to the State. The floor of boards laid on wooden floor timbers a few inches above the ground is fast falling to decay and affords a most excellent nesting place for rats which, during school months, abound in great numbers. The combined odor from rats, decaying wood and air confined beneath the floor is not only offensive but detrimental to health, and the constant contact with rats is a direct menace to the lives of the pupils. The toilets being located in the basement, the pupils are in constant danger of being infected with any disease the rat may have. The whole basement should be at once concreted, a procedure which would cost but a few hundred dollars, and would at once remove the danger and be an object lesson to the pupils. The State can not afford to educate the teachers of our children amid surroundings so totally at variance with sanitary science. If we entirely neglect the sanitary conditions of our school buildings, no matter how excellent the hygienic teaching may be, its effect upon the pupils will be lost. The object always before the eye will impress the young receptive mind much more than the occasional precept taught in the classroom.

Upon these teachers we must depend in a large degree for the proper dissemination of sanitary knowledge, and the State can devote a few hundred dollars to no better purpose than to cement the basement of this building. We heartily recommend and urge that this be done.

Chico State Normal School.

After a careful and thorough inspection of the Chico Normal School, we take great pleasure in reporting that from a sanitary standpoint there is little to be desired in this institution. Since the last report the Normal has been connected with the city sewer system, which is the Waring automatic flush, with the sewer farm some three miles from the city, with sufficient fall, and water to insure the proper working of same.

In the last report certain recommendations were made. One was the cementing the basement floor. This has been done, adding to the sanitary condition and appearance of the building.

After the inspection of the building we feel the State has in this institution a building that was honestly constructed, and the various appropriations have been judiciously handled and the best results have been obtained. Every part of the building from the basement floors presents a neat and clean appearance, reflecting credit on those in charge.

Los Angeles State Normal.

A new heating and ventilating plant has improved the sanitary conditions of this school and made it possible to get a certain amount of fresh air into the classrooms, which formerly could have been accomplished, if at all, only with great difficulty.

The gymnasium does much to develop the strength and vitality of the pupils, and is a strong feature of the school.

San Francisco State Normal.

This is a new institution built since the fire, and is up-to-date and in good sanitary condition.

State Normal School at San Diego.

Considering everything, there is probably no State institution that is in better sanitary condition.

Napa State Hospital.

The plumbing of this hospital has been largely installed anew and the sanitary condition thereby improved. The new reservoir is completed, and should furnish an ample supply of water. The sewer system is good.

With these three vital necessities, all that could be asked, we have a right to expect the good results reported.

Stockton State Hospital.

This is the oldest and largest of our hospitals and is situated on 100 acres of land in the city of Stockton. Many of the buildings are old and the plumbing antiquated, but this is to be remedied in a measure by appropriations made by the last Legislature. The general conditions of the hospital are excellent. The female department is in a building apart from the male, and deserves special mention. Upon entering and going through the halls and wards one is impressed that it has more of the appearance of a well regulated and kept Old Ladies' Home than an insane hospital. It is scrupulously clean, the wards having carpets through the center, pictures on the walls and potted plants on tables. The furniture is substantial, and everything has a homelike appearance. These extras which add so much to the comfort of the patients cost, including a piano, $12,000, and have been bought with money received by the sale of fancywork done by patients.

The new hydrotherapy building is being constructed and will be a valuable addition, as it is believed that many of the acute cases can be cured by early treatment with the appliances it will contain.

The ranch two miles from the hospital has a colony of workers who are doing well and are contented. This should be enlarged, and also arrangements made to care for the unclean and demented cases, as well as the tuberculous, at the ranch, where they can be kept out of doors, which is not possible in the city. This will be a direct advantage to them and a relief to the wards, which are now crowded. The milking stable is well kept, has solid concrete floor and feed trough, and is in excellent condition.

Southern California State Hospital.

Since the last biennial report, the McGonigle cottages for tuberculous patients have been erected. They are of one story, well lighted and ventilated, and have a large connecting porch, which is also connected with the nurses' cottage, where the patients can sit practically out of doors. While this is not so good as the large enclosed camp at Mendocino, where the patients can wander at will among the trees, it is far better than having the tuberculous patients in the wards, where they would surely infect others.

A new dairy barn has been provided for and the contract let for its construction. This was a much needed improvement and what all our institutions keeping cows should have.

The hospital has been unfortunate in having a severe outbreak of diphtheria during the past summer. It is not known how it originated, but as the disease was very prevalent in the surrounding country it could easily be brought in. The patients, attendants and officers were immunized and the mortality was very low. The State Board of Health took charge, putting its bacteriologist there, and examined and reëxamined the throats of all in any way connected with the hospital. A detailed account will be found in the report of the Bacteriological Department.

The general sanitary conditions are excellent, and were in no way responsible for the epidemic.

This hospital will, in a year or two, be practically a new institution, and as such should and probably will be in the best of sanitary condition. It will be of solid concrete and brick, and with good sewage and excellent water supply will require only the careful watchfulness needed by all institutions to make it perfect. It is doubtful, however, if any better health will be maintained among the inmates or a larger per cent of cures effected than in the cheap, one-story wooden barracks used since the destruction of the buildings. They are well up from the ground, leaving no place for vermin to live and breed and allow a free circulation of air. The wards are well aired and lighted, and are kept clean, so that the good health of the inmates is not surprising.

The milk house is the best of any of the hospitals and could be duplicated by all to advantage. The stables are old and have wooden floors, but are kept in as perfect shape as possible. The manure is daily removed from the vicinity of the barns, so that very few flies are in evidence. The hogpens and yards are well cared for, the pens being washed daily and the fresh water supplied in the bath tubs. The chicken yards and houses are clean and the fowls healthy. There is little at the present time that can be suggested for the betterment of the hygienic conditions.

Mendocino State Hospital.

This hospital has kept up its former reputation for healthfulness and good sanitary conditions. The water supply, while fairly good, is not adequate for the growing needs of the institution. Built for 500 inmates, it has increased to nearly 1,000, and to supply their wants and for the general purposes of the institution wells will probably have to be provided.

In each of the last two biennial reports we have recommended that a new dairy building be constructed. This is an imperative need and should be neglected no longer. There is no milk room attached to the milking stables, which are old and entirely of wood and saturated with the filth of long standing. The hay and other feed is stored in the same building, and it is impossible to keep milk clean. The dairy herd is in fine condition and is provided with good sleeping sheds, but the want of proper milking sheds and a milk house detract very much from the value of the dairy product, and we again earnestly recommend an appropriation sufficient to build suitable stables and milk house.

Two more years' experience with the outdoor Tuberculosis Camp strengthens our faith in outdoor life for those suffering from tuberculosis, and also as for those suffering from sick minds. The camp has been enlarged by the addition of new and improved buildings built so as to be a protection against the severe weather, but so that plenty of fresh air must always be present. The rapid filling up of the hospital has necessitated putting many non-tuberculous patients in the camp, which can be safely done on account of the good and abundant air and sunshine. With an outlay of about $5,000, one hundred patients are cared for in this camp, with better results to mind and body than could be had in the large wards of the hospital.

Every State hospital should have a similar outdoor ward for the tuberculous, and also where the untidy can be kept, thus saving the wards the disagreeable odors arising from the presence of this class of patients.

The hospital should have a cold storage plant and new kitchen furniture.

There are many acute cases going to our hospitals which could be cured if they received proper care and treatment at first. A receiving ward for the treatment of these cases should be built at this as well as the other hospitals, and would undoubtedly pay the cost of construction in saving of expense of long treatment of the cases that become chronic.

The California Home for Feeble-Minded Children.

The general sanitary conditions are fair. Owing to the extension of the institution to the north a new sewer system will be needed, as the other tank is too high to be of avail.

An ample supply of water, which is of such vital need at an institution like this, should be developed some way before more extensive enlargement is allowed.

A new dairy barn, with a cement floor and a milk room detached, is a valuable addition to the equipment of the home.

Pure milk is the ideal food for children and the State has no right to furnish other than pure, but with the old barn it was an impossibility.

State Prison at San Quentin.

There are at present 1,692 male prisoners and 35 female prisoners confined in this prison. The prison yard and the space between the buildings is extremely well kept. The drainage is excellent, and the whole yard is flushed with salt water (of which the prison has an abundant supply from its own pumping plant every morning). At present prisoners are housed in tiers of cells and in large dormitories in the old sash and blind building. The individual cells have been built a great many years and contain no plumbing. The plumbing in the old sash and blind building consists of water-closets and lavatories, and is very old. New quarters will soon be erected, and each cell will be supplied with running water and a water-closet. At present in the cell tiers excrement is collected in buckets, and these are emptied every morning, carefully cleansed, allowed to dry in the sun, and then a liberal supply of chloride of lime is sprinkled in them. In the cells housing five or six men, barrels are provided which have seats upon their tops. We examined a large number of these barrels and there was no odor from them. We believe the prison authorities are doing as well as they possibly could do with these poor arrangements. The excrement is dumped in a large hopper in the prison yard, which is flushed with water, and this, too, is odorless. The sewage is carried about one hundred feet out into the bay. The pipe is large and is covered with water, except at exceptionally low tide, which occurs about once a month. This pipe should certainly be extended so as to be covered with water at all times. The women's quarters are provided with satisfactory toilet facilities.

Each prisoner has his own individual drinking bucket and it bears the number of his cell. These buckets are scoured with sapolio once a week.

The bathing facilities for the prisoners are wholly inadequate. There is a large tank sunk in the cement flooring of the yard in which prisoners are obliged to bathe once a week. This is open on all sides, and in the winter time it must certainly be a hardship to take a bath under such conditions. Near this tank in the yard is a large sink divided into toilet seats and so arranged that the contents of the sink can be flushed thoroughly at all times.

There has been very little sickness at the prison, two cases of typhoid and one of pneumonia in fifteen months. There are nine cases of tuberculosis, and all tuberculous cases are isolated as soon as discovered. The patients in the hospital receive excellent treatment and fare.

Large cuspidors are provided in the dormitories, and an endeavor made to keep the floors clean. The cuspidors are filled with creolin, and the penalty for spitting on the floor is severe. The sanitary conditions, we should say, are as good as the construction of the old prison will allow, with the exception of the bathing facilities.

The arrangements for ventilation in the cells is very far from being satisfactory. Air enters from small apertures in the steel doors and makes its exit through ventilators placed in the ceiling and back walls, and the prisoners complain that there is a constant draught when the wind is blowing.

State Prison, Folsom.

There is little to suggest here, except that its popularity seems too great, as there is too much crowding inside the walls.

While the cells and rooms are kept as clean as possible, it is not well to have inmates crowded together. The general health is good and the building clean.

Respectfully submitted.

MARTIN REGENSBURGER, M.D.,
President,
W. A. BRIGGS, M.D.,
Vice-President,
N. K. FOSTER,
Secretary,
F. K. AINSWORTH, M.D.,
A. C. HART, M.D.,
O. STANSBURY, M.D.,
W. LE MOYNE WILLS, M.D.,
State Board of Health.

FINANCIAL STATEMENTS.

FUND FOR TRAVELING AND CONTINGENT EXPENSES.

Statement Showing Condition of Appropriation for Traveling and Contingent Expenses of State Board of Health for Fifty-eighth and Fifty-ninth Fiscal Years.

Fifty-eighth Fiscal Year.

By amount appropriated	$2,500 00
By balance, etc.	279 97
	$2,779 97

To warrants drawn in favor of State Board of Health, as follows:

No.	Date—1906.	Amount.
669	July 17	$78 45
1012	July 31	144 65
1794	Aug. 8	27 10
2148	Aug. 21	153 96
2366	Aug. 30	30 80
2380	Aug. 31	90 00
3215	Sept. 12	16 35
3443	Sept. 17	59 55
3949	Sept. 29	110 45
4479	Oct. 11	19 80
5083	Oct. 31	184 85
5829	Nov. 24	20 20
6253	Nov. 30	125 00
6836	Dec. 14	102 46
7132	Dec. 31	107 21
	1907.	
7687	Jan. 3	8 56
8904	Jan. 15	111 20
11143	Jan. 31	98 00
13204	Feb. 9	28 00
15382	Mar. 1	125 40
16503	Mar. 5	16 50
18168	Mar. 25	59 40
18247	Mar. 28	20 85
19374	April 11	33 20
19695	April 24	50 15
20156	April 30	40 60
20828	May 15	189 90
20906	May 18	25 35
20969	May 21	183 50
21791	June 7	25 00
22140	June 21	215 15
181*	July 2	266 72
619*	July 13	11 63
		$2,779 94
	Balance	03
		$2,779 97

Fifty-ninth Fiscal Year.

By amount appropriated	$2,500 00

No.	Date—1907.	Amount.
560	July 11	$26 85
723	July 19	45 50
1606	Aug. 5	215 40
2104	Aug. 15	84 07
3509	Sept. 4	31 40
3172	Sept. 11	22 77
3438	Sept. 19	84 70
3627	Sept. 28	54 20
4403	Oct. 8	44 85
4777	Oct. 25	63 70
5545	Nov. 2	21 75
5792	Nov. 12	56 89
5793	Nov. 12	92 54
6452	Nov. 26	17 75
7697	Dec. 14	124 15
	1908.	
8768	Jan. 3	19 70
9089	Jan. 14	77 80
10238	Feb. 4	61 65
10412	Feb. 6	50 85
11380	Feb. 29	89 60
11707	Mar. 5	29 10
12071	Mar. 17	72 30
12716	Mar. 31	42 75
13149	April 8	41 90
14124	April 30	13 47
14820	May 19	48 98
14938	May 22	86 50
15428	May 29	56 65
16184	June 27	197 15
254†	July 2	15 50
512†	July 10	18 05
3005†	Sept. 4	6 80
		$1,915 27
	To balance	584 73
		$2,500 00

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*Contracted in the fifty-eighth fiscal year, and paid in the fifty-ninth fiscal year from funds of the fifty-eighth fiscal year.

†Contracted in the fifty-ninth, and paid in the sixtieth fiscal year from funds of the fifty-ninth fiscal year.

CONTAGIOUS DISEASE FUND.

Statement Showing Condition of Appropriation for Prevention of Contagious Diseases.

FIFTY-EIGHTH FISCAL YEAR.

By balance of appropriation of March 20, 1903 .... $70,692 46

To warrants drawn as follows:

No.	Date—1906.	Amount.
261	July 10	$53 50
3615	Sept. 28	50 15
5488	Nov. 10	15 35
6546	Dec. 4	33 10
	1907.	
7916	Jan. 9	266 40
10811	Jan. 29	57 00
20159	April 30	50 00
20960	May 21	40 50
		$566 00
To balance		70,126 46
		$70,692 46

FIFTY-NINTH FISCAL YEAR.

By balance of appropriation of March 20, 1903 .... $70,126 46

To warrants drawn as follows:

No.	Date—1907.	Amount.
1577	Aug. 5	$9 78
2412	Aug. 29	43 55
3594	Sept. 26	107 70
3628	Sept. 28	75 00
5685	Nov. 7	548 70
6056	Nov. 21	108 34
6842	Nov. 30	836 60
7814	Dec. 17	80 15
8694	Dec. 31	1,186 75
	1908.	
8770	Jan. 3	117 64
10226	Feb. 4	1,742 88
10420	Feb. 6	32 83
10716	Feb. 13	192 25
11379	Feb. 29	1,910 00
11920	Mar. 13	42 85
12264	Mar. 24	51 30
12762	Mar. 31	1,691 50
13146	April 8	62 55
13622	April 24	20 28
13627	April 24	1,688 40
14616	May 6	244 30
14699	May 14	29 20
14943	May 22	59 15
15430	May 29	1,661 75
16565	June 30	1,065 95
		$13,609 50
To balance		56,516 96
		$70,126 46

TUBERCULOSIS FUND.

Statement Showing Condition of Appropriation for the Dissemination of Knowledge as to the Best Means of Preventing the Spread of Tuberculosis.

FIFTY-NINTH FISCAL YEAR.

By amount appropriated $2,000 00

To warrants drawn as follows:

No.	Date—1908.	Amount.
10717	Feb. 13	$40 10
12309	Mar. 26	74 19
13147	April 8	48 60
13522	April 22	15 80
14615	May 6	179 90
14819	May 19	56 13
15035	May 26	137 84
		$552 56
To balance		1,447 44
		$2,000 00

BACTERIOLOGICAL LABORATORY FUND.

Statement Showing the Condition of the Appropriation for the State Bacteriological Laboratory.

FIFTY-NINTH FISCAL YEAR.

By amount appropriated...$2,000 00

To warrants drawn as follows:

No.	Date—1907.	Amount.
5897	Nov. 12	$465 07
7700	Dec. 14	224 01
	1908.	
10224	Feb. 4	124 37
10843	Feb. 19	221 12
12063	Mar. 17	118 93
12310	Mar. 26	192 98
13148	April 8	67 78
14514	May 6	203 13
601*	July 13	173 40
3144*	Sept. 11	208 21
		$2,000 00

PURE FOOD AND DRUG FUND.

Statement Showing Condition of Appropriation for Preventing the Manufacture, Sale or Transportation of Adulterated, Mislabeled or Misbranded Foods, Liquors, and Drugs.

FIFTY-NINTH FISCAL YEAR.

By amount appropriated...$10,000 00

To warrants drawn as follows:

No.	Date—1908.	Amount.
9400	Jan. 21	$620 95
10225	Feb. 4	1,042 62
10428	Feb. 6	205 20
10714	Feb. 13	53 90
11378	Feb. 29	912 35
12064	Mar. 17	109 25
12717	Mar. 31	865 23
14123	April 30	424 25
14517	May 6	308 25
14818	May 19	451 75
15429	May 29	209 60
15642	June 3	295 36
16564	June 30	648 08
		$6,146 79
To balance		3,853 21
		$10,000 00

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*Contracted in fifty-ninth fiscal year, and paid in the sixtieth fiscal year from funds of the fifty-ninth fiscal year.

PRINTING FUND.

Statement Showing Amount of Printing Done for State Board of Health During the Fifty-eighth Fiscal Year.

SUMMARY.

FIFTY-EIGHTH FISCAL YEAR.

Balance from fifty-seventh fiscal year	$1,235 50
Additional appropriation	200 00
	$1,435 50
Printing fifty-eighth fiscal year	1,435 50

FIFTY-NINTH FISCAL YEAR.

Appropriation fifty-ninth and sixtieth fiscal years	$3,000 00
Printing fifty-ninth fiscal year	751 25
Balance to sixtieth fiscal year	$2,248 75

FIFTY-EIGHTH FISCAL YEAR.

1906. July—			
No. 4364—3,000	Marriage Certificates	$9 50	
4685—1,000	Monthly Bulletins for June	25 00	
			$34 50
August—			
4825—1,000	Monthly Bulletins for July	$33 25	33 25
September—			
4984— 150	Programs	1 50	1 50
October—			
4983—1,000	Monthly Bulletins for August	29 50	
9452—1,200	Biennial Reports, 1904-06	857 50	
5108—1,000	Monthly Bulletins for September	31 00	
			918 00
November—			
5249—1,500	Letter Heads, Typewriter	$4 25	
5310—1,000	Monthly Bulletins for October	45 50	
			49 75
December—			
5474—1,000	Monthly Bulletins for November	$34 25	
5481—1,000	Addenda Report	3 75	
			38 00
1907. January—			
No. 5396— 30	Death Certificates. Binding	$30 00	
5847—1,000	Monthly Bulletins for December	33 00	
			63 00
February—			
6080—2,000	Letter Heads, Typewriter (furnished)	$4 00	
6224—1,000	Monthly Bulletins for January	33 75	
			37 75
March—			
6437—1,000	"No Death" Reports	$4 50	
6589—1,200	Monthly Bulletins for February	33 75	
			38 25
April—			
6743— 300	Programs	$3 25	
6825—1,200	Monthly Bulletins for March	33 75	
			37 00
May—			
6738—1,000	Miscellaneous Chapters	$52 00	
7034—1,200	Monthly Bulletins for April	25 00	
			77 00
June—			
7270—1,200	Monthly Bulletins for May	$25 00	
7261—2,500	Letter Heads, Typewriter	9 75	
7262—1,000	Letter Heads, ½, Typewriter	3 75	
7037— 63	Marriage Certificates. Binding	63 00	
7264—1,000	Envelopes No. 10	6 00	
			107 50
			$1,435 50

PRINTING FUND—*Continued.*

FIFTY-NINTH FISCAL YEAR.

	No.	Quantity	Item	Amount	Total
1907. July—					
	No. 7260	2.000	Letter Heads, Typewriter	$8 00	
	7462	1,000	Envelopes, No. 6¼	4 00	
	7502	1,200	Monthly Bulletins for June	25 00	
	7506	1,000	Circular Letter	4 50	
	7508	1,000	Geographic Division Tables	15 00	
					$56 50
August—					
	7650	1,200	Monthly Bulletins for July	$28 50	
	7670	2,000	Original Death Certificates	9 00	
					37 50
September—					
	7705	500	Plague Case Reports	$4 00	
	7711	3,000	Envelopes, Nos. 6¼-10	12 50	
	7712	4,000	Letter Heads and one half, Typewriter	15 00	
	7759	1,000	Form No. 18	12 00	
	7785	1,200	Monthly Bulletins for August	29 00	
					72 50
October—					
	7885	1,200	Monthly Bulletins for September	$24 50	
	7917	100	Ledger Paper	1 50	
					26 00
November—					
	7918	32	Marriage Certificates. Binding	$32 00	
	7951	45	Death Certificates. Binding	45 00	
	8067	1,200	Monthly Bulletins for October	30 00	
					107 00
December—					
	8091	21	Death Certificates. Binding	$21 00	
	8172	1,000	Envelopes, No. 6¼	4 00	
	8195	250	Circular Letter	5 50	
	8226	1,200	Monthly Bulletins	33 00	
					63 50
1908. January—					
	8208	500	County Tables	$21 00	
	8209	500	City Tables	21 00	
	8235	5	Certified Copy Record Books	6 50	
	8284	2,000	Registration Fees for Accounts	21 00	
	8295	500	Circular Letter	6 25	
	8335	1,000	Inspectors Certificates	4 25	
	8353	300	Circular Letter	3 25	
					83 25
February—					
	8413	2,000	Envelopes, No. 6¾	$6 50	
	8443	1,000	Circular Letter	7 50	
	8459	250	Envelopes, No. 6¼, reg.	2 25	
	8503	2,000	Envelopes, No. 9	9 25	
	8530	1,500	Monthly Bulletins for January	46 50	
					72 00
March—					
	8465	66	Birth Certificates. Binding	$66 00	
	8590	800	Postal Cards	5 50	
	8633	10	Fumigation Certificates. Books	6 25	
	8682	2	Bulletins. Binding	2 75	
	8703	1,000	Circular Letter	4 50	
	8704	5,000	Certificates of Inspecting Remains	7 75	
	8702	500	Vouchers (2)	8 50	
					101 25
April—					
	8727	36	Marriage Certificates. Binding	$36 00	
	8796	100	Programs	5 00	
					41 00
May—					
	8894	1,000	"No Death" Reports	$5 00	5 00
June—					
	8977	250	Circular Letter	5 00	
	8984	5,000	Letter Heads, and one half, Typewriter	15 50	
	9024	1,000	Letter Heads, Typewriter	5 00	
	9025	1,000	Envelopes, No. 6¾	3 75	
	9073	1,700	Monthly Bulletins for May	56 50	
					85 75
					$751 25

VITAL STATISTICS

FOR CALENDAR YEARS 1907 AND 1906

[NOTE.—The vital statistics are presented for calendar, instead of fiscal years, to correspond with the annual mortality reports of the Federal Census Bureau.]

DEPARTMENT OF VITAL STATISTICS.

GEORGE D. LESLIE, Statistician.

STATISTICS OF BIRTHS: 1907 AND 1906.

SUMMARY.

Increase.—The births registered in California numbered 24,674 for 1907, against 20,974 for 1906, an increase of 3,700, or 17.6 per cent, partly due to improved registration.

The per cent of increase was 18.6 for the counties north of Tehachapi, as compared with 15.6 for those to the south.

For the metropolitan area, comprising San Francisco and the other bay counties, the rate of gain was as great as 34.0, and for Los Angeles County it was 21.9, the per cents of increase being much less for other groups of counties.

Of the individual counties, thirty-four showed increases in births, two no change, and twenty-one showed decreases.

The increases were above the State average, 17.6 per cent, in the following twenty counties: Humboldt, Mariposa, Mono, Sutter, Contra Costa, Ventura, Colusa, Inyo, Lake, Trinity, Alameda, Shasta, San Mateo, San Francisco, Tehama, Monterey, Los Angeles, Merced, Lassen, and Marin.

The rate of gain was 18.4 for the nineteen freeholders' charter cities and 16.5 for all the rest of the State.

The cities showing increases in births were as follows, in descending order: San Bernardino, Berkeley, San Francisco, Pasadena, San Diego, Santa Cruz, Sacramento, Oakland, Stockton, Salinas, Los Angeles, Santa Rosa, Napa, and Fresno.

Comparison of the ranking of the leading counties in births registered shows gains for the following counties: Sacramento, Riverside, Santa Cruz, Tulare, Monterey, Contra Costa, San Mateo, San Luis Obispo, Mendocino, Shasta, Ventura, and Humboldt.

In the comparative ranking of cities there were also rises in rank for Berkeley, Sacramento, Pasadena, San Bernardino, Santa Cruz, Watsonville, and Napa.

Altogether 60.3 per cent of the births registered in California in 1906 were in nineteen freeholders' charter cities, and 64.0 per cent of the State total for 1907 were in the twenty-four cities of this class reporting births that year.

Birth-rates.—For an estimated State population of 2,001,193 in 1907, the 24,674 births give a rate of 12.3, and for an estimated population of 1,882,846 in 1906 the 20,974 births give a rate of 11.1 per 1,000 inhabitants.

The birth-rates in 1907 and 1906, respectively, were 16.1 and 15.7 for the counties south of Tehachapi, as compared with only 11.1 and 9.8 for those to the north.

The individual counties with birth-rates above the State averages each year were: Fresno, Los Angeles, San Mateo, San Bernardino, Lake, Tulare, Santa Clara, Riverside, Stanislaus, Butte, Santa Barbara, Madera, Santa Cruz, and Marin.

The twenty-four freeholders' charter cities reporting births in 1907 had an estimated population of 1,144,630, and the nineteen in 1906 had a population of 1,044,063. The births for these cities totaled 15,786 in 1907 and 12,654 in 1906, so that the birth-rates were 13.8 and 12.1, respectively.

For the rest of the State, with an estimated population of 856,563 in 1907 and 838,783 in 1906, the births numbered 8,888 and 8,320, and the rates were only 10.4 and 9.9.

The birth-rates were above the general averages for cities each year for Long Beach, Santa Cruz, Pasadena, Fresno, San Bernardino, Berkeley, Santa Rosa, Napa, Watsonville, Alameda, Santa Barbara, San Diego, Santa Monica, Los Angeles, Vallejo, San José, Grass Valley, and Salinas.

General Birth Statistics.—The 24,674 babies in 1907 included 12,645 boys and 12,029 girls, while of the 20,974 in 1906, 10,926 were male and 10,048 female. The per cent male was only 51.2 for 1907 against 52.1 for 1906, the general excess of male births being less marked in the last year covered than in the one before.

The per cent male was 51.4 for births in the twenty-four freeholders' charter cities in 1907 and 51.9 for the nineteen such cities in 1906. For the rest of California the per cent male was 51.0 in 1907 and 52.3 in 1906.

The race distribution of births in 1907 was: White, 24,097; Japanese, 221; negro, 179; Chinese, 155; and Indian, 22. For 1906 the figures were: White, 20,632; Japanese, 134; Chinese, 116; negro, 82; and Indian, 10. The per cent white was 97.7 for 1907, as compared with 98.4 for 1906.

For freeholders' charter cities the per cent white was 97.3 in 1907 and 98.1 in 1906, while for the rest of the State the per cents white were 98.4 and 98.8, respectively.

The preponderance of males is much greater, both within cities and outside them, among the few non-Caucasian babies than among the white infants constituting the great bulk of all.

The nativity of the white mothers in 1907 was: Born in other states, 9,206, or 38.2 per cent; born in California, 8,449, or 35.1 per cent; and foreign born, 6,442, or 26.7 per cent. The figures for 1906 were: Other states, 7,811, or 37.8 per cent; California, 7,482, or 36.3 per cent; and foreign, 5,339, or 25.9 per cent.

For cities the per cent of mothers born in other states was 37.5 in 1907 and 37.4 in 1906; the per cents born in California were 32.5 and 32.8; and the per cents foreign born were 30.0 and 29.8. For the rural districts the per cents in 1907 and 1906 were, respectively: California, 39.6 and 41.6; other states, 39.3 and 38.5; and foreign, 21.1 and 19.9.

Within cities more mothers were born in other states than in California, but outside cities more mothers were born in the Golden State than elsewhere in the United States.

Nativity of Brides and Mothers.—Comparison of the per cent distribution of white brides and mothers, by nativity, shows that throughout California a larger proportion of the brides than of the mothers were born in the Golden State. In general, too, a somewhat larger proportion of the brides than of the mothers were born elsewhere in the United States. On the other hand, a much larger proportion of the mothers in California than of the brides were foreign born.

Similarly, a much larger proportion of the single brides than of the mothers in California were native daughters. However, slightly more of the mothers than of the single brides in this State were natives of other states, and very many more of the women bearing children than of the single brides in California were born in foreign countries.

It seems, therefore, that in California, as elsewhere in the United States, the fecundity of foreign-born women is greater than that of native women, whether born in California or other states.

INCREASE OF BIRTHS: 1906 TO 1907.

Geographic Divisions.—Exclusive of stillbirths, altogether 24,674 births were registered in 1907 and 20,974 in 1906, under the law of 1905 requiring physicians to file certificates with County Recorders and City Health Officers for transmittal to the State Bureau of Vital Statistics. The increase of births for 1907 over 1906 was 3,700, or 17.6 per cent, part of the gain being due to more complete registration.

The births registered in the counties north of Tehachapi totaled 16,752 for 1907, against 14,121 for 1906, a gain of 2,631, or 18.6 per cent. The totals for Southern California were 7,922 in 1907 and 6,853 in 1906, an increase of 1,069, or 15.6 per cent.

The per cent of increase was no less than 30.7 for San Francisco and 38.4 for the other bay counties, or 34.0 for the metropolitan area, against 4.5 for the rural counties north of Tehachapi. Similarly, the rate of gain was 21.9 for Los Angeles, but only 1.2 for the other counties of Southern California.

Further details appear in the table on the next page giving the number and per cent of increase in births for the several geographic divisions of the State, in 1906 to 1907:

TABLE 1.—*Increase of Births, for Geographic Divisions: 1906 to 1907.*

GEOGRAPHIC DIVISION.	Births.		Increase.	
	1907.	1906.	Number.	Per Cent.
THE STATE	24,674	20,974	3,700	17.6
Northern California	2,405	2,232	173	7.8
Coast counties	953	824	129	15.7
Interior counties	1,452	1,408	44	3.1
Central California	14,347	11,889	2,458	20.7
San Francisco	5,128	3,923	1,205	30.7
Other bay counties	3,944	2,849	1,095	38.4
Coast counties	1,924	1,831	93	5.1
Interior counties	3,351	3,286	65	2.0
Southern California	7,922	6,853	1,069	15.6
Los Angeles	5,823	4,778	1,045	21.9
Other counties	2,099	2,075	24	1.2
Northern and Central California	16,752	14,121	2,631	18.6
Coast counties	11,949	9,427	2,522	26.8
Interior counties	4,803	4,694	109	2.3
Metropolitan area	9,072	6,772	2,300	34.0
Rural counties	7,680	7,349	331	4.5

Counties.—The table on the following page gives the increase (or decrease) of births for each county, as well as the per cent of increase for those showing gains in 1907 over 1906.

The apparently high rate of gain shown for Humboldt County is explained by the incompleteness of the returns for 1906, while the high rates for Mariposa and Mono counties are unimportant on account of the very small totals each year.

The per cents of increase were highest for the following counties: Sutter, 80.4; Contra Costa, 61.7; Ventura, 53.8; Colusa, 46.7; Inyo, 45.5; Lake, 44.3; Trinity, 40.0; Alameda, 38.8; Shasta, 33.8; San Mateo, 32.2; San Francisco, 30.7; Tehama, 30.6; Monterey, 25.6; Los Angeles, 21.9; Merced, 21.2; Lassen, 19.4; and Marin, 19.2. Each of these seventeen counties shows a rate of gain above the average rate for the State, 17.6 per cent.

There were also increases in births, but at rates below the State average, in the following fourteen counties, arranged in descending order: Madera, 16.1; San Diego, 15.1; Amador, 14.8; Sacramento, 13.4; Fresno, 9.6; Kings, 8.8; San Bernardino, 8.6; San Luis Obispo, 7.7; Yuba, 4.2; Glenn, 3.7; Santa Clara, 3.5; Napa, 2.2; Sonoma, 1.6; and Solano, 0.4. For Alpine and Calaveras counties exactly the same number of births were reported in 1907 as in 1906.

TABLE 2.—*Increase of Births, for Counties: 1906 to 1907.*

County.	Births.		Increase.	Decrease.	Per Cent of Increase.
	1907.	1906.			
California	24,674	20,974	3,700		17.6
Alameda	3,181	2,292	889		38.8
Alpine	6	6			
Amador	62	54	8		14.8
Butte	246	257		11	
Calaveras	95	95			
Colusa	88	60	28		46.7
Contra Costa	291	180	111		61.7
Del Norte	27	30		3	
El Dorado	81	122		41	
Fresno	891	813	78		9.6
Glenn	28	27	1		3.7
Humboldt	139	45	94		208.9
Inyo	16	11	5		45.5
Kern	144	169		25	
Kings	136	125	11		8.8
Lake	101	70	31		44.3
Lassen	43	36	7		19.4
Los Angeles	5,823	4,778	1,045		21.9
Madera	108	93	15		16.1
Marin	242	203	39		19.2
Mariposa	14	6	8		133.3
Mendocino	151	157		6	
Merced	63	52	11		21.2
Modoc	60	70		10	
Mono	2	1	1		100.0
Monterey	270	215	55		25.6
Napa	139	136	3		2.2
Nevada	221	255		34	
Orange	290	343		53	
Placer	65	75		10	
Plumas	31	36		5	
Riverside	333	356		23	
Sacramento	574	506	68		13.4
San Benito	42	50		8	
San Bernardino	553	509	44		8.6
San Diego	480*	417	63		15.1
San Francisco	5,128	3,923	1,205		30.7
San Joaquin	405	408		3	
San Luis Obispo	181	168	13		7.7
San Mateo	230	174	56		32.2
Santa Barbara	300	357		57	
Santa Clara	1,106	1,069	37		3.5
Santa Cruz	325	329		4	
Shasta	210	157	53		33.8
Sierra	29	48		19	
Siskiyou	171	193		22	
Solano	264	263	1		0.4
Sonoma	382	376	6		1.6
Stanislaus	151	165		14	
Sutter	92	51	41		80.4
Tehama	94	72	22		30.6
Trinity	14	10	4		40.0
Tulare	295	313		18	
Tuolumne	3	11		8	
Ventura	143	93	50		53.8
Yolo	41	73		32	
Yuba	74	71	3		4.2

***Includes 6 births in Imperial County, formed August 15, 1907.**

According to the registration, there were decreases in births for 1907, as compared with 1906, in the following twenty-one counties arranged alphabetically: Butte, Del Norte, El Dorado, Kern, Mendocino, Modoc, Nevada, Orange, Placer, Plumas, Riverside, San Benito, San Joaquin, Santa Barbara, Santa Cruz, Sierra, Siskiyou, Stanislaus, Tulare, Tuolumne, and Yolo. In some cases the decreases were considerable, indicating the failure of physicians to register births and the neglect of officials to enforce the law.

Cities.—The County Recorder is ex officio local registrar of births, except that in cities having freeholders' charters the Health Officer so acts. Returns are therefore available only for cities with freeholders' charters, and a comparison between 1907 and 1906 must necessarily be limited to the cities reporting births for both years. The table on the following page shows the increase (or decrease) of births in 1906 to 1907 for freeholders' charter cities and for the rural parts of the counties containing them.

In the nineteen freeholders' charter cities reporting births both years, there were 14,985 births in 1907 and 12,654 in 1906, an increase of 2,331, or 18.4 per cent. In all the rest of the State the number of births registered was 9,689 for 1907 and 8,320 for 1906, a gain of 1,369, or 16.5 per cent.

The per cent of increase was 26.7 for the rural parts of the fifteen counties with freeholders' charter cities. The rates of gain range as follows for the rural parts of the counties mentioned: Alameda, 141.3; Los Angeles, 81.3; Monterey, 29.6; Fresno, 17.6; Santa Clara, 6.2; and Solano, 1.8. There were decreases in births, according to the registration, in the rural parts of the following nine counties: Napa, Nevada, Sacramento, San Bernardino, San Diego, San Joaquin, Santa Barbara, Santa Cruz, and Sonoma. In these cases, as in counties without any freeholders' charter cities, the County Recorders are the officials held directly responsible for the enforcement of the law.

The per cents of increase in births were as follows for freeholders' charter cities: San Bernardino, 41.4; Berkeley, 34.2; San Francisco, 30.7; Pasadena, 27.2; San Diego, 26.2; Santa Cruz, 24.7; Sacramento, 23.5; Oakland, 16.8; Stockton, 14.4; Salinas, 13.2; Los Angeles, 11.1; Santa Rosa, 9.5; Napa, 6.8; and Fresno, 0.5. The registration showed decreases in births for the following five cities: Grass Valley, San José, Santa Barbara, Vallejo, and Watsonville. Here the City Health Officers are charged with the duty of enforcing the registration law upon their fellow physicians.

TABLE 3.—*Increase of Births, for Cities: 1906 to 1907.*

CITY.	Births.		Increase.	Decrease.	Per Cent of Increase.
	1907.	1906.			
19 FREEHOLDERS' CHARTER CITIES	14,985	12,654	2,331	--------	18.4
RURAL PARTS OF 15 COUNTIES	5,057	3,992	1,065	--------	26.7
RURAL PART OF STATE	9,689	8,320	1,369	--------	16.5
Alameda County*	847	351	496	--------	141.3
Berkeley town	510	380	130	--------	34.2
Oakland city	1,824	1,561	263	--------	16.8
Fresno County*	507	431	76	--------	17.6
Fresno city	384	382	2	--------	0.5
Los Angeles County*	1,182	652	530	--------	81.3
Los Angeles city	4,201	3,780	421	--------	11.1
Pasadena city	440	346	94	--------	27.2
Monterey County*	210	162	48	--------	29.6
Salinas city	60	53	7	--------	13.2
Napa County*	61	63	--------	2	--------
Napa city	78	73	5	--------	6.8
Nevada County*	144	146	--------	2	--------
Grass Valley city	77	109	--------	32	--------
Sacramento County*	132	148	--------	16	--------
Sacramento city	442	358	84	--------	23.5
San Bernardino County*	365	376	--------	11	--------
San Bernardino city	188	133	55	--------	41.4
San Diego County*	148†	154	--------	6	--------
San Diego city	332	263	69	--------	26.2
San Francisco (City and County)	5,128	3,923	1,205	--------	30.7
San Joaquin County*	174	206	--------	32	--------
Stockton city	231	202	29	--------	14.4
Santa Barbara County*	171	184	--------	13	--------
Santa Barbara city	129	173	--------	44	--------
Santa Clara County*	724	682	42	--------	6.2
San José city	382	387	--------	5	--------
Santa Cruz County*	57	96	--------	39	--------
Santa Cruz city	182	146	36	--------	24.7
Watsonville city	86	87	--------	1	--------
Solano County*	115	113	2	--------	1.8
Vallejo city	149	150	--------	1	--------
Sonoma County*	220	228	--------	8	--------
Santa Rosa city	162	148	14	--------	9.5

*Figures are for county exclusive of freeholders' charter city or cities.

†Includes 6 births in Imperial County, formed August 15, 1907.

County Totals.—The table below shows the counties for which at least 100 births were reported to the State Bureau of Vital Statistics in 1907 and 1906, respectively:

TABLE 4.—*Rank of Counties with at least 100 Births: 1907 and 1906.*

1907.			1906.		
Rank.	County.	Births.	Rank.	County.	Births.
	THE STATE	24,674		THE STATE	20,974
1.	Los Angeles	5,823	1.	Los Angeles	4,778
2.	San Francisco	5,128	2.	San Francisco	3,923
3.	Alameda	3,181	3.	Alameda	2,292
4.	Santa Clara	1,106	4.	Santa Clara	1,069
5.	Fresno	891	5.	Fresno	813
6.	Sacramento	574	6.	San Bernardino	509
7.	San Bernardino	553	7.	Sacramento	506
8.	San Diego	*480	8.	San Diego	417
9.	San Joaquin	405	9.	San Joaquin	408
10.	Sonoma	382	10.	Sonoma	376
11.	Riverside	333	11.	Santa Barbara	357
12.	Santa Cruz	325	12.	Riverside	356
13.	Santa Barbara	300	13.	Orange	343
14.	Tulare	295	14.	Santa Cruz	329
15.	Contra Costa	291	15.	Tulare	313
16.	Orange	290	16.	Solano	263
17.	Monterey	270	17.	Butte	257
18.	Solano	264	18.	Nevada	255
19.	Butte	246	19.	Monterey	215
20.	Marin	242	20.	Marin	203
21.	San Mateo	230	21.	Siskiyou	193
22.	Nevada	221	22.	Contra Costa	180
23.	Shasta	210	23.	San Mateo	174
24.	San Luis Obispo	181	24.	Kern	169
25.	Siskiyou	171	25.	San Luis Obispo	168
26.	Mendocino	151	26.	Stanislaus	165
27.	Stanislaus	151	27.	Mendocino	157
28.	Kern	144	28.	Shasta	157
29.	Ventura	143	29.	Napa	136
30.	Humboldt	139	30.	Kings	125
31.	Napa	139	31.	El Dorado	122
32.	Kings	136		Remaining 26 counties	1,246
33.	Madera	108			
34.	Lake	101			
	Remaining 23 counties	1,070			

* Includes 6 births in Imperial County, formed August 15, 1907.

There were thirty-one counties with at least 100 births registered in 1906 and thirty-four in 1907, El Dorado dropping out and Ventura, Humboldt, Madera, and Lake entering the list. Similarly, while there were only twenty counties reporting at least 200 births for 1906, there were twenty-three reporting this number for 1907, the additional counties being Contra Costa, San Mateo, and Shasta. On the other hand, there were fifteen counties reporting 300 births for 1906, but only thirteen for 1907, Orange and Tulare falling below this limit.

Comparison of the ranking of counties in the number of births registered shows gains in certain cases. Thus, Sacramento supplanted San Bernardino in sixth place in the ranking, while Riverside rose from twelfth place to eleventh, Santa Cruz from fourteenth to twelfth, Tulare from fifteenth to fourteenth, and Monterey from nineteenth to seventeenth. Contra Costa County rose from twenty-second place to fifteenth, passing Orange, Solano, Butte, Nevada, Monterey, Marin, and

Siskiyou. San Mateo County rose from twenty-third place to twenty-first, San Luis Obispo from twenty-fifth to twenty-fourth, Mendocino from twenty-seventh to twenty-sixth, and Shasta from twenty-eighth to twenty-third. Ventura and Humboldt counties rose from below thirty-first place to twenty-ninth and thirtieth, respectively.

City Totals.—The following table gives the comparative ranking of the nineteen freeholders' charter cities reporting births for 1907 and 1906, as well as the supplemental ranking of the five additional cities of this class reporting births for 1907 alone (Alameda, Long Beach, Riverside, Eureka, and Santa Monica):

TABLE 5.—*Rank of Cities reporting Births: 1907 and 1906.*

1907.			1906.		
Rank.	City.	Births.	Rank.	City.	Births.
	19 FREEHOLDERS' CHARTER CITIES	14,985		19 FREEHOLDERS' CHARTER CITIES	12,654
1.	San Francisco	5,128	1.	San Francisco	3,923
2.	Los Angeles	4,201	2.	Los Angeles	3,780
3.	Oakland	1,824	3.	Oakland	1,561
4.	Berkeley	510	4.	San José	387
5.	Sacramento	442	5.	Fresno	382
6.	Pasadena	440	6.	Berkeley	380
7.	Fresno	384	7.	Sacramento	358
8.	San José	382	8.	Pasadena	346
9.	San Diego	332	9.	San Diego	263
10.	Stockton	231	10.	Stockton	202
11.	San Bernardino	188	11.	Santa Barbara	173
12.	Santa Cruz	182	12.	Vallejo	150
13.	Santa Rosa	162	13.	Santa Rosa	148
14.	Vallejo	149	14.	Santa Cruz	146
15.	Santa Barbara	129	15.	San Bernardino	133
16.	Watsonville	86	16.	Grass Valley	109
17.	Napa	78	17.	Watsonville	87
18.	Grass Valley	77	18.	Napa	73
19.	Salinas	60	19.	Salinas	53
	5 additional freeholders' charter cities reporting births for 1907 alone	801			
a.	Alameda	378			
b.	Long Beach	158			
c.	Riverside	105			
d.	Eureka	90			
e.	Santa Monica	70			

Berkeley, Sacramento, and Pasadena rose from rank 6, 7, and 8, respectively, in 1906, to 4, 5, and 6 in 1907, passing San José and Fresno. San Bernardino rose from fifteenth place in the ranking to eleventh, passing Santa Barbara, Vallejo, Santa Rosa, and Santa Cruz. At the same time Santa Cruz rose from fourteenth place to twelfth, passing Santa Barbara, Vallejo, and Santa Rosa. Watsonville and Napa rose from rank 17 and 18, respectively, in 1906, to 16 and 17 in 1907, passing Grass Valley.

It may be noted that the 12,654 births in the nineteen freeholders' charter cities in 1906 form 60.3 per cent of the 20,974 births registered in the whole State, and that the 14,985 births in these same cities in 1907 form 60.7 per cent of the 24,674 births registered in California. Including the five additional cities reporting births for 1907 alone, the twenty-four freeholders' charter cities reported 15,786 births, or 64.0 per cent of the State total.

BIRTH-RATES: 1907 AND 1906.

Geographic Divisions.—In order to calculate rates the population of California has been estimated conservatively according to the Census Bureau method by adding to the population in 1900 six tenths of the increase between 1890 and 1900 for 1906 and seven tenths for 1907, except that for the few counties (or cities) showing decreases between the last two Federal censuses the population in 1900 has been taken for both 1906 and 1907, and that for the three principal cities arbitrary estimates have been made because of their exceptional conditions of growth. The estimates were 450,000 for San Francisco and 200,000 for Oakland each year, while the estimates for Los Angeles were 250,000 for 1907 and 200,000 for 1906, the estimates for San Francisco and Oakland being unchanged for 1907 because of possible overestimates for 1906. Although the Census Bureau method of estimating population, even with the modifications made in the California Bureau of Vital Statistics, does not give very satisfactory results for individual counties or cities that may have grown rapidly since 1900, yet underestimates for some places are offset by possible overestimates for others, so that the estimated population is fairly accurate for geographic divisions and for the entire State.

The following table shows the population as estimated by the method already explained, the births, and the birth-rates per 1,000 population for counties arranged geographically in both 1907 and 1906:

TABLE 6.—*Estimated Population, Births, and Birth-rate per 1,000 Population, for Counties arranged Geographically: 1907 and 1906.*

COUNTY.	Estimated Population.		Births.		Birth-rate per 1,000 Population.	
	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	2,001,193	1,882,846	24,674	20,974	12.3	11.1
Northern California	274,686	272,095	2,405	2,232	8.8	8.2
Coast counties	124,373	123.078	953	824	7.7	6.7
Del Norte	2,408	2,408	27	30	11.2	12.5
Humboldt	29,648	29,285	139	45	4.7	1.5
Lake	6,017	6,017	101	70	16.8	11.6
Mendocino	22,462	22,177	151	157	6.7	7.1
Napa	16,479	16.475	139	136	8.4	8.3
Sonoma	42,511	41,935	382	376	9.0	9.0
Trinity	4,848	4,781	14	10	2.9	2.1
Interior counties	150,313	149,017	1,452	1,408	9.7	9.4
Butte	17,117	17,117	246	257	14.4	15.0
Colusa	7,364	7,364	88	60	12.0	8.1
Glenn	5,150	5,150	28	27	5.4	5.2
Lassen	4,701	4,674	43	36	9.1	7.7
Modoc	5,139	5.130	60	70	11.7	13.6
Nevada	18,083	18,041	221	255	12.2	14.1
Placer	16,266	16,197	65	75	4.0	4.6
Plumas	4,657	4,657	31	36	6.7	7.7
Shasta	20,948	20.429	210	157	10.0	7.7
Sierra	4,017	4,017	29	48	7.2	11.9
Siskiyou	20,321	19,841	171	193	8.4	9.7
Sutter	6,178	6,136	92	51	14.9	8.3
Tehama	11,752	11.644	94	72	8.0	6.2
Yuba	8,620	8,620	74	71	8.6	8.2

TABLE 6.—*Estimated Population, Births, and Birth-rate per 1,000 Population, for Counties arranged Geographically: 1907 and 1906—Continued.*

COUNTY.	Estimated Population.		Births.		Birth-rate per 1,000 Population.	
	1907.	1906.	1907.	1906.	1907.	1906.
Central California	1,235,303	1,175,186	14,347	11,889	11.6	10.1
San Francisco	450,000	450,000	5,128	3,923	11.4	8.7
Other bay counties	332,936	279,528	3,944	2,849	11.8	10.2
Alameda	280,676	228,185	3,181	2,292	11.3	10.0
Contra Costa	21,218	20,765	291	180	13.7	8.7
Marin	17,543	17,280	242	203	13.8	11.7
San Mateo	13,499	13,298	230	174	17.0	13.1
Coast counties	135,566	133,967	1,924	1,831	14.2	13.7
Monterey	19,900	19,826	270	215	13.6	10.8
San Benito	6,788	6,765	42	50	6.2	7.4
San Luis Obispo	17,033	16,976	181	168	10.6	9.9
Santa Clara	68,764	67,543	1,106	1,069	16.1	15.8
Santa Cruz	23,081	22,857	325	329	14.1	14.4
Interior counties	316,801	311,691	3,351	3,286	10.6	10.5
Alpine	509	509	6	6	11.8	11.8
Amador	11,673	11,594	62	54	5.3	4.7
Calaveras	12,923	12,591	95	95	7.4	7.5
El Dorado	8,986	8,986	81	122	9.0	13.6
Fresno	45,168	44,123	891	813	19.7	18.4
Inyo	4,960	4,877	16	11	3.2	2.3
Kern	21,150	20,483	144	169	6.8	8.3
Kings	12,823	12,479	136	125	10.6	10.0
Madera	7,598	7,423	108	93	14.2	12.5
Mariposa	5,373	5,280	14	6	2.6	1.1
Merced	10,006	9,893	63	52	6.3	5.3
Mono	2,283	2,266	2	1	0.9	0.4
Sacramento	49,818	49,261	574	506	11.5	10.3
San Joaquin	40,228	39,546	405	408	10.1	10.3
Solano	26,381	26,061	264	263	10.0	10.1
Stanislaus	9,550	9,550	151	165	15.8	17.3
Tulare	18,375	18,375	295	313	16.1	17.0
Tuolumne	14,725	14,216	3	11	0.2	0.8
Yolo	14,272	14,178	41	73	2.9	5.1
Southern California	491,204	435,565	7,922	6,853	16.1	15.7
Los Angeles	333,481	281,243	5,823	4,778	17.5	17.0
Other counties	157,723	154,322	2,099	2,075	13.3	13.4
Orange	23,971	23,360	290	343	12.1	14.7
Riverside	21,043	20,592	333	356	15.8	17.3
San Bernardino	32,850	32,145	553	509	16.8	15.8
San Diego	41,325	40,438	480*	417	11.6	10.3
Santa Barbara	21,160	20,842	300	357	14.2	17.1
Ventura	17,374	16,945	143	93	8.2	5.5
Northern and Central California	1,509,989	1,447,281	16,752	14,121	11.1	9.8
Coast counties	1,042,875	986,573	11,949	9,427	11.5	9.6
Interior counties	467,114	460,708	4,803	4,694	10.3	10.2
Metropolitan area	782,936	729,528	9,072	6,772	11.6	9.3
Rural counties	727,053	717,753	7,680	7,349	10.1	10.2

* Includes 6 births in Imperial County, formed August 15, 1907.

It appears from this table that for an estimated State population of 2,001,193 in 1907 the 24,674 births represent a birth-rate of 12.3 per 1,000 inhabitants, while for a population of 1,882,846 in 1906 the 20,974 births give a rate of 11.1 per 1,000.

The birth-rates were no less than 16.1 and 15.7 in 1907 and 1906 for the counties south of Tehachapi, as compared with only 11.1 and 9.8 for those to the north, the rates being 11.6 and 10.1 for Central California and 8.8 and 8.2 for Northern California. The birth-rates were as great as 17.5 and 17.0 for Los Angeles, against 13.3 and 13.4 for the rest of Southern California. The rates were notably high besides only for the coast counties of Central California, 14.2 in 1907 and 13.7 in 1906, the birth-rates being below the State averages for the remaining geographic divisions.

In 1906 the birth-rate was somewhat less for the metropolitan area than for the rural counties of Northern and Central California (9.3 against 10.2), but this was probably due to incomplete registration of births in San Francisco on account of the confusion following the great fire, for in 1907 the birth-rate for the urban territory was 11.6, as compared with only 10.1 for the rural districts.

Counties.—The individual counties with birth-rates above the State averages of 12.3 and 11.1 for 1907 and 1906, respectively, were as follows: Fresno, 19.7 and 18.4; Los Angeles, 17.5 and 17.0; San Mateo, 17.0 and 13.1; San Bernardino, 16.8 and 15.8; Lake, 16.8 and 11.6; Tulare, 16.1 and 17.0; Santa Clara, 16.1 and 15.8; Riverside and Stanislaus, each 15.8 and 17.3; Butte, 14.4 and 15.0; Santa Barbara, 14.2 and 17.1; Madera, 14.2 and 12.5; Santa Cruz, 14.1 and 14.4; and Marin, 13.8 and 11.7. The birth-rate was above the general average only for 1906 (11.1) in the following counties: Orange, 14.7; Nevada, 14.1; El Dorado and Modoc, each 13.6; Del Norte, 12.5; Sierra, 11.9; and Alpine, 11.8. Similarly, the birth-rate was above the State average for 1907 alone (12.3) in the following counties: Sutter, 14.9; Contra Costa, 13.7; and Monterey, 13.6.

Cities.—The table on the opposite page gives the estimated population, births, and birth-rate per 1,000 population for each city reporting births in 1907 or 1906. Since the population, except for San Francisco, Los Angeles, and Oakland, was estimated on the assumption that the increase was the same for each year since 1900 as for each year between 1890 and 1900, the estimates may be too low for cities that have grown with special rapidity since the last Federal census was taken. However, the variations from the standard method made by the Census Bureau in published estimates for Berkeley, Pasadena, and San Diego, on account of annexations of territory, have been followed in these estimates, while for other cities the same method has been applied as explained heretofore for counties.

TABLE 7.—*Estimated Population, Births, and Birth-rate per 1,000 Population, for Cities: 1907 and 1906.*

City.	Estimated Population.		Births.		Birth-rate per 1,000 Population.	
	1907.	1906.	1907.	1906.	1907.	1906.
FREEHOLDERS' CHARTER CITIES	1,144,630	1,044,063	15,786	12,654	13.8	12.1
REST OF STATE	856,563	838,783	8,888	8,320	10.4	9.9
Alameda County:						
Alameda city	20,174	--------	378	--------	18.7	--------
Berkeley town	20,800	19,700	510	380	24.5	19.3
Oakland city	200,000	200,000	1,824	1,561	9.1	7.8
Fresno County:						
Fresno city	13,625	13,460	384	382	28.2	28.4
Humboldt County:						
Eureka city	9,056	--------	90	--------	9.9	--------
Los Angeles County:						
Long Beach city	3,435	--------	158	--------	46.0	--------
Los Angeles city	250,000	200,000	4,201	3,780	16.8	18.9
Pasadena city	15,019	14,378	440	346	29.3	24.1
Santa Monica city	4,107	--------	70	--------	17.0	--------
Monterey county:						
Salinas city	3,983	3,886	60	53	15.1	13.6
Napa County:						
Napa city	4,036	4,036	78	73	19.3	18.1
Nevada County:						
Grass Valley city	4,836	4,539	77	109	15.9	24.0
Riverside County:						
Riverside city	9,576	--------	105	--------	11.0	--------
Sacramento County:						
Sacramento city	31,312	31,022	442	358	14.1	11.5
San Bernardino County:						
San Bernardino city	7,648	7,434	188	133	24.6	17.9
San Diego County:						
San Diego city	19,380	19,140	332	263	17.1	13.7
San Francisco:						
(City and County)	450,000	450,000	5,128	3,923	11.4	8.7
San Joaquin County:						
Stockton city	19,662	19,354	231	202	11.7	10.4
Santa Barbara County:						
Santa Barbara city	7,091	7,019	129	173	18.2	24.6
Santa Clara County:						
San José city	23,908	23,564	382	387	16.0	16.4
Santa Cruz County:						
Santa Cruz city	5,701	5,695	182	146	31.9	25.6
Watsonville city	4,494	4,356	86	87	19.1	20.0
Solano County:						
Vallejo city	9,099	8,937	149	150	16.4	16.8
Sonoma County:						
Santa Rosa city	7,688	7,543	162	148	21.1	19.6

For the twenty-four freeholders' charter cities reporting births for 1907, the estimated population was 1,144,630, so that the 15,786 births represent a birth-rate of 13.8 per 1,000 inhabitants. Similarly, for the nineteen cities reporting births in 1906, the estimated population was 1,044,063, so that the 12,654 births give a rate of 12.1. The birth-rates were considerably less for the rest of the State each year. The estimated population outside freeholders' charter cities reporting births was 856,563 in 1907 and 838,783 in 1906, so that the births totaling 8,888 and 8,320, respectively, represent birth-rates of only 10.4 and 9.9, as compared with 13.8 and 12.1 for the cities taken together.

The birth-rates were above the city averages of 13.8 and 12.1 for 1907 and 1906, respectively, in the following cities: Long Beach, 46.0 (in 1907 alone); Santa Cruz, 31.9 in 1907 and 25.6 in 1906; Pasadena, 29.3 and 24.1; Fresno, 28.2 and 28.4; San Bernardino, 24.6 and 17.9; Berkeley, 24.5 and 19.3; Santa Rosa, 21.1 and 19.6; Napa, 19.3 and 18.1; Watsonville, 19.1 and 20.0; Alameda, 18.7 (in 1907 alone); Santa Barbara, 18.2 and 24.6; San Diego, 17.1 and 13.7; Santa Monica, 17.0 (in 1907 alone); Los Angeles 16.8 and 18.9; Vallejo, 16.4 and 16.8; San José, 16.0 and 16.4; Grass Valley, 15.9 and 24.0; and Salinas, 15.1 and 13.6. The birth-rate for Sacramento was above the city average in 1907, 14.1 against 13.8, but not in 1906, only 11.5 against 12.1. The birth-rates were below the general averages for cities for Stockton, San Francisco, and Oakland, for both 1907 and 1906, and also for Riverside and Eureka in 1907, when alone these two cities reported births separately.

GENERAL BIRTH STATISTICS: 1907 AND 1906.

Sex.—The following table gives the classification of births by sex, with per cent distributions, for the several geographic divisions in both 1907 and 1906:

TABLE 8.—*Births classified by Sex, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Births.						Per Cent Male.		Per Cent Female.	
	Total.		Male.		Female.					
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	24,674	20,974	12,645	10,926	12,029	10,048	51.2	52.1	48.8	47.9
Northern California	2,405	2,232	1,212	1,167	1,193	1,065	50.4	52.3	49.6	47.7
Coast counties	953	824	475	425	478	399	49.8	51.6	50.2	48.4
Interior counties	1,452	1,408	737	742	715	666	50.8	52.7	49.2	47.3
Central California	14,347	11,889	7,393	6,184	6,954	5,705	51.5	52.0	48.5	48.0
San Francisco	5,128	3,923	2,633	2,040	2,495	1,883	51.3	52.0	48.7	48.0
Other bay counties	3,944	2,849	2,062	1,497	1,882	1,352	52.3	52.5	47.7	47.5
Coast counties	1,924	1,831	986	961	938	870	51.2	52.5	48.8	47.5
Interior counties	3,351	3,286	1,712	1,686	1,639	1,600	51.1	51.3	48.9	48.7
Southern California	7,922	6,853	4,040	3,575	3,882	3.278	51.0	52.2	49.0	47.8
Los Angeles	5,823	4,778	2,994	2,494	2,829	2,284	51.4	52 2	48.6	47.8
Other counties	2,099	2,075	1,046	1,081	1,053	994	49.8	52.1	50.2	47.9
Northern and Central California	16,752	14,121	8,605	7.351	8,147	6,770	51.4	52.1	48.6	47.9
Coast counties	11,949	9,427	6,156	4,923	5,793	4,504	51.5	52.2	48.5	47.8
Interior counties	4,803	4,694	2,449	2,428	2,354	2,266	51.0	51.7	49.0	48.3
Metropolitan area	9,072	6,772	4,695	3,537	4,377	3,235	51.8	52.2	48.2	47.8
Rural counties	7,680	7,349	3,910	3,814	3,770	3,535	50.9	51.9	49.1	48.1

The proportion of the sexes among the 24,674 children born in California in 1907 was: Male, 12,645, or 51.2 per cent; and female, 12,029, or 48.8 per cent. Among the 20,974 children born in 1906, the proportion of the sexes was: Male, 10,926, or 52.1 per cent; and female, 10,048, or 47.9 per cent. For 1907, as compared with 1906, there was a decrease of 0.9 in the per cent male, and, correspondingly, an increase of 0.9 in the per cent female.

In 1907 the male births exceeded the female by 616, or 5.1 per cent, while in 1906 the excess of boys over girls was 878, or 8.7 per cent. In 1907 alone the girl babies outnumbered the boys by 3 in the coast counties of Northern California, and by 7 in the counties of Southern California other than Los Angeles. However, the male births exceeded the female in the remaining geographic divisions in 1907, as well as in all in 1906. In 1907 the per cent male ranged from 52.3, for the bay counties other than San Francisco, to 49.8, in each case, for the coast counties of Northern California, and for the counties south of Tehachapi, except Los Angeles. In 1906 the per cent male ranged from 52.7 for the interior counties of Northern California to 51.3 for the interior counties of Central California.

The per cents male were higher for Los Angeles in 1907 and 1906 (51.4 and 52.2) than for the other counties of Southern California (49.8 and 52.1). Similarly, the per cents were higher for the metropolitan area each year (51.8 and 52.2) than for the rural counties north of Tehachapi (50.9 and 51.9). However, the per cents male were only 51.3 and 52.0 for San Francisco in 1907 and 1906, as compared with 52.3 and 52.5 for the other bay counties.

The following table shows, for 1907 and 1906, the classification of births by sex, with per cent distributions, for the freeholders' charter cities in contrast with the rest of the State. There were twenty-four freeholders' charter cities in 1907 and nineteen in 1906:

TABLE 9.—*Births classified by Sex, with Per Cents, for Cities and Rest of State: 1907 and 1906.*

POPULATION GROUP.	Births.						Per Cent Male.		Per Cent Female.	
	Total.		Male.		Female.					
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
CALIFORNIA	24,674	20,974	12,645	10,926	12,029	10,048	51.2	52.1	48.8	47.9
Freeholders' charter cities	15,786	12,654	8,115	6,572	7,671	6,082	51.4	51.9	48.6	48.1
Rest of State	8,888	8,320	4,530	4,354	4,358	3,966	51.0	52.3	49.0	47.7

It appears from this table that among the 15,786 births in the twenty-four freeholders' charter cities in 1907, the proportion of the sexes was: Male, 8,115, or 51.4 per cent; and female, 7,671, or 48.6 per cent. The proportion of the sexes among the 12,654 births for the nineteen cities in 1906 was: Male, 6,572, or 51.9 per cent; and female, 6,082, or 48.1 per cent. In the freeholders' charter cities there was a decrease of 0.5 in the per cent male, and, conversely, an increase of 0.5 in the per cent female.

In California outside freeholders' charter cities there were 8,888 births in 1907, classified by sex, as follows: Male, 4,530, or 51.0 per cent; and female, 4,358, or 49.0 per cent. For the State outside cities, in 1906, the 8,320 births were distributed by sex, as follows: Male, 4,354, or 52.3 per cent; and female, 3,966, or 47.7 per cent. For the rural part of the State the per cent male showed a decrease of 1.3 and the per cent female an increase of 1.3, correspondingly.

In the twenty-four freeholders' charter cities in 1907 the per cent male was greater by 0.4 than in the rest of the State (51.4 as compared with 51.0). In 1906, however, the per cent male for the nineteen freeholders' charter cities fell short of that for the rest of the State by 0.4 (51.9 against 52.3).

Race.—The following table gives the classification of births by race, as well as the per cent white, for the several geographic divisions in 1907 and 1906:

TABLE 10.—*Births classified by Race, with Per Cent White, for Geographic Divisions: 1907 and 1906.*

Geographic Division.	Births.						Per Cent White.
	Total.	White.	Negro.	Indian.	Chinese.	Japanese.	
1907.							
The State	24,674	24,097	179	22	155	221	97.7
Northern California	2,405	2,369	9	11	9	7	98.5
Coast counties	953	941	1	4	4	3	98.7
Interior counties	1,452	1,428	8	7	5	4	98.3
Central California	14,347	13,994	62	6	130	155	97.5
San Francisco	5,128	5,055	6	--------	28	39	98.6
Other bay counties	3,944	3,784	29	1	78	52	95.9
Coast counties	1,924	1,879	4	--------	8	33	97.7
Interior counties	3,351	3,276	23	5	16	31	97.8
Southern California	7,922	7,734	108	5	16	59	97.6
Los Angeles	5,823	5,671	86	2	13	51	97.4
Other counties	2,099	2,063	22	3	3	8	98.3
Northern and Central California	16,752	16,363	71	17	139	162	97.7
Coast counties	11,949	11,659	40	5	118	127	97.6
Interior counties	4,803	4,704	31	12	21	35	97.9
Metropolitan area	9,072	8,839	35	1	106	91	97.4
Rural counties	7,680	7,524	36	16	33	71	98.0
1906.							
The State	20,974	20,632	82	10	116	134	98.4
Northern California	2,232	2,213	1	3	6	9	99.2
Coast counties	824	817	--------	3	2	2	99.2
Interior counties	1,408	1,396	1	--------	4	7	99.1
Central California	11,889	11,668	29	3	97	92	98.1
San Francisco	3,923	3,855	3	1	32	32	98.3
Other bay counties	2,849	2,767	8	1	43	30	97.1
Coast counties	1,831	1,806	2	--------	7	16	98.6
Interior counties	3,286	3,240	16	1	15	14	98.6
Southern California	6,853	6,751	52	4	13	33	98.5
Los Angeles	4,778	4,703	44	--------	10	21	98.4
Other counties	2,075	2,048	8	4	3	12	98.7
Northern and Central California	14,121	13,881	30	6	103	101	98.3
Coast counties	9,427	9,245	13	5	84	80	98.1
Interior counties	4,694	4,636	17	1	19	21	98.8
Metropolitan area	6,772	6,622	11	2	75	62	97.8
Rural counties	7,349	7,259	19	4	28	39	98.8

This table shows that the race distribution of the 24,674 births in California in 1907 was: White, 24,097, or 97.7 per cent; Japanese, 221; negro, 179; Chinese, 155; and Indian, 22. In 1906 the race distribution of the 20,974 births was: White, 20,632, or 98.4 per cent; Japanese, 134; Chinese, 116; negro, 82; and Indian, 10. There was a decrease of 0.7 in the per cent white, 97.7 in 1907 against 98.4 in 1906. Each year the Japanese were the leading non-Caucasian race represented in births. In 1907 the negro babies outnumbered the Chinese, though in 1906 the Chinese "native sons and daughters" outnumbered the little black pickaninnies.

In 1907 and 1906 the per cent white was highest in Northern California (98.5 and 99.2), next in Southern California (97.6 and 98.5), and lowest in Central California (97.5 and 98.1). Among the minor geographic divisions the per cent white ranged from 98.7 and 99.2 for the coast counties of Northern California in 1907 and 1906, respectively, to 95.9 and 97.1 for the bay counties other than San Francisco.

Each year the per cents white were less for Los Angeles (97.4 in 1907 and 98.4 in 1906) than for the other counties of Southern California (98.3 and 98.7); and likewise less for the metropolitan area (97.4 and 97.8) than for the rural counties north of Tehachapi (98.0 and 98.8). However, the per cents white were much greater for San Francisco than for the other bay counties, being no less than 98.6 and 98.3 for the metropolis against only 95.9 and 97.1 for the suburbs. The suburbs surpass the metropolis especially in the number of negro and Chinese babies, many Chinese having moved to Oakland after the great fire in San Francisco in 1906.

The following table gives the race distribution of births, with the per cent white, for the twenty-four freeholders' charter cities in 1907, and the nineteen in 1906, in contrast with the rest of the State:

TABLE 11.—*Births classified by Race, with Per Cent White, for Cities and Rest of State: 1907 and 1906.*

POPULATION GROUP.	Births.						Per Cent White.
	Total.	White.	Negro.	Indian.	Chinese.	Japanese.	
1907.							
CALIFORNIA	24,674	24,097	179	22	155	221	97.7
Freeholders' charter cities	15,786	15,353	138	5	127	163	97.3
Rest of State	8,888	8,744	41	17	28	58	98.4
1906.							
CALIFORNIA	20,974	20,632	82	10	116	134	98.4
Freeholders' charter cities	12,654	12,411	63	3	92	85	98.1
Rest of State	8,320	8,221	19	7	24	49	98.8

It appears from this table that among the 15,786 births in the twenty-four freeholders' charter cities in 1907, the race distribution was: White, 15,353, or 97.3 per cent; Japanese, 163; negro, 138; Chinese, 127; and Indian, 5. The race distribution of the 12,654 births in the nineteen cities in 1906 was: White, 12,411, or 98.1 per cent; Chinese, 92; Japanese, 85; negro, 63; and Indian, 3. There was a decrease of 0.8 in the per cent white, 97.3 in 1907 against 98.1 in 1906. In 1907 the Japanese and negroes were the leading non-Caucasian races represented by births in cities, though in 1906 the Chinese surpassed both.

For the State, exclusive of freeholders' charter cities, there were 8,888 births in 1907, distributed by race, as follows: White, 8,744, or 98.4 per cent; Japanese, 58; negro, 41; Chinese, 28; and Indian, 17. There were 8,320 births in California outside cities in 1906, distributed by race, as follows: White, 8,221, or 98.8 per cent; Japanese, 49; Chinese, 24; negro, 19; and Indian, 7. In the rural part of the State the per cent white showed a decrease of only 0.4, 98.4 for 1907 against 98.8 for 1906. Each year the Japanese were the leading non-Caucasian race represented by births occurring outside cities, with the negroes second in 1907 and the Chinese second in 1906.

In the twenty-four freeholders' charter cities in 1907 the per cent white was less by 1.1 than in the rest of the State (97.3 as compared with 98.4), but in the nineteen cities of this class in 1906 the per cent white fell short of that for the rural districts by only 0.7 (98.1 against 98.8).

Sex and Race.—In the following table births of whites and non-Caucasians are classified by sex, with per cents, for both 1907 and 1906, There were so few births of non-Caucasians in some geographic divisions that figures are presented here only for the twenty-four freeholders' charter cities in 1907 and the nineteen in 1906, as contrasted with the rest of California:

TABLE 12.—*Births classified by Sex and Race, with Per Cents by Sex, for Cities and Rest of State: 1907 and 1906.*

POPULATION GROUP.	Births.						Per Cent Male.		Per Cent Female.	
	Total.		Male.		Female.					
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
WHITE.										
California	24,097	20,632	12,327	10,741	11,770	9,891	51.2	52.1	48.8	47.9
Freeholders' charter cities	15,353	12,411	7,878	6,444	7,475	5,967	51.3	51.9	48.7	48.1
Rest of State	8,744	8,221	4,449	4,297	4,295	3,924	50.9	52.3	49.1	47.7
NON-CAUCASIAN.										
California	577	342	318	185	259	157	55.1	54.1	44.9	45.9
Freeholders' charter cities	433	243	237	128	196	115	54.7	52.7	45.3	47.3
Rest of State	144	99	81	57	63	42	56.3	57.6	43.7	42.4

The proportion of the sexes among the white births is practically the same as shown in Table 9, *ante,* for total births. The per cents male and female for white births are identical with those for total births, except only than in the cities and the rest of the State in 1907 alone the per cents male are less by 0.1, and the per cents female are correspondingly greater by 0.1, among white births than among total births.

However, the proportion of the sexes among the few non-Caucasian births is very different from that among the many white births, the preponderance of males being much greater among the non-Caucasians than among the whites. In 1907 and 1906, respectively, the per cents male among non-Caucasian births were 55.1 and 54.1 for California as a whole; 54.7 and 52.7 for the twenty-four and nineteen freeholders' charter cities; and no less than 56.3 and 57.6 for the rest of the State.

Nativity of White Mothers.—The analysis of births by race may be extended to a consideration of births according to the nativity of white mothers—classified as born in California, born in other states, or foreign born. The cases where the nativity of the white mothers was not given on the birth certificates numbered only 129, or 0.5 per cent, in 1907 and only 161, or 0.8 per cent, in 1906. These few have been included with the mothers born elsewhere in the United States than California, because it seems less likely that the nativity would be unknown or not given for mothers born in this State or in foreign countries than for mothers born in other states.

The following table shows the nativity of white mothers, by numbers and per cents, for the several geographic divisions in both 1907 and 1906:

TABLE 13.—*White Mothers classified by Nativity, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	White Mothers.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born	Born in California.	Born in Other States.	Foreign Born.
1907.							
THE STATE	24,097	8,449	9,206	6,442	35.1	38.2	26.7
Northern California	2,369	1,253	745	371	52.9	31.4	15.7
Coast counties	941	452	273	216	48.0	29.0	23.0
Interior counties	1,428	801	472	155	56.1	33.0	10.9
Central California	13,994	5,929	3,758	4,307	42.4	26.8	30.8
San Francisco	5,055	2,088	931	2,036	41.3	18.4	40.3
Other bay counties	3,784	1,649	1,067	1,068	43.6	28.2	28.2
Coast counties	1,879	851	548	480	45.3	29.2	25.5
Interior counties	3,276	1,341	1,212	723	40.9	37.0	22.1
Southern California	7,734	1,267	4,703	1,764	16.4	60.8	22.8
Los Angeles	5,671	786	3,520	1,365	13.8	62.1	24.1
Other counties	2,063	481	1,183	399	23.3	57.4	19.3
Northern and Central California	16,363	7,182	4,503	4,678	43.9	27.5	28.6
Coast counties	11,659	5,040	2,819	3,800	43.2	24.2	32.6
Interior counties	4,704	2,142	1,684	878	45.5	35.8	18.7
Metropolitan area	8,839	3,737	1,998	3,104	42.3	22.6	35.1
Rural counties	7,524	3,445	2,505	1,574	45.8	33.3	20.9

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*Includes those of unknown nativity, numbering in the entire State only 129, or 0.5 per cent, in 1907 and 161, or 0.8 per cent, in 1906.

TABLE 13.—*White Mothers classified by Nativity, with Per Cents, for Geographic Divisions: 1907 and 1906—Continued.*

Geographic Division.	White Mothers.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
1906.							
The State	20,632	7,482	7,811	5,339	36.3	37.8	25.9
Northern California	2,213	1,198	713	302	54.1	32.2	13.7
Coast counties	817	407	252	158	49.8	30.9	19.3
Interior counties	1,396	791	461	144	56.7	33.0	10.3
Central California	11,668	5,052	3,093	3,523	43.3	26.5	30.2
San Francisco	3,855	1,603	730	1,522	41.6	18.9	39.5
Other bay counties	2,767	1,164	750	853	42.1	27.1	30.8
Coast counties	1,806	819	538	449	45.3	29.8	24.9
Interior counties	3,240	1,466	1,075	699	45.2	33.2	21.6
Southern California	6,751	1,232	4,005	1,514	18.3	59.3	22.4
Los Angeles	4,703	733	2,813	1,157	15.6	59.8	24.6
Other counties	2,048	499	1,192	357	24.4	58.2	17.4
Northern and Central California	13,881	6,250	3,806	3,825	45.0	27.4	27.6
Coast counties	9,245	3,993	2,270	2,982	43.2	24.5	32.3
Interior counties	4,636	2,257	1,536	843	48.7	33.1	18.2
Metropolitan area	6,622	2,767	1,480	2,375	41.8	22.3	35.9
Rural counties	7,259	3,483	2,326	1,450	48.0	32.0	20.0

* Includes those of unknown nativity, numbering in the entire State only 129, or 0.5 per cent, in 1907 and 161, or 0.8 per cent, in 1906.

It appears from this table that of the mothers of the 24,097 white children born in California in 1907, 9,206, or 38.2 per cent, were themselves born in other states; 8,449, or 35.1 per cent, were born in this State; and 6,442, or 26.7 per cent, were born in foreign countries. Of the 20,632 white mothers bearing children in 1906, those born elsewhere in the United States were 7,811, or 37.8 per cent; those born in California were 7,482, or 36.3 per cent; and the foreign born were 5,339, or 25.9 per cent. There was a decrease of 1.2 in the per cent of white mothers born in California (35.1 in 1907 against 36.3 in 1906). On the other hand, there was an increase of 0.4 in the per cent of mothers born elsewhere in the United States (38.2 against 37.8), and an increase of no less than 0.8 in the per cent of foreign born mothers (26.7 against 25.9).

The proportion of white mothers born in other states is very high for Southern California, but is quite low for Northern and Central California, especially the latter. The per cents of white mothers born elsewhere in the United States were 60.8 and 59.3 for the counties south of Tehachapi in 1907 and 1906, as compared with 27.5 and 27.4 for those to the north, the per cents being 31.4 and 32.2 for Northern California, and only 26.8 and 26.5 for Central California. The per cents born in other states were 62.1 and 59.8 for Los Angeles, against 57.4 and 58.2 for the rest of Southern California. On the other hand, the per cents were only 22.6 and 22.3 for the metropolitan area, as compared with 33.3 and 32.0 for the rural counties north of Tehachapi.

Similarly, the per cents born in other states were only 18.4 and 18.9 for San Francisco, against 28.2 and 27.1 for the other bay counties.

The proportion of mothers who were themselves native daughters is very high for Northern as well as Central California, but is very low indeed for Southern California. The per cents born in the Golden State among white mothers in 1907 and 1906, respectively, were 52.9 and 54.1 for Northern California, and 42.4 and 43.3 for Central California, or 43.9 and 45.0 for both together, as compared with merely 16.4 and 18.3 for all south of Tehachapi. The per cents were as little as 13.8 and 15.6 for Los Angeles against 23.3 and 24.4 for the other counties of Southern California. The per cents were likewise less for the metropolitan area than for the rural counties north of Tehachapi, being 42.3 and 41.8 for the former against 45.8 and 48.0 for the latter. Moreover, the per cents of native daughters among the mothers were also less for the metropolis proper (41.3 and 41.6) than for the suburban counties (43.6 and 42.1).

The proportion of foreign born mothers of the white race is notably high only for Central California, particularly in San Francisco and the other bay counties. The per cents foreign born in 1907 and 1906, respectively, were 30.8 and 30.2 for Central California, as compared with merely 22.8 and 22.4 for Southern California, and 15.7 and 13.7 for Northern California. The per cents foreign born for the counties north of Tehachapi were 28.6 and 27.6 in 1907 and 1906, being no less than 35.1 and 35.9 for the metropolitan area, against only 20.9 and 20.0 for the rural counties. The per cents foreign born among white mothers in San Francisco were no less than 40.3 and 39.5, as compared with 28.2 and 30.8 for the other bay counties in 1907 and 1906, respectively.

The table which follows gives numbers and per cents showing the nativity of white mothers for the twenty-four freeholders' charter cities in 1907 and the nineteen in 1906, as compared with all the rest of California:

TABLE 14.—*White Mothers classified by Nativity, with Per Cents, for Cities and Rest of State: 1907 and 1906.*

Population Group.	White Mothers.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
1907.							
California	24,097	8,449	9,206	6,442	35.1	38.2	26.7
Freeholders' charter cities	15,353	4,985	5,767	4,601	32.5	37.5	30.0
Rest of State	8,744	3,464	3,439	1,841	39.6	39.3	21.1
1906.							
California	20,632	7,482	7,811	5,339	36.3	37.8	25.9
Freeholders' charter cities	12,411	4,065	4,648	3,698	32.8	37.4	29.8
Rest of State	8,221	3,417	3,163	1,641	41.6	38.5	19.9

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* Includes those of unknown nativity, numbering in the entire State only 129, or 0.5 per cent, in 1907 and 161, or 0.8 per cent, in 1906.

The table shows that of the 15,353 mothers of white children born in the twenty-four freeholders' charter cities in 1907, 5,767, or 37.5 per cent, were natives of other states; 4,985, or 32.5 per cent, were natives of California; and 4,601, or 30.0 per cent, were natives of foreign countries. Of the 12,411 white mothers bearing children in the nineteen cities in 1906, those born elsewhere in the United States were 4,648, or 37.4 per cent; those born in California were 4,065, or 32.8 per cent; and those born abroad were 3,698, or 29.8 per cent. There was a decrease of 0.3 in the per cent of white mothers, in cities, born in California (32.5 for 1907, against 32.8 in 1906). On the other hand, there was an increase of 0.1 in the per cent of mothers, in cities, born in other states (37.5 against 37.4), and of 0.2 in the per cent of foreign born mothers (30.0 against 29.8).

In the State outside cities there were 8,744 births of white children in 1907, with mothers born as follows: California, 3,464, or 39.6 per cent; other states, 3,439, or 39.3 per cent; and foreign, 1,841, or 21.1 per cent. In 1906 there were 8,221 white children born in the rural part of the State, with maternal nativity as follows: California, 3,417, or 41.6 per cent; elsewhere in the United States, 3,163, or 38.5 per cent; and foreign countries, 1,641, or 19.9 per cent. The per cent of mothers born in California decreased by no less than 2.0 (39.6 against 41.6), while the per cent born in other states increased by 0.8 (39.3 against 38.5), and the per cent born abroad likewise increased by as much as 1.2 (21.1 against 19.9). These changes in the nativity of mothers in the rural part of the State were all much greater than the changes in maternal nativity for children born in the cities.

The per cents American born, whether in California or in other states, were less for cities each year than for rural districts, while the per cent foreign born was much greater within the cities than outside them. The excess in the per cent of mothers born in California for rural districts over that for cities was 7.1 in 1907 (39.6 against 32.5), and 8.8 in 1906 (41.6 against 32.8). Similarly, the excess in the per cent born in other states for the rural over the urban districts was 1.8 in 1907 (39.3 against 37.5), and 1.1 in 1906 (38.5 against 37.4). On the other hand, the excess in the per cent foreign born among white mothers in cities over that among mothers in the country districts was no less than 8.9 in 1907 (30.0 against 21.1), and as great as 9.9 in 1906 (29.8 against 19.9).

As in the State as a whole, so in the cities reporting the bulk of all births, the mothers born in other states outnumbered each year those born in California. In the territory outside cities, however, the native daughters were somewhat more numerous than other American mothers.

NATIVITY OF BRIDES AND MOTHERS: 1907 AND 1906.

Nativity of White Brides and Mothers.—Some interest may attach to a comparison between the nativity of white brides and white mothers in California. Accordingly, a table has been prepared giving, for the several geographic divisions in 1907 and 1906, the per cent distribution of white brides and white mothers by nativity, as follows:

TABLE 15.—*Per Cent Distribution, by Nativity, of White Brides and White Mothers, for Geographic Divisions: 1907 and 1906.*

Geographic Division.	Per Cent Born in California.		Per Cent Born in Other States.		Per Cent Foreign Born.	
	White Brides.	White Mothers.	White Brides.	White Mothers.	White Brides.	White Mothers.
1907.						
The State	40.9	35.1	39.2	38.2	19.9	26.7
Northern California	59.7	52.9	28.4	31.4	11.9	15.7
Coast counties	59.0	48.0	23.2	29.0	17.8	23.0
Interior counties	60.5	56.1	33.9	33.0	5.6	10.9
Central California	48.9	42.4	27.8	26.8	23.3	30.8
San Francisco	45.7	41.3	21.9	18.4	32.4	40.3
Other bay counties	49.2	43.6	28.5	28.2	22.3	28.2
Coast counties	52.7	45.3	29.9	29.2	17.4	25.5
Interior counties	50.6	40.9	33.1	37.0	16.3	22.1
Southern California	19.9	16.4	63.8	60.8	16.3	22.8
Los Angeles	17.4	13.8	65.1	62.1	17.5	24.1
Other counties	24.9	23.3	61.2	57.4	13.9	19.3
Northern and Central California	50.5	43.9	27.9	27.5	21.6	28.6
Coast counties	49.5	43.2	25.7	24.2	24.8	32.6
Interior counties	53.0	45.5	33.3	35.8	13.7	18.7
Metropolitan area	47.5	42.3	25.2	22.6	27.3	35.1
Rural counties	53.9	45.8	30.9	33.3	15.2	20.9
1906.						
The State	41.6	36.3	39.7	37.8	18.7	25.9
Northern California	62.0	54.1	26.8	32.2	11.2	13.7
Coast counties	59.0	49.8	24.9	30.9	16.1	19.3
Interior counties	65.0	56.7	28.9	33.0	6.1	10.3
Central California	49.6	43.3	28.9	26.5	21.5	30.2
San Francisco	47.1	41.6	23.2	18.9	29.7	39.5
Other bay counties	49.8	42.1	28.3	27.1	21.9	30.8
Coast counties	52.8	45.3	31.0	29.8	16.2	24.9
Interior counties	50.4	45.2	35.2	33.2	14.4	21.6
Southern California	20.0	18.3	64.1	59.3	15.9	22.4
Los Angeles	17.6	15.6	65.9	59.8	16.5	24.6
Other counties	25.1	24.4	60.1	58.2	14.8	17.4
Northern and Central California	51.3	45.0	28.6	27.4	20.1	27.6
Coast counties	50.3	43.2	26.6	24.5	23.1	32.3
Interior counties	54.0	48.7	33.6	33.1	12.4	18.2
Metropolitan area	48.5	41.8	26.0	22.3	25.5	35.9
Rural counties	54.4	48.0	31.7	32.0	13.9	20.0

This table shows that while the per cents of white brides born in California were 40.9 and 41.6 in 1907 and 1906, the per cents of native daughters among white mothers were only 35.1 and 36.3, respectively.

The excess in the per cent born in California among brides over that among mothers was 5.8 in 1907 (40.9 against 35.1) and 5.3 in 1906 (41.6 against 36.3). A larger per cent of the white brides than of the white mothers were natives of the Golden State in every main and minor geographic division in both 1907 and 1906.

The per cents of white brides born in other states were 39.2 and 39.7 in 1907 and 1906, while the per cents born elsewhere in the United States were slightly less among white mothers, 38.2 and 37.8, respectively. The excess in the per cent born in other states for brides over that for mothers was 1.0 in 1907 (39.2 against 38.2) and 1.9 in 1906 (39.7 against 37.8). For the coast counties of Northern California and the interior counties of Central California in 1907, and for both the coast and interior counties of Northern California in 1906, the per cents born elsewhere in the United States were greater among white mothers than among white brides. But in all other cases each year a larger per cent of the white brides than of the white mothers in California were born in other states.

The per cents foreign born in 1907 and 1906 were only 19.9 and 18.7 among white brides, as compared with no less than 26.7 and 25.9 among white mothers. The per cent foreign born among mothers exceeded that among brides by 6.8 in 1907 (26.7 for mothers and 19.9 for brides) and by 7.2 in 1906 (25.9 for mothers and 18.7 for brides). In every geographic division both years a much larger per cent of the white mothers than of the white brides were foreign born.

The following table shows, for the several geographic divisions in 1907 and 1906, the results of comparing the per cent distribution, by nativity, of white brides and white mothers:

TABLE 16.—*Comparison of Per Cent Distribution, by Nativity, of White Brides and White Mothers, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Excess in Per Cent Born in California for White *Brides* over that for White *Mothers*.		Excess in Per Cent Born in Other States for White *Brides* over that for White *Mothers*.		Excess in Per Cent Foreign Born for White *Mothers* over that for White *Brides*.	
	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	5.8	5.3	1.0	1.9	6.8	7.2
Northern California	6.8	7.9	—3.0	—5.4	3.8	2.5
Coast counties	11.0	9.2	—5.8	—6.0	5.2	3.2
Interior counties	4.4	8.3	0.9	—4.1	5.3	4.2
Central California	6.5	6.3	1.0	2.4	7.5	8.7
San Francisco	4.4	5.5	3.5	4.3	7.9	9.8
Other bay counties	5.6	7.7	0.3	1.2	5.9	8.9
Coast counties	7.2	7.5	0.7	1.2	8.1	8.7
Interior counties	9.7	5.2	—3.9	2.0	5.8	7.2
Southern California	3.5	1.7	3.0	4.8	6.5	6.5
Los Angeles	3.6	2.0	3.0	6.1	6.6	8.1
Other counties	1.6	0.7	3.8	1.9	5.4	2.6
Northern and Central California	6.6	6.3	0.4	1.2	7.0	7.5
Coast counties	6.3	7.1	1.5	2.1	7.8	9.2
Interior counties	7.5	5.3	—2.5	0.5	5.0	5.8
Metropolitan area	5.2	6.7	2.6	3.7	7.8	10.4
Rural counties	8.1	6.4	—2.4	—0.3	5.7	6.1

The per cents born in California were considerably greater each year among brides than among mothers, and the per cents born in other states were likewise greater, though only slightly, among brides than among mothers. On the other hand, the per cents foreign born were much greater for white mothers than for white brides both years.

The excess in the per cent born in California for brides over that for mothers was much greater for Northern and Central California, 6.6 in 1907 and 6.3 in 1906, than for Southern California, 3.5 and 1.7, respectively. However, the proportion of native daughters among both brides and mothers is much greater anyway in the counties north of Tehachapi than in those to the south. The excess in the per cents for brides over those for mothers was somewhat less for the metropolitan area than for the rural counties north of Tehachapi in 1907, 5.2 as compared with 8.1, but was slightly greater in 1906, 6.7 against 6.4. The excess in the per cents born in California among brides over that among mothers was less each year for San Francisco (4.4 in 1907 and 5.5 in 1906) than for the other bay counties (5.6 and 7.7).

The excess in the per cent born in other states for brides over that for mothers was considerably greater for the counties south of Tehachapi than for those to the north, being 3.0 and 4.8 for the former in 1907 and 1906 against only 0.4 and 1.2 for the latter. It should be noted, though, that the proportion of both brides and mothers born in other states is particularly great for Southern California, but relatively small for Northern as well as Central California. A larger proportion of the brides than of the mothers in the metropolitan area were born elsewhere in the United States, the excess in the per cents being 2.6 for 1907 and 3.7 for 1906; in the rural counties north of Tehachapi, on the contrary, a larger proportion of the mothers than of the brides were born in other states, the excess in the per cents being 2.4 and 0.3 for 1907 and 1906, respectively. The excess in the per cent born in other states among brides over that among mothers was much greater for the metropolis proper (3.5 and 4.3) than for the suburban counties (0.3 and 1.2).

The marked excess in the per cent foreign born among mothers over that among brides was greatest in Central California (7.5 in 1907 and 8.7 in 1906); next in Southern California (6.5 each year); and least in Northern California (3.8 and 2.5). These are the geographic divisions in which the proportions foreign born among both mothers and brides are likewise greatest in the same order as here stated for the excess of foreign mothers over foreign brides. For Northern and Central California together the excess in the per cent of foreign born mothers over that of foreign born brides was 7.0 in 1907 and 7.5 in 1906. In the metropolitan area, where the foreign born element mainly abounds, the excess in the per cent of foreign born mothers over that of foreign born brides was no less than 7.8 in 1907 and 10.4 in 1906, as compared with 5.7 and 6.1, respectively, for the rural counties north of Tehachapi. Similarly, for San Francisco, with a maximum proportion of foreign born inhabitants, the excess in the per cent of foreign mothers over foreign brides was as great as 7.9 and 9.8 in 1907 and 1906, against 5.9 and 8.9, respectively, for the other bay counties.

Nativity of Single White Brides and White Mothers.—Since the marriages in which the brides were single are more often fruitful in children than those in which the brides were widowed or divorced, it may be even more instructive to compare the nativity of white mothers not merely with that of all white brides but rather with the nativity of the single white brides alone. The following table has therefore been prepared to show, for the several geographic divisions in 1907 and 1906, the per cent distribution, by nativity, of single white brides and white mothers.

TABLE 17.—*Per Cent Distribution, by Nativity, of Single White Brides and White Mothers for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Per Cent Born in California.		Per Cent Born in Other States.		Per Cent Foreign Born.	
	Single White Brides.	White Mothers.	Single White Brides.	White Mothers.	Single White Brides.	White Mothers.
1907.						
THE STATE	43.5	35.1	36.8	38.2	19.7	26.7
Northern California	64.0	52.9	25.2	31.4	10.8	15.7
Coast counties	63.2	48.0	20.2	29.0	16.6	23.0
Interior counties	64.8	56.1	30.5	33.0	4.7	10.9
Central California	51.4	42.4	25.4	26.8	23.2	30.8
San Francisco	47.4	41.3	20.1	18.4	32.5	40.3
Other bay counties	52.1	43.6	25.9	28.2	22.0	28.2
Coast counties	55.9	45.3	27.6	29.2	16.5	25.5
Interior counties	53.5	40.9	30.5	37.0	16.0	22.1
Southern California	21.5	16.4	62.6	60.8	15.9	22.8
Los Angeles	18.8	13.8	64.2	62.1	17.0	24.1
Other counties	27.0	23.3	59.4	57.4	13.6	19.3
Northern and Central California	53.2	43.9	25.4	27.5	21.4	28.6
Coast counties	52.0	43.2	23.3	24.2	24.7	32.6
Interior counties	56.3	45.5	30.5	35.8	13.2	18.7
Metropolitan area	49.7	42.3	22.9	22.6	27.4	35.1
Rural counties	57.3	45.8	28.2	33.3	14.5	20.9
1906.						
THE STATE	44.3	36.3	37.3	37.8	18.4	25.9
Northern California	66.7	54.1	22.5	32.2	10.8	13.7
Coast counties	63.7	49.8	20.5	30.9	15.8	19.3
Interior counties	69.8	56.7	24.6	33.0	5.6	10.3
Central California	52.6	43.3	26.3	26.5	21.1	30.2
San Francisco	49.4	41.6	20.7	18.9	29.9	39.5
Other bay counties	53.1	42.1	25.9	27.1	21.0	30.8
Coast counties	55.9	45.3	28.3	29.8	15.8	24.9
Interior counties	53.8	45.2	32.2	33.2	14.0	21.6
Southern California	21.4	18.3	62.9	59.3	15.7	22.4
Los Angeles	18.5	15.6	65.0	59.8	16.5	24.6
Other counties	27.7	24.4	58.3	58.2	14.0	17.4
Northern and Central California	54.6	45.0	25.8	27.4	19.6	27.6
Coast counties	53.4	43.2	23.9	24.5	22.7	32.3
Interior counties	57.7	48.7	30.3	33.1	12.0	18.2
Metropolitan area	51.4	41.8	23.4	22.3	25.2	35.9
Rural counties	58.2	48.0	28.3	32.0	13.5	20.0

When the contrast is drawn between the nativity of single white brides and of white mothers, the same excess heretofore noted in the per cents foreign born among mothers over brides is found to persist in the per cents for mothers over merely the single brides. However, while the per cents born in other states were somewhat greater for all brides than for mothers, the per cents born elsewhere in the United States are slightly less for single white brides than for the white mothers. The excess in the per cent born in California among brides as compared with mothers becomes even greater when the widowed and divorced brides are eliminated and only the single brides are considered.

It appears from the table that the per cent of single white brides born in California was no less than 43.5 in 1907 and 44.3 in 1906, while the corresponding per cents for white mothers were only 35.1 and 36.3, respectively. The excess in the per cent of native daughters among single white brides over that among mothers was as great as 8.4 in 1907 (43.5 as compared with 35.1) and was 8.0 in 1906 (44.3 as compared with 36.3). In all parts of the State both years a considerably larger proportion of the single brides than of the mothers were born in California.

The per cents of single white brides born in other states were 36.8 and 37.3 in 1907 and 1906, while the per cents of mothers born elsewhere in the United States were slightly more, 38.2 and 37.8, respectively. The excess in the per cent born in other states for mothers over that for single brides was 1.4 in 1907 (38.2 for mothers and 36.8 for brides), but was only 0.5 in 1906 (37.8 for mothers and 37.3 for brides). In San Francisco and also in Los Angeles and the rest of Southern California each year the per cent born in other states was greater for single white brides than for white mothers. But in the other geographic divisions in 1907, as well as 1906, the per cents born elsewhere in the United States were somewhat greater among mothers than among single brides.

The per cents foreign born in 1907 and 1906 were only 19.7 and 18.4 among single white brides, in contrast with as much as 26.7 and 25.9 among white mothers. The per cent foreign born for mothers surpassed that for single brides by 7.0 in 1907 (26.7 against 19.7) and by 7.5 in 1906 (25.9 against 18.4). In every geographic division each year the per cent foreign born was decidedly higher for white mothers than for single white brides.

The following table gives a measure of the contrast between the per cent distribution, by nativity, of single white brides and white mothers, for the several geographic divisions in 1907 and 1906:

TABLE 18.—*Comparison of Per Cent Distribution, by Nativity, of Single White Brides and White Mothers, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Excess in Per Cent Born in California for Single White *Brides* over that for White *Mothers*.		Excess in Per Cent Born in Other States for White *Mothers* over that for Single White *Brides*.		Excess in Per Cent Foreign Born for White *Mothers* over that for Single White *Brides*.	
	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	8.4	8.0	1.4	0.5	7.0	7.5
Northern California	11.1	12.6	6.2	9.7	4.9	2.9
Coast counties	15.2	13.9	8.8	10.4	6.4	3.5
Interior counties	8.7	13.1	2.5	8.4	6.2	4.7
Central California	9.0	9.3	1.4	0.2	7.6	9.1
San Francisco	6.1	7.8	—1.7	—1.8	7.8	9.6
Other bay counties	8.5	11.0	2.3	1.2	6.2	9.8
Coast counties	10.6	10.6	1.6	1.5	9.0	9.1
Interior counties	12.6	8.6	6.5	1.0	6.1	7.6
Southern California	5.1	3.1	—1.8	—3.6	6.9	6.7
Los Angeles	5.0	2.9	—2.1	—5.2	7.1	8.1
Other counties	3.7	3.3	—2.0	—0.1	5.7	3.4
Northern and Central California	9.3	9.6	2.1	1.6	7.2	8.0
Coast counties	8.8	10.2	0.9	0.6	7.9	9.6
Interior counties	10.8	9.0	5.3	2.8	5.5	6.2
Metropolitan area	7.4	9.6	—0.3	—1.1	7.7	10.7
Rural counties	11.5	10.2	5.1	3.7	6.4	6.5

It is only in the per cents born in California that the single white brides surpass the white mothers, though this excess is indeed very great. The per cents born outside California, whether in other states or foreign countries, are greater for mothers than for single brides, the excess being only slight in the case of other Americans but quite large in the case of the foreign born.

The excess in the per cent born in California among single brides over that among mothers was much greater for Northern and Central California, 9.3 in 1907 and 9.6 in 1906, than for Southern California, 5.1 and 3.1, respectively. In all cases, however, the proportions born in the Golden State are much greater for the counties north of Tehachapi than for those to the south. The excess in the per cents born in California for single brides over those for mothers was somewhat less for the metropolitan area (7.4 in 1907 and 9.6 in 1907) than for the rural counties north of Tehachapi (11.5 and 10.2), and was likewise less for San Francisco (6.1 and 7.8) than for the other bay counties (8.5 and 11.0).

The excess in the per cent born in other states among mothers over that among single brides is confined to Northern and Central California, being 2.1 in 1907 and 1.6 in 1906 for the whole territory north of Tehachapi. For Southern California, however, the per cent born elsewhere in the United States was higher among single brides than among mothers by 1.8 in 1907 and by 3.6 in 1906, this being the part of the State where the proportions born in other states are particularly great. In the metropolitan area, as in Southern California, the per cents born in other states were higher for single brides than for mothers by 0.3 and 1.1 in 1907 and 1906, though in the rural counties north of Tehachapi the per cents were greater for mothers than for single brides by 5.1 and 3.7, respectively. The excess in the per cents for brides in the metropolitan area, just mentioned, is confined to San Francisco, being 1.7 in 1907 and 1.8 in 1906; the excess is in the per cents for mothers (2.3 and 1.2) in the other bay counties, as in the rest of Northern and Central California outside San Francisco.

The decided excess in the per cent foreign born among mothers over that among single brides was greatest in Central California (7.6 in 1907 and 9.1 in 1906); next in Southern California (6.9 and 6.7); and least in Northern California (4.9 and 2.9). It is in these geographic divisions, in the same order as for the excess for mothers, that the per cents foreign born are relatively greatest among both mothers and brides. For Northern and Central California together the per cent foreign born among mothers exceeded that among single brides by 7.2 in 1907 and 8.0 in 1906. In the metropolitan area, where the foreign born element is especially prominent, the excess in the per cent foreign born for mothers over that for single brides was as great as 7.7 and 10.7 in 1907 and 1906, as compared with 6.4 and 6.5 for the rural counties north of Tehachapi. For San Francisco, where the foreign born population is mainly found, the excess in the per cent foreign born among mothers over that among single brides was 7.8 and 9.6 in 1907 and 1906, against 6.2 and 9.8 for the other bay counties. The excess was greater for the main city than for the suburbs in 1907, but practically the same in each case in 1906 when many San Francisco people were living across the bay on account of disturbed conditions following the great fire.

Conclusion.—The comparison of the nativity of white brides and mothers here made gives a rough measure of the relative fecundity of American and foreign born women in California. The figures indicate that in this State, as in the whole country, the foreign born women are more prone to bear children than are the American born, whether natives of California or of other states. For the proportion foreign born is much greater among mothers than among brides, whether the comparison is made for all brides or only the single ones. On the other hand, the proportion born elsewhere in the United States than California is slightly less among mothers than among all brides, though somewhat greater for mothers than for single brides alone. Similarly, the proportion born in the Golden State is considerably less among mothers than among either all or only the single brides.

However, these conclusions are only tentative, because the registration of births in California does not seem to be quite so complete as the registration of marriages. The deficiency in the registration of births is probably greatest for births in the families of Californians and other Americans, since foreign born families from training abroad appear to realize the importance of promptly registering the births of their children. This deficiency in the registration of the births of children born to American mothers may account in part for the fact that the figures for California in 1907 and 1906 indicate that the fecundity of foreign born women is greater than that of native women. However, the recent data for California agree with the results of earlier statistical investigations in other states, so that it is quite safe to conclude that foreign born women surpass the natives, whether born in California or elsewhere, in the proclivity to bear children.

TABLE 19.—*Births classified by Sex, Race, and*

REGISTRATION DISTRICT.	Total Births.	Male.	Female.
THE STATE	24,674	12,645	12,029
Northern California	2,405	1,212	1,193
Coast counties	953	475	478
Del Norte	27	10	17
Humboldt, rural	49	24	25
Eureka city	90	43	47
Lake	101	45	56
Mendocino	151	72	79
Napa, rural	61	33	28
Napa city	78	33	45
Sonoma, rural	220	117	103
Santa Rosa, city	162	91	71
Trinity	14	7	7
Interior counties	1,452	737	715
Butte	246	125	121
Colusa	88	50	38
Glenn	28	14	14
Lassen	43	19	24
Modoc	60	27	33
Nevada, rural	144	66	78
Grass Valley city	77	40	37
Placer	65	34	31
Plumas	31	14	17
Shasta	210	99	111
Sierra	29	21	8
Siskiyou	171	90	81
Sutter	92	51	41
Tehama	94	47	47
Yuba	74	40	34
Central California	14,347	7,393	6,954
San Francisco	5,128	2,633	2,495
Other bay counties	3,944	2,062	1,882
Alameda, rural	469	259	210
Alameda city	378	206	172
Berkeley town	510	264	246
Oakland city	1,824	948	876
Contra Costa	291	136	155
Marin	242	127	115
San Mateo	230	122	108
Coast counties	1,924	986	938
Monterey, rural	210	101	109
Salinas city	60	35	25
San Benito	42	17	25
San Luis Obispo	181	95	86
Santa Clara, rural	724	359	365
San José city	382	215	167
Santa Cruz, rural	57	28	29
Santa Cruz city	182	97	85
Watsonville city	86	39	47

Nativity of Mothers, for Registration Districts: 1907.

White.			Negro.	Indian.	Chinese.	Japanese.	White Mothers.			
Total.	Male.	Female.					Born in California.	Born in Other States.	Foreign Born	Unknown.
24,097	12,327	11,770	179	22	155	221	8,449	9,077	6,442	129
2,369	1,194	1,175	9	11	9	7	1,253	727	371	18
941	471	470	1	4	4	3	452	265	216	8
27	10	17	--------	--------	--------	--------	12	13	2	--------
48	24	24	--------	1	--------	--------	19	13	16	--------
89	43	46	--------	1	--------	--------	34	14	37	4
101	45	56	--------	--------	--------	--------	56	35	8	2
150	72	78	--------	1	--------	--------	83	31	35	1
57	30	27	--------	--------	3	1	20	14	23	--------
77	33	44	--------	--------	--------	1	49	16	12	--------
218	117	101	--------	1	--------	1	97	68	53	--------
161	90	71	1	--------	--------	--------	71	59	30	1
13	7	6	--------	--------	1	--------	11	2	--------	--------
1,428	723	705	8	7	5	4	801	462	155	10
242	122	120	1	2	--------	1	129	99	11	3
86	49	37	1	--------	--------	1	61	15	9	1
28	14	14	--------	--------	--------	--------	22	4	2	--------
43	19	24	--------	--------	--------	--------	25	15	3	--------
60	27	33	--------	--------	--------	--------	38	19	3	--------
142	66	76	--------	--------	2	--------	86	25	31	--------
77	40	37	--------	--------	--------	--------	46	18	12	1
64	33	31	--------	--------	--------	1	29	27	8	--------
31	14	17	--------	--------	--------	--------	13	15	3	--------
205	95	110	2	3	--------	--------	110	80	14	1
29	21	8	--------	--------	--------	--------	24	2	3	--------
170	90	80	--------	--------	1	--------	66	65	37	2
92	51	41	--------	--------	--------	--------	59	26	7	--------
91	46	45	--------	2	1	--------	47	34	9	1
68	36	32	4	--------	1	1	46	18	3	1
13,994	7,197	6,797	62	6	130	155	5,929	3,689	4,307	69
5,055	2,590	2,465	6	--------	28	39	2,088	905	2,036	26
3,784	1,982	1,802	29	1	78	52	1,649	1,051	1,068	16
458	253	205	5	--------	2	4	190	117	148	3
367	201	166	1	--------	1	9	176	91	98	2
497	259	238	1	--------	1	11	192	193	112	--------
1,704	887	817	21	1	73	25	752	489	458	5
289	135	154	1	--------	--------	1	123	78	82	6
240	126	114	--------	--------	1	1	126	38	76	--------
229	121	108	--------	--------	--------	1	90	45	94	--------
1,879	962	917	4	--------	8	33	851	543	480	5
194	93	101	--------	--------	4	12	111	39	42	2
60	35	25	--------	--------	--------	--------	30	16	14	--------
42	17	25	--------	--------	--------	--------	32	6	4	--------
179	93	86	--------	--------	1	1	104	47	28	--------
712	351	361	2	--------	2	8	266	230	214	2
374	211	163	2	--------	1	5	154	94	125	1
57	28	29	--------	--------	--------	--------	22	22	13	--------
181	97	84	--------	--------	--------	1	84	73	24	--------
80	37	43	--------	--------	--------	6	48	16	16	--------

TABLE 19.—*Births classified by Race, Sex, and Nativity*

REISTRATION DISTRICT.	Total Births.	Male.	Female.
Central California—Continued.			
Interior counties	3,351	1,712	1,639
Alpine	6	3	3
Amador	62	35	27
Calaveras	95	46	49
El Dorado	81	47	34
Fresno, rural	507	255	252
Fresno city	384	180	204
Inyo	16	6	10
Kern	144	77	67
Kings	136	57	79
Madera	108	52	56
Mariposa	14	12	2
Merced	63	36	27
Mono	2	1	1
Sacramento, rural	132	70	62
Sacramento city	442	228	214
San Joaquin, rural	174	92	82
Stockton city	231	112	119
Solano, rural	115	65	50
Vallejo city	149	67	82
Stanislaus	151	89	62
Tulare	295	155	140
Tuolumne	3	2	1
Yolo	41	25	16
Southern California	7,922	4,040	3,882
Los Angeles	5,823	2,994	2,829
Los Angeles, rural	954	475	479
Long Beach city	158	76	82
Los Angeles city	4,201	2,174	2,027
Pasadena city	440	226	214
Santa Monica city	70	43	27
Other counties	2,099	1,046	1,053
Orange	290	146	144
Riverside, rural	228	113	115
Riverside city	105	56	49
San Bernardino, rural	365	181	184
San Bernardino city	188	89	99
San Diego, rural*	148	83	65
San Diego city	332	159	173
Santa Barbara, rural	171	78	93
Santa Barbara city	129	61	68
Ventura	143	80	63
Northern and Central California	16,752	8,605	8,147
Coast counties	11,949	6,156	5,793
Interior counties	4,803	2,449	2,354
Metropolitan area	9,072	4,695	4,377
Rural counties	7,680	3,910	3,770

*Includes 6 births in Imperial County, formed August 15, 1907.

of Mothers, for Registration Districts: 1907—Continued.

White.			Negro.	Indian.	Chinese.	Japanese.	White Mothers.			
Total.	Male.	Female.					Born in California.	Born in Other States.	Foreign Born.	Unknown.
3,276	1,663	1,613	23	5	16	31	1,341	1,190	723	22
6	3	3					4	1	1	
62	35	27					40	6	13	3
93	45	48		2			62	15	16	
81	47	34					58	18	5	
496	247	249	4		2	5	111	207	177	1
377	175	202	5		1	1	102	164	111	
15	6	9	1				4	10	1	
135	68	67	2	1	3	3	52	56	27	
133	55	78	1			2	53	65	13	2
106	51	55	1	1			44	37	20	5
14	12	2					13	1		
63	36	27					31	16	16	
2	1	1						2		
128	68	60	1		2	1	47	48	33	
422	212	210	3	1	2	14	214	122	83	3
170	90	80	2			2	71	67	31	1
225	110	115	2		3	1	111	65	43	6
114	65	49				1	65	17	32	
144	66	78	1		3	1	64	39	41	
151	89	62					63	59	29	
295	155	140					110	156	28	1
3	2	1					1	2		
41	25	16					21	17	3	
7,734	3,936	3,798	108	5	16	59	1,267	4,661	1,764	42
5,671	2,907	2,764	86	2	13	51	786	3,495	1,365	25
946	469	477	1			7	167	589	187	3
157	76	81				1	27	112	11	7
4,070	2,100	1,970	73	2	13	43	547	2,427	1,083	13
429	220	209	11				31	325	71	2
69	42	27	1				14	42	13	
2,063	1,029	1,034	22	3	3	8	481	1,166	399	17
288	145	143	1			1	70	185	32	1
222	112	110	5	1			43	153	26	
94	48	46	7			4	13	57	23	1
362	180	182	3				59	222	79	2
188	89	99					43	103	37	5
146	83	63		1		1	27	82	33	4
327	156	171	3		1	1	49	198	80	
166	76	90	1	1	2	1	84	41	40	1
129	61	68					46	49	31	3
141	79	62	2				47	76	18	
16,363	8,391	7,972	71	17	139	162	7,182	4,416	4,678	87
11,659	6,005	5,654	40	5	118	127	5,040	2,764	3,800	55
4,704	2,386	2,318	31	12	21	35	2,142	1,652	878	32
8,839	4,572	4,267	35	1	106	91	3,737	1,956	3,104	42
7,524	3,819	3,705	36	16	33	71	3,445	2,460	1,574	45

TABLE 20.—*Births classified by Sex, Race, and*

Registration District.	Total Births.	Male.	Female.
The State	20,974	10,926	10,048
Northern California	2,232	1,167	1,065
Coast counties	824	425	399
Del Norte	30	20	10
Humboldt, rural	45	23	22
Eureka city	----	----	----
Lake	70	33	37
Mendocino	157	79	78
Napa, rural	63	29	34
Napa city	73	41	32
Sonoma, rural	228	115	113
Santa Rosa city	148	81	67
Trinity	10	4	6
Interior counties	1,408	742	666
Butte	257	132	125
Colusa	60	33	27
Glenn	27	11	16
Lassen	36	14	22
Modoc	70	41	29
Nevada, rural	146	80	66
Grass Valley city	109	52	57
Placer	75	46	29
Plumas	36	23	13
Shasta	157	85	72
Sierra	48	30	18
Siskiyou	193	103	90
Sutter	51	26	25
Tehama	72	39	33
Yuba	71	27	44
Central California	11,889	6,184	5,705
San Francisco	3,923	2,040	1,883
Other bay counties	2,849	1,497	1,352
Alameda, rural	351	185	166
Berkeley town	380	201	179
Oakland city	1,561	792	769
Contra Costa	180	94	86
Marin	203	120	83
San Mateo	174	105	69
Coast counties	1,831	961	870
Monterey, rural	162	83	79
Salinas city	53	28	25
San Benito	50	24	26
San Luis Obispo	168	90	78
Santa Clara, rural	682	346	336
San José city	387	213	174
Santa Cruz, rural	96	51	45
Santa Cruz city	146	82	64
Watsonville city	87	44	43

Nativity of Mothers, for Registration Districts: 1906.

White.			Negro.	Indian.	Chinese.	Japanese.	White Mothers.			
Total.	Male.	Female.					Born in California.	Born in Other States.	Foreign Born.	Unknown.
20,632	10,741	9,891	82	10	116	134	7,482	7,650	5,339	161
2,213	1,154	1,059	1	3	6	9	1,198	677	302	36
817	420	397	-------	3	2	2	407	238	158	14
30	20	10	-------	-------	-------	-------	8	20	2	-------
45	23	22	-------	-------	-------	-------	13	11	16	5
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
70	33	37	-------	-------	-------	-------	48	19	3	-------
154	77	77	-------	3	-------	-------	101	37	16	-------
63	29	34	-------	-------	-------	-------	25	15	22	1
73	41	32	-------	-------	-------	-------	38	23	8	4
224	112	112	-------	-------	2	2	107	62	52	3
148	81	67	-------	-------	-------	-------	60	50	38	-------
10	4	6	-------	-------	-------	-------	7	1	1	1
1,396	734	662	1	-------	4	7	791	439	144	22
256	131	125	-------	-------	-------	1	127	104	14	11
60	33	27	-------	-------	-------	-------	41	14	4	1
27	11	16	-------	-------	-------	-------	15	12	-------	-------
36	14	22	-------	-------	-------	-------	26	7	3	-------
70	41	29	-------	-------	-------	-------	39	28	3	-------
144	78	66	-------	-------	2	-------	84	31	29	-------
109	52	57	-------	-------	-------	-------	62	25	20	2
70	42	28	-------	-------	-------	5	31	30	9	-------
36	23	13	-------	-------	-------	-------	24	5	7	-------
156	84	72	1	-------	-------	-------	90	56	9	1
48	30	18	-------	-------	-------	-------	36	7	5	-------
193	103	90	-------	-------	-------	-------	96	66	30	1
51	26	25	-------	-------	-------	-------	28	15	6	2
72	39	33	-------	-------	-------	-------	39	30	2	1
68	27	41	-------	-------	2	1	53	9	3	3
11,668	6,066	5,602	29	3	97	92	5,052	3,024	3,523	69
3,855	2,002	1,853	3	1	32	32	1,603	702	1,522	28
2,767	1,451	1,316	8	1	43	30	1,164	742	853	8
348	184	164	-------	-------	1	2	160	80	108	-------
375	197	178	-------	-------	2	3	147	135	93	-------
1,492	756	736	7	-------	38	24	631	413	443	5
180	94	86	-------	-------	-------	-------	65	45	68	2
199	116	83	-------	1	2	1	94	37	67	1
173	104	69	1	-------	-------	-------	67	32	74	-------
1,806	948	858	2	-------	7	16	819	524	449	14
151	76	75	-------	-------	5	6	75	30	46	-------
49	25	24	-------	-------	1	3	34	9	6	-------
50	24	26	-------	-------	-------	-------	30	10	10	-------
168	90	78	-------	-------	-------	-------	91	41	36	-------
680	345	335	1	-------	-------	1	258	211	203	8
385	213	172	1	-------	1	-------	170	108	101	6
92	49	43	-------	-------	-------	4	51	27	14	-------
146	82	64	-------	-------	-------	-------	61	64	21	-------
85	44	41	-------	-------	-------	2	49	24	12	-------

TABLE 20.—*Births classified by Sex, Race, and Nativity*

Registration District.	Total Births.	Male.	Female.
Central California—Continued.			
Interior counties	3,286	1,686	1,600
Alpine	6	4	2
Amador	54	28	26
Calaveras	95	56	39
El Dorado	122	59	63
Fresno, rural	431	218	213
Fresno city	382	197	185
Inyo	11	8	3
Kern	169	95	74
Kings	125	52	73
Madera	93	44	49
Mariposa	6	4	2
Merced	52	27	25
Mono	1	1	
Sacramento, rural	148	73	75
Sacramento city	358	166	192
San Joaquin, rural	206	113	93
Stockton city	202	112	90
Solano, rural	113	49	64
Vallejo city	150	81	69
Stanislaus	165	92	73
Tulare	313	165	148
Tuolumne	11	9	2
Yolo	73	33	40
Southern California	6,853	3,575	3,278
Los Angeles	4,778	2,494	2,284
Los Angeles, rural	652	345	307
Los Angeles city	3,780	1,971	1,809
Pasadena city	346	178	168
Other counties	2,075	1,081	994
Orange	343	171	172
Riverside	356	193	163
San Bernardino, rural	376	207	169
San Bernardino city	133	70	63
San Diego, rural	154	75	79
San Diego city	263	143	120
Santa Barbara, rural	184	95	89
Santa Barbara city	173	80	93
Ventura	93	47	46
Northern and Central California	14,121	7,351	6,770
Coast counties	9,427	4,923	4,504
Interior counties	4,694	2,428	2,266
Metropolitan area	6,772	3,537	3,235
Rural counties	7,349	3,814	3,535

of Mothers, for Registration Districts: 1906.—Continued.

White.			Negro.	Indian.	Chinese.	Japanese.	White Mothers.			
Total.	Male.	Female.					Born in California.	Born in Other States.	Foreign Born.	Unknown.
3,240	1,665	1,575	16	1	15	14	1,466	1,056	699	19
6	4	2	-------	-------	-------	-------	6	-------	-------	-------
54	28	26	-------	-------	-------	-------	35	6	13	-------
95	56	39	-------	-------	-------	-------	76	9	10	-------
121	59	62	-------	-------	1	-------	90	20	9	2
427	218	209	3	-------	-------	1	127	194	106	-------
376	195	181	3	1	2	-------	111	149	115	1
11	8	3	-------	-------	-------	-------	4	7	-------	-------
167	94	73	-------	-------	-------	2	55	67	45	-------
121	49	72	2	-------	-------	2	48	57	15	1
92	43	49	-------	-------	1	-------	35	33	22	2
6	4	2	-------	-------	-------	-------	5	1	-------	-------
51	26	25	-------	-------	-------	1	20	16	15	-------
1	1	-------	-------	-------	-------	-------	1	-------	-------	-------
143	70	73	-------	-------	3	2	69	35	37	2
349	163	186	3	-------	3	3	175	83	83	8
204	113	91	-------	-------	2	-------	95	68	39	2
200	110	90	1	-------	1	-------	117	37	45	1
111	49	62	1	-------	1	-------	63	20	28	-------
148	80	68	1	-------	1	-------	79	22	47	-------
163	90	73	2	-------	-------	-------	80	50	33	-------
312	165	147	-------	-------	-------	1	120	166	26	-------
11	9	2	-------	-------	-------	-------	9	-------	2	-------
71	31	40	-------	-------	-------	2	46	16	9	-------
6,751	3,521	3,230	52	4	13	33	1,232	3,949	1,514	56
4,703	2,452	2,251	44	-------	10	21	733	2,788	1,157	25
647	342	305	2	-------	-------	3	136	383	121	7
3,716	1,934	1,782	36	-------	10	18	567	2,161	971	17
340	176	164	6	-------	-------	-------	30	244	65	1
2,048	1,069	979	8	4	3	12	499	1,161	357	31
342	171	171	-------	-------	-------	1	80	207	53	2
342	185	157	5	2	-------	7	62	208	55	17
374	206	168	1	-------	-------	1	59	250	64	1
131	70	61	1	1	-------	-------	29	80	22	-------
153	75	78	-------	1	-------	-------	33	83	30	7
262	143	119	1	-------	-------	-------	44	168	50	-------
180	93	87	-------	-------	2	2	100	37	40	3
172	80	92	-------	-------	1	-------	58	77	36	1
92	46	46	-------	-------	-------	1	34	51	7	-------
13,881	7,220	6,661	30	6	103	101	6,250	3,701	3,825	105
9,245	4,821	4,424	13	5	84	80	3,993	2,206	2,982	64
4,636	2,399	2,237	17	1	19	21	2,257	1,495	843	41
6,622	3,453	3,169	11	2	75	62	2,767	1,444	2,375	36
7,259	3,767	3,492	19	4	28	39	3,483	2,257	1,450	69

STATISTICS OF MARRIAGES: 1907 AND 1906.

SUMMARY.

Increase.—The marriages registered in California totaled 23,005 for 1907 against 21,317 for 1906, a gain of 1,688, or 7.9 per cent.

The per cent of increase was 9.7 for Northern California and 7.0 for Central California, or 7.4 for both together, against 9.2 for Southern California.

The high rate of gain for San Francisco, 17.5 per cent, in contrast with a slight decrease for the transbay counties, indicates the return of population to the peninsula.

Other high rates of gain were 12.4 per cent for the counties south of Tehachapi except Los Angeles, and 11.6 for the coast counties of Northern California.

Of the individual counties, thirty-eight showed increases in marriages, one no change, and eighteen showed slight decreases.

Marriages increased by at least one fifth, 20.0 per cent, in the following eleven counties: Inyo, Tehama, Kern, Butte, Napa, Calaveras, Mono, Orange, Madera, Humboldt, and Kings.

The increases were also above the State average, 7.9 per cent, in fourteen other counties, as follows: San Francisco, Yuba, Santa Barbara, Modoc, Fresno, Sacramento, San Bernardino, Monterey, Tulare, Nevada, Glenn, Santa Cruz, Mendocino, and San Diego.

Comparison of the ranking of the leading counties in marriages registered shows notable rises in rank for the following counties: Orange, Humboldt, Santa Barbara, Butte, Napa, Kern, Kings, and Tehama.

Marriage-rates.—For an estimated State population of 2,001,193 in 1907 and 1,882,846 in 1906, the marriage-rates are respectively 11.5 and 11.3.

The marriage-rates are higher for Southern California than for Northern and Central California. The rates are also higher for San Francisco and the other bay counties than for the rural counties north of Tehachapi.

Of the individual counties, Marin shows the highest marriage-rates, and Orange the next highest. The rates were also above the State averages for both 1907 and 1906 for the following counties: San Mateo, Sacramento, San Diego, Los Angeles, Riverside, Santa Clara, San Bernardino, Fresno, Tulare, Santa Cruz, Santa Barbara, and San Joaquin.

The statistics indicate that there is a tendency for persons living in rural counties to be married at the largest city easily accessible, but that there is also a counter movement impelling residents of large cities like San Francisco or Los Angeles to go to the suburbs to be wed.

General Marriage Statistics.—There were 17,253 marriages in 1907 and 15,790 in 1906, which were the first for both parties, the per cents being respectively 75.0 and 74.1, or a gain of 0.9 for 1907 as compared with 1906.

The proportion of first marriages was considerably higher each year for San Francisco than for any other geographic division, though not as high as for certain small counties in the interior mountains. The proportion of marriages where both parties were single is very low indeed, however, for Marin and San Mateo counties adjoining San Francisco, as well as for Orange adjoining Los Angeles.

In 1907 there were 2,320 marriages of single men with widows or divorcees, but only 1,742 marriages of single women with widowers or divorced men, the corresponding figures for 1906 being 2,238 and 1,674. Each year only a few counties showed exceptions to the rule that there are more unions of bachelors with widows than of maids with widowers.

In 1,690 cases, or 7.3 per cent of all, in 1907 and in 1,615, or 7.6 per cent, in 1906, the marriages were the second or over for both grooms and brides. Marriages where both parties were widowed or divorced occur less in the metropolis than in the suburbs, and less in the whole urban area than in sparsely settled rural counties.

In 1907 altogether 19,573, or 85.1 per cent, of the grooms were single, 2,108 widowed, and 1,324 divorced; in 1906 the single were 18,028, or 84.6 per cent, the widowed 1,988, and the divorced 1,301.

The single brides in 1907 numbered 18,995, or 82.6 per cent, the widowed 2,312, and the divorced 1,698; in 1906, 17,464, or 81.9 per cent, were single, 2,174 widowed, and 1,679 divorced.

The widows outnumbered the widowers by 204, or 9.7 per cent, in 1907 and by 186, or 9.4 per cent, in 1906. Similarly, the divorcees remarrying outnumbered the divorced men by 374, or 28.2 per cent, in 1907 and by 378, or 29.1 per cent, in 1906.

The per cents widowed and divorced, both among grooms and brides, were greater each year for the counties south of Tehachapi than for those to the north.

More widowers, as well as widows, remarry in the country districts than in urban centers and, in the latter, more remarry in the suburbs than in the metropolis proper.

Divorced men and women both marry again more in the metropolitan area than in the rural counties, though less in the main city than in the surrounding suburbs.

The high marriage-rates for suburban counties are due largely to the fact that these places are preferred by city couples, especially by divorced persons marrying once more.

Nativity of California Brides.—Of the 23,005 brides in 1907 only 413, or 1.8 per cent, were non-Caucasians, and of 21,317 in 1906 only 362, or 1.7 per cent, belonged to other than the white race, the white brides numbering 22,592 in 1907 and 20,955 in 1906.

Of the white brides in 1907, the single numbered 18,693, or 82.7 per cent; the widowed, 2,240, or 9.9 per cent; and the divorced, 1,659, or 7.4 per cent. In 1906, 17,209, or 82.1 per cent, were single; 2,104, or 10.1 per cent, widowed; and 1,642, or 7.8 per cent, divorced.

The white brides born in California numbered 9,245 in 1907 and 8,710 in 1906, and among them the per cents single were, respectively, 87.9 and 87.6; the per cents widowed, 6.1 and 5.8; and the per cents divorced, 6.0 and 6.6.

The brides born in other states totaled 8,842 in 1907 and 8,315 in 1906, among whom the per cents for the single were, respectively, 77.9 and 77.1; for the widowed, 12.1 and 12.5; and for the divorced, 10.0 and 10.4.

There were 4,505 foreign born brides in 1907 and 3,930 in 1906, among whom the per cents single were, respectively, 81.7 and 80.7; the per cents widowed, 13.5 and 14.2; and the per cents divorced, only 4.8 and 5.1.

The proportion of widows and divorcees among all white brides was somewhat greater each year for Southern California than for Northern or Central California.

Widows remarry especially in the rural counties and divorcees particularly in the metropolitan area. Both widows and divorcees, however, remarry more in suburban counties, like Marin and San Mateo, than in San Francisco, the metropolis proper.

More widows of each nativity remarry in country districts than in urban centers, but more divorcees, whether born in California, in other states, or abroad, remarry in the metropolitan area than in rural counties. In each element of the population—Californian, other American, or foreign—more divorcees, as well as widows, remarry in the suburban territory than within the metropolis itself.

Among the white brides in 1907, 9,245, or 40.9 per cent, were born in California; 8,842, or 39.2 per cent, in other states; and 4,505, or 19.9 per cent, in foreign countries. In 1906, the native daughters numbered 8,710, or 41.6 per cent; other Americans, 8,315, or 39.7 per cent; and the foreign born, 3,930, or 18.7 per cent.

In 1907 and 1906, respectively, the per cents born in California were 43.5 and 44.3 among the single white brides; 33.6 and 35.1 among the divorced; and 25.0 and 24.0 among the widowed. In all parts of the State the native daughters form the bulk of the single brides and a large proportion of the divorced, but a small proportion of the widowed.

In 1907 and 1906 the per cents born elsewhere in the United States than here were 53.5 and 52.8 among the divorced, and 47.9 and 49.4 among the widowed, against only 36.8 and 37.3 among the single white brides. In general, a larger proportion of the divorcees than of the widows remarrying in California were born elsewhere in the United States, while relatively few of the single brides here were born in other states.

The per cents foreign born in 1907 and 1906, respectively, were 27.1 and 26.6 among the widowed, as compared with 19.7 and 18.4 among the single and only 12.9 and 12.1 among the divorced. Throughout California, as a rule, the proportion of foreign born brides is highest among the widowed, and next among the single, being very low indeed among the divorced.

While the bulk of the single brides were born in California, the great bulk of the divorcees were born elsewhere in the United States, and most of the widows were likewise born outside California, either in other states or abroad. The proportion foreign born, though relatively great among widows, is especially small among divorcees, nearly all the divorced brides being natives of California or other states.

INCREASE OF MARRIAGES: 1906 TO 1907.

Geographic Divisions.—Altogether 23,005 marriages were reported by County Recorders to the California State Bureau of Vital Statistics for 1907 as compared with 21,317 for 1906, these being the first calendar years covered by the operations of the present registration law enacted in 1905. The increase of marriages for 1907 over 1906 was 1,688, a gain of 7.9 per cent.

In the counties north of Tehachapi the marriages reported for 1907 totaled 15,728 against 14,650 for 1906, an increase of 1,078, or 7.4 per cent. For Southern California the totals were 7,277 in 1907 and 6,667 in 1906, a gain of 610, or 9.2 per cent.

The per cent of increase for San Francisco was no less than 17.5. This high rate of gain indicates that the inhabitants who were driven elsewhere by the great fire in April, 1906, were reëstablishing themselves in homes in the new San Francisco throughout 1907. Confirmation appears from the fact that the group of other bay counties, instead of showing the usual increase of marriages, suffered a slight decrease for 1907 as compared with 1906. The net gain for the entire metropolitan area was thus 7.4 per cent, or the same as for the rural counties north of Tehachapi.

In Southern California, Los Angeles shows an increase in marriages of 7.6 per cent, against no less than 12.4 per cent for the surrounding counties.

The rate of gain for Northern California alone was 9.7, being as much as 11.6 for the coast counties and 7.8 for the interior counties. The corresponding rate for Central California alone was 7.0, the per cent of increase for the coast counties other than the metropolitan area being 3.3 and that for the interior counties being 7.9, or the same as for the entire State.

The table on the following page shows the number and per cent of increase in marriages for the several geographic divisions of the State, in 1906 to 1907.

TABLE 1.—*Increase of Marriages, for Geographic Divisions: 1906 to 1907.*

GEOGRAPHIC DIVISION.	Marriages.		Increase.	
	1907.	1906.	Number.	Per Cent.
THE STATE	23,005	21,317	1,688	7.9
Northern California	2,278	2,077	201	9.7
Coast counties	1,168	1,047	121	11.6
Interior counties	1,110	1,030	80	7.8
Central California	13,450	12,573	877	7.0
San Francisco	4,158	3,539	619	17.5
Other bay counties	4,169	4,217	48*	1.1*
Coast counties	1,697	1,642	55	3.3
Interior counties	3,426	3,175	251	7.9
Southern California	7,277	6,667	610	9.2
Los Angeles	4,847	4,506	341	7.6
Other counties	2,430	2,161	269	12.4
Northern and Central California	15,728	14,650	1,078	7.4
Coast counties	11,192	10,445	747	7.2
Interior counties	4,536	4,205	331	7.9
Metropolitan area	8,327	7,756	571	7.4
Rural counties	7,401	6,894	507	7.4

* Decrease.

Counties.—The table on the opposite page gives the increase (or decrease) of marriages for each county, as well as the per cent of increase for those showing gains in 1907 over 1906.

The apparently high rate of gain shown for Inyo County is due only to the fact that complete returns for 1907 are contrasted with incomplete ones for 1906.

The per cents of increase in marriages were highest for the following counties: Tehama, 39.3; Kern, 35.5; Butte, 31.4; Napa, 27.2; Calaveras, 26.8; Mono. 25.0; Orange, 21.8; Madera, 20.4; Humboldt, 20.3; Kings, 20.0; San Francisco, 17.5; Yuba, 17.1; Santa Barbara, 16.1; Modoc, 15.2; Fresno, 14.8; Sacramento, 13.9; San Bernardino, 13.4; Monterey and Tulare, each 12.6; Nevada, 12.5; Glenn, 11.1; Santa Cruz, 10.4; Mendocino, 8.5; and San Diego, 8.1. Each of these twenty-four counties shows a rate of gain above the average rate for the State, 7.9 per cent.

There were also increases in marriages, but at rates below the State average, in the following thirteen counties arranged in descending order: Los Angeles, 7.6; San Luis Obispo, 5.9; Sonoma, 4.7; Riverside, 4.2; Stanislaus, 4.0; Tuolumne, 3.3; Ventura, 3.1; Lake, 3.0; Placer, 2.3; Contra Costa and San Mateo, each 2.0; Merced, 1.3; and Santa Clara, 0.5. For Plumas County exactly the same number of marriages were reported in 1907 as in 1906.

There were decreases in marriages for 1907 as compared with 1906 in the following eighteen counties arranged alphabetically: Alameda, Alpine, Amador, Colusa, Del Norte, El Dorado, Lassen, Marin, Mariposa, San Benito, San Joaquin, Shasta, Sierra, Siskiyou, Solano, Sutter, Trinity, and Yolo. In most of these cases, however, the decreases were only slight.

TABLE 2.—*Increase of Marriages, for Counties: 1906 to 1907.*

COUNTY.	Marriages.		Increase.	Decrease.	Per Cent of Increase.
	1907.	1906.			
CALIFORNIA	23,005	21,317	1,688		7.9
Alameda	3,009	3,019		10	
Alpine		1		1	
Amador	66	74		8	
Butte	222	169	53		31.4
Calaveras	52	41	11		26.8
Colusa	34	38		4	
Contra Costa	200	196	4		2.0
Del Norte	8	12		4	
El Dorado	45	48		3	
Fresno	630	549	81		14.8
Glenn	40	36	4		11.1
Humboldt	320	266	54		20.3
Inyo	40	13	27		207.7
Kern	206	152	54		35.5
Kings	144	120	24		20.0
Lake	34	33	1		3.0
Lassen	27	33		6	
Los Angeles	4,847	4,506	341		7.6
Madera	59	49	10		20.4
Marin	703	750		47	
Mariposa	15	17		2	
Mendocino	191	176	15		8.5
Merced	81	80	1		1.3
Modoc	38	33	5		15.2
Mono	5	4	1		25.0
Monterey	196	174	22		12.6
Napa	206	162	44		27.2
Nevada	117	104	13		12.5
Orange	638	524	114		21.8
Placer	90	88	2		2.3
Plumas	21	21			
Riverside	299	287	12		4.2
Sacramento	950	834	116		13.9
San Benito	47	58		11	
San Bernardino	458	404	54		13.4
San Diego	628*	581	47		8.1
San Francisco	4,158	3,539	619		17.5
San Joaquin	470	520		50	
San Luis Obispo	196	185	11		5.9
San Mateo	257	252	5		2.0
Santa Barbara	274	236	38		16.1
Santa Clara	961	956	5		5.9
Santa Cruz	297	269	28		10.4
Shasta	144	161		17	
Sierra	8	16		8	
Siskiyou	120	127		7	
Solano	154	186		32	
Sonoma	398	380	18		4.7
Stanislaus	104	100	4		4.0
Sutter	29	33		4	
Tehama	124	89	35		39.3
Trinity	11	18		7	
Tulare	250	222	28		12.6
Tuolumne	62	60	2		3.3
Ventura	133	129	4		3.1
Yolo	93	105		12	
Yuba	96	82	14		17.1

*Includes 5 marriages in Imperial County, formed August 15, 1907.

County Totals.—The following table shows the counties for which at least 100 marriages were reported to the State Bureau of Vital Statistics in 1907 and 1906, respectively:

TABLE 3.—*Rank of Counties with at Least 100 Marriages: 1907 and 1906.*

1907.			1906.		
Rank.	County.	Marriages.	Rank.	County.	Marriages.
	THE STATE	23,005		THE STATE	21,317
1.	Los Angeles	4,847	1.	Los Angeles	4,506
2.	San Francisco	4,158	2.	San Francisco	3,539
3.	Alameda	3,009	3.	Alameda	3,019
4.	Santa Clara	961	4.	Santa Clara	956
5.	Sacramento	950	5.	Sacramento	834
6.	Marin	703	6.	Marin	750
7.	Orange	638	7.	San Diego	581
8.	Fresno	630	8.	Fresno	549
9.	San Diego	*628	9.	Orange	524
10.	San Joaquin	470	10.	San Joaquin	520
11.	San Bernardino	458	11.	San Bernardino	404
12.	Sonoma	398	12.	Sonoma	380
13.	Humboldt	320	13.	Riverside	287
14.	Riverside	299	14.	Santa Cruz	269
15.	Santa Cruz	297	15.	Humboldt	266
16.	Santa Barbara	274	16.	San Mateo	252
17.	San Mateo	257	17.	Santa Barbara	236
18.	Tulare	250	18.	Tulare	222
19.	Butte	222	19.	Contra Costa	196
20.	Kern	206	20.	Solano	186
21.	Napa	206	21.	San Luis Obispo	185
22.	Contra Costa	200	22.	Mendocino	176
23.	Monterey	196	23.	Monterey	174
24.	San Luis Obispo	196	24.	Butte	169
25.	Mendocino	191	25.	Napa	162
26.	Solano	154	26.	Shasta	161
27.	Kings	144	27.	Kern	152
28.	Shasta	144	28.	Ventura	129
29.	Ventura	133	29.	Siskiyou	127
30.	Tehama	124	30.	Kings	120
31.	Siskiyou	120	31.	Yolo	105
32.	Nevada	117	32.	Nevada	104
33.	Stanislaus	104	33.	Stanislaus	100
	Remaining 24 counties	1,001		Remaining 24 counties	977

*Includes 5 marriages in Imperial County, formed August 15, 1907.

Each year there were thirty-three counties with at least 100 marriages, Tehama replacing Yolo in the list in 1907. While there were only eighteen counties reporting 200 marriages for 1906, there were twenty-two reporting this number for 1907, the additional counties being Butte, Kern, Napa, and Contra Costa.

Comparison of the ranking of these leading counties in the number of marriages registered shows notable gains in certain cases. Thus, Orange County rose from ninth place to seventh, passing San Diego and Fresno, while Humboldt rose from fifteenth to thirteenth, passing Riverside and Santa Cruz. Santa Barbara displaced San Mateo in sixteenth place in the ranking. Butte rose from twenty-fourth place to nineteenth, passing Contra Costa, Solano, San Luis Obispo, Mendocino, and Monterey; Napa rose from twenty-fifth place to twenty-first, passing these same counties; and Kern rose from twenty-seventh place to twentieth, passing these counties and Shasta besides. Likewise, Kings rose from thirtieth place to twenty-seventh, passing Ventura and Siskiyou. Finally, Tehama rose from below thirty-third place to thirtieth, passing Siskiyou, Yolo, Nevada, and Stanislaus.

MARRIAGE-RATES: 1907 AND 1906.

Geographic Divisions.—For the purpose of calculating marriage-rates, the population of California has been estimated conservatively according to the Census Bureau method by adding to the population in 1900 six tenths of the increase between 1890 and 1900 for 1906, and seven tenths for 1907, except that for the few counties showing decreases between the last two Federal censuses the population in 1900 has been taken for both 1906 and 1907, and for the three principal cities arbitrary estimates have been made because of their exceptional conditions of growth. The estimate for San Francisco in 1906 was 450,000, for Los Angeles 200,000, and for Oakland 200,000, while for 1907 the estimates were, respectively, 450,000, 250,000, and 200,000, the estimates for San Francisco and Oakland remaining unchanged for 1907 because of possible overestimates for 1906.

For convenience in tabulation the fifty-seven counties of California have been grouped in three main and eight minor geographic divisions, shown in the table which follows, the counties in each group being arranged alphabetically for the sake of ready reference. Marriage-rates are also shown for the metropolitan area, comprising San Francisco and the other bay counties (Alameda, Contra Costa, Marin, and San Mateo), in contrast with the rural counties of Northern and Central California.

The following table gives the estimated population, marriages, and marriage-rate per 1,000 population for the several counties arranged by geographic divisions in both 1907 and 1906:

TABLE 4.—*Estimated Population, Marriages, and Marriage-rate per 1,000 Population, for Counties arranged Geographically: 1907 and 1906.*

COUNTY.	Estimated Population.		Marriages.		Marriage-rate per 1,000 Population.	
	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	2,001,193	1,882,846	23,005	21,317	11.5	11.3
Northern California	274,686	272,095	2,278	2,077	8.3	7.6
Coast counties	124,373	123,078	1,168	1,047	9.4	8.5
Del Norte	2,408	2,408	8	12	3.3	5.0
Humboldt	29,648	29,285	320	266	10.8	9.1
Lake	6,017	6,017	34	33	5.7	5.5
Mendocino	22,462	22,177	191	176	8.5	7.9
Napa	16.479	16,475	206	162	12.5	9.8
Sonoma	42,511	41,935	398	380	9.4	9.1
Trinity	4.848	4,781	11	18	2.3	3.8
Interior counties	150,313	149,017	1,110	1,030	7.4	6.9
Butte	17,117	17,117	222	169	13.0	9.9
Colusa	7,364	7,364	34	38	4.6	5.2
Glenn	5,150	5.150	40	36	7.8	7.0
Lassen	4,701	4.674	27	33	5.7	7.1
Modoc	5.139	5,130	38	33	7.4	6.4
Nevada	18,083	18,041	117	104	6.5	5.8
Placer	16,266	16,197	90	88	5.5	5.4
Plumas	4,657	4,657	21	21	4.5	4.5
Shasta	20.948	20.429	144	161	6.9	7.9
Sierra	4,017	4,017	8	16	2.0	4.0
Siskiyou	20,321	19,841	120	127	5.9	6.4
Sutter	6,178	6,136	29	33	4.7	5.4
Tehama	11,752	11,644	124	89	10.6	7.6
Yuba	8.620	8,620	96	82	11.1	9.5

TABLE 4.—*Estimated Population, Marriages, and Marriage-rate per 1,000 Population, for Counties arranged Geographically: 1907 and 1906—Continued.*

COUNTY.	Estimated Population.		Marriages.		Marriage-rate per 1,000 Population.	
	1907.	1906.	1907.	1906.	1907.	1906.
Central California	1,235,303	1,175,186	13,450	12,573	10.9	10.7
San Francisco	450,000	450,000	4,158	3,539	9.2	7.9
Other bay counties	332,936	279,528	4,169	4,217	12.5	15.1
Alameda	280,676	228,185	3,009	3,019	10.7	13.2
Contra Costa	21,218	20,765	200	196	9.4	9.4
Marin	17,543	17.280	703	750	40.1	43.4
San Mateo	13,499	13,298	257	252	19.0	19.0
Coast counties	135,566	133,967	1,697	1,642	12.5	12.3
Monterey	19,900	19,826	196	174	9.8	8.8
San Benito	6,788	6,765	47	58	6.9	8.6
San Luis Obispo	17,033	16,976	196	185	11.5	10.9
Santa Clara	68,764	67,543	961	956	14.0	14.2
Santa Cruz	23.081	22,857	297	269	12.9	11.8
Interior counties	316,801	311,691	3,426	3,175	10.8	10.2
Alpine	509	509	------	1	------	2.0
Amador	11,673	11,594	66	74	5.7	6.4
Calaveras	12.823	12,591	52	41	4.1	3.3
El Dorado	8,986	8.986	45	48	5.0	5.3
Fresno	45,168	44,123	630	549	13.9	12.4
Inyo	4,960	4,877	40	13	8.1	2.7
Kern	21,150	20,483	206	152	9.7	7.4
Kings	12.923	12,479	144	120	11.1	9.6
Madera	7,598	7,423	59	49	7.8	6.6
Mariposa	5.373	5,280	15	17	2.8	3.2
Merced	10.006	9,893	81	80	8.1	8.1
Mono	2,283	2,266	5	4	2.2	1.8
Sacramento	49,818	49,261	950	834	19.1	16.9
San Joaquin	40.228	39,546	470	520	11.7	13.2
Solano	26,381	26,061	154	186	5.8	7.1
Stanislaus	9,550	9,550	104	100	10.9	10.5
Tulare	18,375	18,375	250	222	13.6	12.1
Tuolumne	14.725	14,216	62	60	4.2	4.2
Yolo	14.272	14,178	93	105	6.5	7.4
Southern California	491,204	435,565	7.277	6,667	14.8	15.3
Los Angeles	333,481	281,243	4,847	4,506	14.5	16.0
Other counties	157,723	154,322	2,430	2,161	15.4	14.0
Orange	23,971	23,360	638	524	26.6	22.4
Riverside	21.043	20,592	299	287	14.2	13.9
San Bernardino	32,850	32,145	458	404	13.9	12.6
San Diego	41,325	40,438	*628	581	15.2	14.4
Santa Barbara	21,160	20.842	274	236	12.9	11.3
Ventura	17,374	16,945	133	129	7.7	7.6
Northern and Central California	1,509,989	1.447,281	15,728	14,650	10.4	10.1
Coast counties	1,042.875	986,573	11,192	10,445	10.7	10.6
Interior counties	467,114	460,708	4,536	4,205	9.7	9.1
Metropolitan area	782,936	729,528	8,327	7,756	10.6	10.6
Rural counties	727,053	717,753	7,401	6,894	10.2	9.6

*Includes 5 marriages in Imperial County, formed August 15, 1907.

For an estimated State population of 2,001,193 in 1907, the 23,005 marriages registered give a marriage-rate of 11.5 per 1,000 inhabitants, while for an estimated population of 1,882,846 in 1906, the 21,317 marriages represent a rate of 11.3.

The marriage-rates are higher for the counties south of Tehachapi than for those to the north, being 14.8 and 15.3 for Southern California, against 10.4 and 10.1 for Northern and Central California together in 1907 and 1906, respectively. The marriage-rates were 10.9 and 10.7 for Central California, and 8.3 and 7.6 for Northern California. In each case the rates are higher for the coast counties than for the interior counties. The rates were also higher each year for the metropolitan area, comprising San Francisco and the other bay counties, 10.6 each year, than for the rural counties of Northern and Central California, 10.2 for 1907 and 9.6 for 1906.

The rates were 14.5 and 16.0 for Los Angeles County in 1907 and 1906, and respectively 15.4 and 14.0 for the remaining counties south of Tehachapi. The other minor geographic divisions with rates above the State average are the bay counties other than San Francisco, 12.5 in 1907 and 15.1 in 1906, and the adjoining coast counties of Central California, 12.5 and 12.3 in 1907 and 1906, respectively.

Counties.—Among the individual counties, Marin adjoining San Francisco shows the highest marriage-rates, 40.1 in 1907 and 43.4 in 1906, and Orange adjoining Los Angeles shows the next highest rates, 26.6 and 22.4 for 1907 and 1906, respectively. The marriage-rates are also notably high for the following counties: San Mateo, 19.0 each year; Sacramento, 19.1 in 1907 and 16.9 in 1906; San Diego, 15.2 and 14.4, respectively; Los Angeles, 14.5 and 16.0; Riverside, 14.2 and 13.9; Santa Clara, 14.0 and 14.2; San Bernardino, 13.9 and 12.6; Fresno, 13.9 and 12.4; Tulare, 13.6 and 12.1; Santa Cruz, 12.9 and 11.8; Santa Barbara, 12.9 and 11.3; and San Joaquin, 11.7 and 13.2. These are the counties with marriage-rates above the State averages, 11.5 for 1907 and 11.3 for 1906. The rate was also above the State average for 1906 for Alameda County, 13.2 in 1906, but only 10.7 for 1907. The rates were above the State average for 1907 alone for Butte, 13.0; Napa, 12.5; and San Luis Obispo, 11.5 (10.9 in 1906). The marriage-rates were at least 10.0 per 1,000 inhabitants for the following additional counties in 1907: Kings and Yuba, each 11.1; Stanislaus, 10.9 (10.5 in 1906); Humboldt, 10.8; and Tehama, 10.6. The counties named comprise all those for which the marriage-rate was at least 10.0 per 1,000 population for one or both of the years 1907 and 1906.

The counties mentioned as having high marriage-rates will be recognized as counties having large cities. Inspection of the table also shows that in each geographic division the counties with the highest rates for the particular group are counties containing important cities or towns. Moreover, the marriage-rates are higher for the metropolitan area than for the rural counties north of Tehachapi. It seems, therefore, that there is a strong tendency for marriageable persons living in the country to go to an urban center to be married; if not to the metropolis itself, then to the largest city accessible for a satisfactory celebration of the event.

On the other hand, there is a counter movement by which couples living in metropolitan centers like San Francisco or Los Angeles select for their place of marriage not the metropolis proper, but instead a suburban city or town. This is shown by the very great proportion of marriages to resident inhabitants for Marin and San Mateo counties in the suburbs of San Francisco and for Orange County, adjoining Los Angeles. In short, country swains like to celebrate marriage in large cities, while couples belonging to a metropolis are apt to prefer the suburbs.

GENERAL MARRIAGE STATISTICS: 1907 AND 1906.

Number in Order.—The table on the following page shows the number in order of marriages, with per cents, for the three main and eight minor geographic divisions, as well as certain other groups of counties, in both 1907 and 1906.

It appears from this table that of 23,005 marriages in 1907, 17,253 were first marriages for both parties; 2,320 were first marriages for the grooms only; 1,742 were first marriages for the brides only; and 1,690 were second marriages or over for both grooms and brides. Of 21,317 marriages in 1906, there were 15,790 in which neither party had been married before; 2,238 where only the grooms were single; 1,674 where only the brides were single, and 1,615 where both grooms and brides were widowed or divorced.

The per cent of marriages which were the first for both parties was 75.0 in 1907, as compared with 74.1 in 1906, a rise of 0.9 in the per cent of first marriages. On the other hand, the per cent of marriages which were the first for the grooms only was 10.1 in 1907, against 10.5 in 1906; the per cent which were the first for the brides only was 7.6 in 1907, against 7.8 in 1906; and the per cent which were the second or over for both grooms and brides was 7.3 in 1907, against 7.6 in 1906. That is, in 1907, as compared with 1906, there was a notable gain in the proportion of marriages where both parties were single and slight decreases in the proportion of marriages where either the groom or bride, or each of them, was widowed or divorced.

TABLE 5.—*Marriage classified by Number in Order, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Total Marriages.	Number of Marriage.				Per Cent of Marriages.			
		1st of Both Parties.	1st of Groom Only.	1st of Bride Only.	2d or Over of Both.	1st of Both Parties.	1st of Groom Only.	1st of Bride Only.	2d or Over of Both
1907.									
THE STATE	23.005	17,253	2,320	1,742	1,690	75.0	10.1	7.6	7.3
Northern California	2,278	1,754	206	157	161	77.0	9.0	6.9	7.1
Coast counties	1,168	897	106	82	83	76.8	9.1	7.0	7.1
Interior counties	1,110	857	100	75	78	77.2	9.0	6.8	7.0
Central California	13,450	10,264	1,354	945	887	76.3	10.1	7.0	6.6
San Francisco	4,158	3,316	372	281	189	79.8	8.9	6.8	4.5
Other bay counties	4,169	3,045	466	345	313	73.0	11.2	8.3	7.5
Coast counties	1,697	1,299	169	108	121	76.5	10.0	6.4	7.1
Interior counties	3,426	2,604	347	211	264	76.0	10.1	6.2	7.7
Southern California	7,277	5,235	760	640	642	71.9	10.5	8.8	8.8
Los Angeles	4,847	3,541	479	418	409	73.1	9.9	8.6	8.4
Other counties	2,430	1,694	281	222	233	69.7	11.6	9.1	9.6
Northern and Central California	15,728	12,018	1,560	1,102	1,048	76.4	9.9	7.0	6.7
Coast counties	11,192	8,557	1,113	816	706	76.5	9.9	7.3	6.3
Interior counties	4,536	3,461	447	286	342	76.3	9.9	6.3	7.5
Metropolitan area	8,327	6,361	838	626	502	76.4	10.1	7,5	6.0
Rural counties	7,401	5,657	722	476	546	76.4	9.8	6.4	7.4
1906.									
THE STATE	21,317	15,790	2,238	1,674	1,615	74.1	10.5	7.8	7.6
Northern California	2,077	1,600	201	133	143	77.0	9.7	6.4	6.9
Coast counties	1,047	809	101	67	70	77.3	9.6	6.4	6.7
Interior counties	1,030	791	100	66	73	76.8	9.7	6.4	7.1
Central California	12,573	9,377	1,362	946	888	74.6	10.8	7.5	7.1
San Francisco	3,539	2,742	353	255	189	77.5	10.0	7.2	5.3
Other bay counties	4,217	3,026	515	336	340	71.7	12.2	8.0	8.1
Coast counties	1,642	1,208	172	144	118	73.6	10.5	8.8	7.1
Interior counties	3,175	2,401	322	211	241	75.6	10.1	6.7	7.6
Southern California	6,667	4,813	675	595	584	72.2	10.1	8.9	8.8
Los Angeles	4,506	3,329	417	383	377	73.9	9.2	8.5	8.4
Other counties	2.161	1,484	258	212	207	68.7	11.9	9.8	9.6
Northern and Central California	14,650	10,977	1,563	1,079	1,031	74.9	10.7	7.4	7.0
Coast counties	10,445	7,785	1,141	802	717	74.5	10.9	7.7	6.9
Interior counties	4,205	3,192	422	277	314	75.9	10.0	6.6	7.5
Metropolitan area	7,756	5,768	868	591	529	74.4	11.2	7.6	6.8
Rural counties	6,894	5,209	695	488	502	75.5	10.1	7.1	7.3

The per cent of first marriages for both parties was highest each year for Northern California, next for Central California, and lowest for Southern California. The per cents for Northern and Central California together were 76.4 in 1907 and 74.9 in 1906, as compared with respectively 71.9 and 72.2 for the counties south of Tehachapi.

The per cents of first marriages are not far from the same for the metropolitan area as for the rural counties of Northern and Central California, being 76.4 for each group in 1907 and 74.4 for the metropolitan area, against 75.5 for the rural counties in 1906. However, in the metropolitan area there are wide differences between the per cents for San Francisco and for the other bay counties, the per cents for the metropolis proper being no less than 79.8 and 77.5 in 1907 and 1906 (or the highest among geographic divisions), but only 73.0 and 71.7, respectively, for the group of suburban counties (Alameda, Contra Costa, Marin, and San Mateo). Similarly, the per cents of first marriages were 73.1 and 73.9 for Los Angeles in 1907 and 1906, but as low as 69.7 and 68.7 for the other counties of Southern California.

The proportion of marriages where both parties were single is very high for certain small counties. Thus, all of the few marriages in Sierra County in 1907 and in Alpine and Mariposa in 1906 were first marriages for both parties, while the per cent of first marriages was also very high in 1906 for El Dorado (91.7), Inyo (92.3), and Plumas (95.2).

The per cents of first marriages, however, are very low indeed for individual counties adjoining San Francisco and Los Angeles. Thus, for counties adjoining San Francisco, the per cents were only 66.9 and 66.3 for San Mateo in 1907 and 1906, and as low as 64.0 and 61.3, respectively, for Marin. Likewise the per cents of first marriages for Orange county adjoining Los Angeles were only 66.8 in 1907 and 65.3 in 1906. There are only a few other counties in the State where in 1907 or 1906 less than 70.0 per cent of the marriages were first marriages for both parties, the additional counties in 1907 being Del Norte, Madera, Riverside, San Diego, and Santa Barbara, and in 1906 Kern, San Diego, San Joaquin, Santa Barbara, and Santa Cruz.

In 1907 there were 2,320 marriages which were the first for only the grooms, as compared with only 1,742 which were the first for only the brides. Similarly in 1906 the first marriages for only the grooms numbered 2,238, against only 1,674 for first marriages of the brides alone. The excess of first marriages of grooms only over first marriages of brides only was 578, or 33.2 per cent, in 1907 and 564, or 33.7 per cent, in 1906. In other words, the number of single men marrying widowed or divorced women is about one third greater than the number of single women marrying widowed or divorced men. No main or minor geographic division of California shows any departure from this rule that there are more unions of bachelors with widows than of maids with widowers. There were exceptions to the rule, and only slight exceptions at that, for only ten counties in 1907 (Colusa, Lake, Lassen, Nevada, Riverside, San Benito, Sutter, Tehama, Ventura, and Yuba), and for only seven in 1906 (Kings, Lake, Lassen, San Benito, Siskiyou, Sutter, and Tuolumne). In five other counties in 1907 (Calaveras, Inyo, Merced, Modoc, and Tuolumne) and in three others in 1906 (Nevada, San Bernardino, and Santa Barbara) there were exactly the same number of marriages where only the grooms were single as where only the brides were single. But in all the remaining counties of the State the rule holds good that there are many more marriages between bachelors and widows than between maidens and widowers.

The per cent of marriages which were the second or over for both grooms and brides (7.3 for the State in 1907, against 7.6 in 1906) is higher for the counties south of Tehachapi than for those to the north. The per cent for Southern California was 8.8 each year, while for Northern and Central California together it was only 6.7 in 1907 and 7.0 in 1906. The per cent of marriages where both parties were widowed or divorced was highest of all, 9.6 each year, for the counties of Southern California other than Los Angeles, being 8.4 for Los Angeles alone each year. In Northern and Central California the per cents for the rural counties were 7.4 and 7.3 in 1907 and 1906, as compared with only 6.0 and 6.8, respectively, for the metropolitan area. Moreover, in the metropolitan area the per cents were no less than 7.5 in 1907 and 8.1 in 1906 for the suburban counties, against only 4.5 and 5.3, respectively, or the lowest of all each year, for San Francisco alone. Marriages between widowed or divorced men and women occur less in San Francisco than in the suburbs, and less in a metropolitan center such as either San Francisco or Los Angeles than in sparsely settled rural counties. Thus, the counties in which at least one tenth of the marriages were between widowers and widows were in 1907 Del Norte, Inyo, Marin, San Diego, San Mateo, Siskiyou, and Tulare, and in 1906 Lake, Marin, Mono, Orange, San Bernardino, Solano, Tehama, and Tuolumne.

Status of Grooms.—The table which follows gives for each geographic division in 1907 and 1906 the civil status or marital condition of the grooms—whether single, widowed, or divorced—at the time of marriage:

TABLE 6.—*Grooms classified by Marital Condition, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Grooms.				Per Cent.		
	Totals.	Single.	Widowed	Divorced.	Single.	Widowed	Divorced.
1907.							
THE STATE	23,005	19,573	2,108	1,324	85.1	9.2	5.7
Northern California	2,278	1,960	198	120	86.0	8.7	5.3
Coast counties	1,168	1,003	107	58	85.9	9.1	5.0
Interior counties	1,110	957	91	62	86.2	8.2	5.6
Central California	13,450	11,618	1,087	745	86.4	8.1	5.5
San Francisco	4,158	3,688	279	191	88.7	6.7	4.6
Other bay counties	4,169	3,511	368	290	84.2	8.8	7.0
Coast counties	1,697	1,468	144	85	86.5	8.5	5.0
Interior counties	3,426	2,951	296	179	86.1	8.7	5.2
Southern California	7,277	5,995	823	459	82.4	11.3	6.3
Los Angeles	4,847	4,020	540	287	82.9	11.2	5.9
Other counties	2,430	1,975	283	172	81.3	11.6	7.1
Northern and Central California	15,728	13,578	1,285	865	86.3	8.2	5.5
Coast counties	11,192	9,670	898	624	86.4	8.0	5.6
Interior counties	4,536	3,908	387	241	86.2	8.5	5.3
Metropolitan area	8,327	7,199	647	481	86.4	7.8	5.8
Rural counties	7,401	6,379	638	384	86.2	8.6	5.2

TABLE 6.—*Grooms classified by Marital Condition, with Per Cents, for Geographic Divisions: 1907 and 1906—Continued.*

GEOGRAPHIC DIVISION.	Grooms.				Per Cent.		
	Totals.	Single.	Widowed	Divorced.	Single.	Widowed	Divorced.
1906.							
THE STATE	21,317	18,028	1,988	1,301	84.6	9.3	6.1
Northern California	2,077	1,801	197	79	86.7	9.5	3.8
Coast counties	1,047	910	95	42	86.9	9.1	4.0
Interior counties	1,030	891	102	37	86.5	9.9	3.6
Central California	12,573	10,739	1,054	780	85.4	8.4	6.2
San Francisco	3,539	3,095	261	183	87.4	7.4	5.2
Other bay counties	4,217	3,541	376	300	84.0	8.9	7.1
Coast counties	1,642	1,380	146	116	84.0	8.9	7.1
Interior counties	3,175	2,723	271	181	85.8	8.5	5.7
Southern California	6,667	5,488	737	442	82.3	11.1	6.6
Los Angeles	4,506	3,746	470	290	83.2	10.4	6.4
Other counties	2,161	1,742	267	152	80.6	12.4	7.0
Northern and Central California	14,650	12,540	1,251	859	85.6	8.5	5.9
Coast counties	10,445	8,926	878	641	85.5	8.4	6.1
Interior counties	4,205	3,614	373	218	85.9	8.9	5.2
Metropolitan area	7,756	6,636	637	483	85.6	8.2	6.2
Rural counties	6,894	5,904	614	376	85.6	8.9	5.5

The table shows that of 23,005 grooms in 1907, 19,573, or 85.1 per cent, were single; 2,108, or 9.2 per cent, were widowed; and 1,324, or 5.7 per cent, were divorced. Of the 21,317 grooms in 1906, the single numbered 18,028, or 84.6 per cent; the widowed 1,988, or 9.3 per cent; and the divorced 1,301, or 6.1 per cent. There was an increase of 0.5 in the per cent single for 1907 as compared with 1906, offset by a drop of 0.1 in the per cent widowed and of 0.4 in the per cent divorced.

Relatively more grooms were single in Northern and Central California than in Southern California. The per cent single for the counties north of Tehachapi was 86.3 in 1907 and 85.6 in 1906, while for the counties to the south the per cents were only 82.4 and 82.3, respectively. There is virtually no difference between the per cents for the metropolitan area and for the rural counties of Northern and Central California, the per cents differing by only 0.2 (86.4 against 86.2) in 1907, and being exactly the same (85.6) in 1906. Within the metropolitan area, however, there are wide differences between the per cents for San Francisco and for the other bay counties. The per cent of single grooms in the metropolis proper was 88.7 in 1907 and 87.4 in 1906, these being the maximum per cents among geographic divisions, while for the suburban counties the per cents were, respectively, 84.2 and 84.0, or the lowest outside Southern California. The per cents single were 82.9 and 83.2 for Los Angeles in 1907 and 1906, but only 81.3 and 80.6, respectively, for the other counties south of Tehachapi.

The individual counties in which at least 90.0 per cent of the grooms were single were (in 1907) Contra Costa, Glenn, Mariposa, Mono, Monterey, Sierra, Solano, Trinity, and Yolo, and (in 1906) Alpine, Amador, Calaveras, Del Norte, El Dorado, Inyo, Madera, Mariposa, Merced, Modoc, Plumas, Sierra, Stanislaus, and Trinity. On the other hand, those in which only 80.0 per cent or less of the grooms were single were Del Norte, Marin, Riverside, and Sutter, in 1907, and Marin, Mono, Orange, San Diego, Santa Barbara, and Tuolumne in 1906.

The proportion of widowers among the grooms is much greater for Southern California than for Northern or Central California. The per cent widowed for the counties south of Tehachapi was 11.3 in 1907 and 11.1 in 1906, as compared with only 8.2 and 8.5, respectively, for the counties to the north. The per cents were 11.2 and 10.4 for Los Angeles in 1907 and 1906, against 11.6 and 12.4 for the other counties south of Tehachapi. Similarly, the per cents were only 7.8 and 8.2 for the metropolitan area, as compared with 8.6 and 8.9 for the rural counties of Northern and Central California. In the metropolitan area, moreover, the per cents widowed were only 6.7 and 7.4 for San Francisco, against 8.8 and 8.9 for the other bay counties. More widowers remarry in the rural counties than in metropolitan centers, and in the metropolitan district more remarry in the suburbs than in the main city.

The counties in which widowers formed at least one tenth (10.0 per cent) of all grooms in 1907 were: Del Norte, Inyo, Madera, Merced, Napa, San Benito, Sutter, Tehama, Tulare, and Yuba, north of Tehachapi; and Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Santa Barbara in Southern California. In 1906 the counties in which 10.0 per cent or more of the grooms were widowers were: Butte, Kern, Lake, Lassen, Nevada, Santa Cruz, Siskiyou, Solano, Sonoma, Sutter, Tehama, and Tuolumne, in Northern and Central California; and Los Angeles, Orange, San Bernardino, San Diego, Santa Barbara, and Ventura, south of Tehachapi.

The proportion of divorced grooms, as of the widowed, is greater for the counties south of Tehachapi than for those to the north. The per cents divorced in 1907 and 1906, respectively, were 6.3 and 6.6 for Southern California, as compared with 5.5 and 6.2 for Central California and 5.3 and 3.8 for Northern California, or 5.5 and 5.9 for both together. The per cents were 5.9 and 6.4 for Los Angeles in 1907 and 1906, against 7.1 and 7.0, respectively, for the other counties of Southern California. North of Tehachapi, on the other hand, the per cents divorced are greater for the metropolitan area than for the rural counties, being 5.8 and 6.2 for the former, against 5.2 and 5.5 for the latter. In the metropolitan area, however, the per cents divorced are much less for San Francisco than for the suburbs, being only 4.6 and 5.2 for the metropolis proper, as compared with 7.0 and 7.1 for the other bay counties. While more divorced men remarry in urban centers than in country districts, not nearly so many remarry in the main city as in the surrounding suburbs.

The individual counties in which at least 7.5 per cent of the grooms were divorced were (in 1907) Calaveras, Del Norte, El Dorado, Lake, Marin, Plumas, Riverside, San Diego, San Mateo, Santa Barbara, Siskiyou, and Stanislaus, and (in 1906) Marin, Mono, Orange, Placer, San Joaquin, San Mateo, Santa Barbara, and Santa Clara. The per cent of divorced grooms was especially high each year for Marin (10.2 in 1907 and 10.3 in 1906) and for San Mateo (10.1 and 9.1) in the suburbs of San Francisco.

Status of Brides.—The following table shows for the several geographic divisions in 1907 and 1906 the civil status or marital condition of the brides—whether single, widowed, or divorced—on the wedding day:

TABLE 7.—*Brides classified by Marital Condition, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Brides.				Per Cent.		
	Total.	Single.	Widowed	Divorced	Single.	Widowed	Divorced
1907.							
THE STATE	23,005	18,995	2,312	1,698	82.6	10.0	7.4
Northern California	2,278	1,911	238	129	83.9	10.4	5.7
Coast counties	1,168	979	122	67	83.8	10.5	5.7
Interior counties	1,110	932	116	62	84.0	10.4	5.6
Central California	13,450	11,209	1,273	968	83.3	9.5	7.2
San Francisco	4,158	3,597	337	224	86.5	8.1	5.4
Other bay counties	4,169	3,390	409	370	81.3	9.8	8.9
Coast counties	1,697	1,407	181	109	82.9	10.7	6.4
Interior counties	3,426	2,815	346	265	82.2	10.1	7.7
Southern California	7,277	5,875	801	601	80.7	11.0	8.3
Los Angeles	4,847	3,959	503	385	81.7	10.4	7.9
Other counties	2,430	1,916	298	216	78.8	12.3	8.9
Northern and Central California	15,728	13,120	1,511	1,097	83.4	9.6	7.0
Coast counties	11,192	9,373	1,049	770	83.7	9.4	6.9
Interior counties	4,536	3,747	462	327	82.6	10.2	7.2
Metropolitan area	8,327	6,987	746	594	83.9	9.0	7.1
Rural counties	7,401	6,133	765	503	82.9	10.3	6.8
1906.							
THE STATE	21,317	17,464	2,174	1,679	81.9	10.2	7.9
Northern California	2,077	1,733	206	138	83.4	9.9	6.7
Coast counties	1,047	876	96	75	83.7	9.2	7.1
Interior counties	1,030	857	110	63	83.2	10.7	6.1
Central California	12,573	10,323	1,228	1,022	82.1	9.8	8.1
San Francisco	3,539	2,997	293	249	84.7	8.3	7.0
Other bay counties	4,217	3,362	462	393	79.7	11.0	9.3
Coast counties	1,642	1,352	161	129	82.3	9.8	7.9
Interior counties	3,175	2,612	312	251	82.3	9.8	7.9
Southern California	6,667	5,408	740	519	81.1	11.1	7.8
Los Angeles	4,506	3,712	480	314	82.4	10.6	7.0
Other counties	2,161	1,696	260	205	78.5	12.0	9.5
Northern and Central California	14,650	12,056	1,434	1,160	82.3	9.8	7.9
Coast counties	10,445	8,587	1,012	846	82.2	9.7	8.1
Interior counties	4,205	3,469	422	314	82.5	10.0	7.5
Metropolitan area	7,756	6,359	755	642	82.0	9.7	8.3
Rural counties	6,894	5,697	679	518	82.6	9.9	7.5

It appears from this table that of 23,005 brides in 1907, the single numbered 18,995, or 82.6 per cent; the widowed 2,312, or 10.0 per cent; and the divorced 1,698, or 7.4 per cent. Of the 21,317 brides in 1906, 17,464, or 81.9 per cent, were single; 2,174, or 10.2 per cent, were widowed; and 1,679, or 7.9 per cent, were divorced. For 1907 as compared with 1906 there was a rise of 0.7 in the per cent single, and on the other hand, a drop of 0.2 in the per cent widowed and of 0.5 in the per cent divorced.

It may be noted that in 1907 the widowed grooms numbered only 2,108, against 2,312 for the brides, and that in 1906 the widowers totaled 1,988 and the widows 2,174. That is, the widows outnumbered the widowers by 204, or 9.7 per cent, in 1907 and by 186, or 9.4 per cent, in 1906. In 1907 the divorced grooms numbered only 1,324 and the brides 1,698, while in 1906, similarly, the divorced men remarrying totaled 1,301 and the women 1,679. In other words, the number of divorced women remarrying exceeded that of divorced men by 374, or 28.2 per cent, in 1907 and by 378, or 29.1 per cent, in 1906.

The per cent single among brides was highest in both 1907 and 1906 for Northern California (83.9 and 83.4), next for Central California (83.3 and 82.1), and lowest for Southern California (80.7 and 81.1). The per cent single for Northern and Central California together was 83.4 in 1907 and 82.3 in 1906. The per cent for the metropolitan area surpassed that for the rural counties by 1.0 in 1907 (83.9 against 82.9), but fell short by 0.6 in 1906 (82.0 against 82.6). The per cent of single brides for San Francisco was 86.5 in 1907 and 84.7 in 1906, these being the maximum per cents among geographic divisions. At the same time, the per cents for the other bay counties were only 81.3 and 79.7, respectively, or the lowest outside Southern California. The per cents single were 81.7 and 82.4 for Los Angeles in 1907 and 1906, but only 78.8 and 78.5, respectively, for the other counties south of Tehachapi.

The individual counties in which at least 90.0 per cent of the brides were single were Colusa, Glenn, Lassen, and Sierra in 1907, and Alpine, El Dorado, Inyo, Kings, Lassen, Mariposa, and Plumas in 1906. On the other hand, the counties in which only 80.0 per cent or less of the brides were single were (in 1907) Del Norte, Madera, Marin, Mariposa, Mono, Orange, Sacramento, San Diego, San Mateo, Santa Barbara, Shasta, and Trinity, and (in 1906) Kern, Marin, Mono, Orange, San Diego, San Joaquin, San Mateo, Santa Barbara, Santa Cruz, Shasta, Solano, Tehama, and Ventura.

The proportion of widows among the brides, as of widowers among grooms, is higher for Southern California than for Northern or Central California. The per cent of widowed brides for the counties south of Tehachapi was 11.0 in 1907 and 11.1 in 1906, as compared with 9.6 and 9.8, respectively, for the counties to the north. The per cents were 10.4 and 10.6 for Los Angeles in 1907 and 1906, against no less than 12.3 and 12.0 for the other counties of Southern California. In 1906 the per cent widowed was 9.7 for the metropolitan area, against 9.9 for the rural counties north of Tehachapi, while in 1907 the per cent for the metropolitan area was only 9.0, against 10.3 for the rural counties. The per cents for San Francisco were only 8.1 and 8.3 in

1907 and 1906, as compared with 9.8 and 11.0 for the other bay counties. As with widowers, so with widows, somewhat more remarry in the country districts than in urban centers, and, in the latter, more remarry in the suburbs than in the metropolis proper.

The counties in which widows formed at least one tenth (10.0 per cent) of all brides in 1907 were: Butte, Del Norte, El Dorado, Inyo, Madera, Marin, Mariposa, Mendocino, Mono, Placer, Sacramento, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Siskiyou, Solano, Sonoma, Stanislaus, Trinity, Tuolumne, and Yuba in Northern and Central California; and Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Santa Barbara in Southern California. In 1906 the counties in which 10.0 per cent or more of the brides were widows were: north of Tehachapi—Alameda, Amador, Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Madera, Marin, Monterey, Placer, Sacramento, San Joaquin, San Mateo, Santa Cruz, Shasta, Siskiyou, Solano, Sonoma, Tehama, Trinity, and Tuolumne; and south of Tehachapi—Los Angeles, Orange, San Bernardino, San Diego, Santa Barbara, and Ventura.

Generally speaking, the proportion of divorced brides, as of the grooms, is somewhat greater for Southern California than for Northern or Central California. The per cents divorced among brides in 1907 and 1906, respectively, were 8.3 and 7.8 for the counties south of Tehachapi, against 5.7 and 6.7 for Northern California, and 7.2 and 8.1 for Central California, or 7.0 and 7.9 for all north of Tehachapi. The per cents were 7.9 and 7.0 for Los Angeles in 1907 and 1906, as compared with no less than 8.9 and 9.5 for the other counties of Southern California. North of Tehachapi, on the contrary, the per cents divorced among brides (as among grooms) are greater for the metropolitan area than for the rural counties, the per cents for brides being 7.1 and 8.3 for the urban district, against 6.8 and 7.5 for the country districts as a whole. Within the metropolitan area, however, the per cent of divorced brides (as of grooms) is much less for San Francisco than for the other bay counties, the per cents divorced among brides being only 5.4 and 7.0 for the metropolis proper, against as much as 8.9 and 9.3 for the suburban territory. Divorced women, like divorced men, remarry more in the metropolitan area than in the rural counties, but less in the city itself than in the adjacent suburbs.

The individual counties in which at least 7.5 per cent of all brides in 1907 were divorced were: Amador, Calaveras, Del Norte, Kern, Madera, Marin, Plumas, Sacramento, San Benito, San Joaquin, San Mateo, Sutter, and Trinity in Northern and Central California, and all the counties of Southern California—Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura. The counties with 7.5 per cent or more divorced brides in 1906 were: north of Tehachapi—Alameda, Del Norte, Kern, Lake, Madera, Marin, Mono, Monterey, Napa, Placer, Sacramento, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Solano, Sutter, and Yolo; and south of Tehachapi—Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Santa Barbara. The per cent of divorced brides was particularly high each year for Marin (13.9 in 1907 and 14.5 in 1906) and for San Mateo (14.4 and 12.3) adjoining San Francisco, as well as for Orange (10.2 and 12.6) adjoining Los Angeles.

In general, the proportion of the widowed and divorced, both among grooms and brides, is notably high for counties like Marin and San Mateo in the north and Orange in the south, adjacent to the great cities of San Francisco and Los Angeles. Analysis of marriage-rates showed there is a tendency on the part of many couples belonging to these cities to go to the suburbs to be married. This preference for a suburban town rather than the city proper as a place of marriage is most marked in the case of widowed and divorced persons marrying again, especially in the case of the divorced. The shy divorcee even more than the coy maiden seeks the quiet or secrecy of a suburban Gretna Green.

NATIVITY OF CALIFORNIA BRIDES: 1907 AND 1906.

Race and Nativity.—The table below gives for California in 1907 and 1906 a classification of brides by race, nativity, and marital condition, as well as the per cent distribution by marital condition. The white brides of unknown nativity numbered only 161, or 0.7 per cent, in 1907 and 222, or 1.1 per cent, in 1906. These few have accordingly been included throughout with brides born elsewhere in the United States than California:

TABLE 8.—*Brides classified by Race, Nativity, and Marital Condition, with Per Cent Distribution by Marital Condition, for California: 1907 and 1906.*

RACE OR NATIVITY.	Brides.				Per Cent.		
	Total.	Single.	Widowed	Divorced.	Single.	Widowed	Divorced.
1907.							
THE STATE	23,005	18,995	2,312	1,698	82.6	10.0	7.4
White	22,592	18,693	2,240	1,659	82.7	9.9	7.4
Born in California	9,245	8,127	561	557	87.9	6.1	6.0
Born in other states*	8,842	6,883	1,072	887	77.9	12.1	10.0
Foreign born	4,505	3,683	607	215	81.7	13.5	4.8
Non-Caucasian	413	302	72	39	73.1	17.4	9.5
1906.							
THE STATE	21,317	17,464	2,174	1,679	81.9	10.2	7.9
White	20,955	17,209	2,104	1,642	82.1	10.1	7.8
Born in California	8,710	7,628	505	577	87.6	5.8	6.6
Born in other states*	8,315	6,410	1,039	866	77.1	12.5	10.4
Foreign born	3,930	3,171	560	199	80.7	14.2	5.1
Non-Caucasian	362	255	70	37	70.5	19.3	10.2

* Includes those of unknown nativity, numbering only 161, or 0.7 per cent, in 1907 and 222, or 1.1 per cent, in 1906.

Considering first the non-Caucasian brides, one will observe that among them the per cents single were 73.1 in 1907 and 70.5 in 1906; the per cents widowed, 17.4 and 19.3; and the per cents divorced, 9.5 and 10.2. These per cents differ greatly from the per cents for white brides, the proportion of single brides among the non-Caucasians being relatively small and the proportion widowed rather great. However, the numbers from which the per cents were calculated are themselves too small for the per cents to be very significant, especially as the non-Caucasians in California comprise widely different races, such as the Chinese and Japanese on one hand and negroes and Indians on the other. The 413 non-Caucasian brides in 1907 form only 1.8 per cent of the State total, and the 362 in 1906 form only 1.7 per cent. Of all the single brides, the non-Caucasians were only 1.6 and 1.5 per cent in 1907 and 1906; of the widowed, only 3.1 and 3.2 per cent; and of the divorced, only 2.3 and 2.2 per cent. On account of the small proportion of non-Caucasians among California brides, attention will be directed in the following discussion only to the facts for whites.

Of the 22,592 white brides in 1907, 18,693, or 82.7 per cent, were single; 2,240, or 9.9 per cent, widowed; and 1,659, or 7.4 per cent, divorced. Among the 20,955 in 1906, the single were 17,209, or 82.1 per cent; the widowed 2,104, or 10.1 per cent; and the divorced 1,642, or 7.8 per cent. For 1907 as compared with 1906 there was a rise of 0.6 in the per cent single, with declines of 0.2 and 0.4 in the per cents widowed and divorced.

Among the white brides in 1907, 9,245 were born in California, and of these, 8,127, or 87.9 per cent, were single; 561, or 6.1 per cent, widowed; and 557, or 6.0 per cent, divorced. Among the 8,710 brides in 1906 who were natives of this State, the single were 7,628, or 87.6 per cent; the widowed 505, or 5.8 per cent; and the divorced 577, or 6.6 per cent. The per cents single and widowed each increased to the extent of 0.3, while there was a decrease of 0.6 in the per cent divorced.

Including the few of unknown nativity, altogether 8,842 of the brides in 1907 were born elsewhere in the United States than California, and among them the single were 6,883, or 77.9 per cent; the widowed 1,072, or 12.1 per cent; and the divorced 887, or 10.0 per cent. Of the 8,315 white brides in 1906 who were born in other states, 6,410, or 77.1 per cent, were single; 1,039, or 12.5 per cent, widowed; and 866, or 10.4 per cent, divorced. There was an increase of 0.8 in the per cent single, with decreases of 0.4 in each case in the per cents widowed and divorced.

Of the white brides in 1907, the foreign born numbered 4,505, of whom the single were 3,683, or 81.7 per cent; the widowed 607, or 13.5 per cent; and the divorced 215, or only 4.8 per cent. Of the 3,930 foreign born brides in 1906, 3,171, or 80.7 per cent, were single; 560, or 14.2 per cent, widowed; and only 199, or 5.1 per cent, divorced. There was an increase of 1.0 in the per cent single, counterbalanced by decreases of 0.7 in the per cent widowed and 0.3 in the per cent divorced.

Status of White Brides.—The table on the following page shows, by numbers and per cents, the civil status or marital condition of the white brides at the time of marriage—whether single, widowed, or divorced—for the several geographic divisions of the State in both 1907 and 1906.

TABLE 9.—*White Brides classified by Marital Condition, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	White Brides.				Per Cent.		
	Total.	Single.	Widowed	Divorced	Single.	Widowed	Divorced
1907.							
THE STATE	22,592	18,693	2,240	1,659	82.7	9.9	7.4
Northern California	2,256	1,890	237	129	83.8	10.5	5.7
Coast counties	1,163	974	122	67	83.7	10.5	5.8
Interior counties	1,093	916	115	62	83.8	10.5	5.7
Central California	13,253	11,053	1,246	954	83.4	9.4	7.2
San Francisco	4,095	3,540	334	221	86.4	8.2	5.4
Other bay counties	4,101	3,340	396	365	81.4	9.7	8.9
Coast counties	1,680	1,394	178	108	83.0	10.6	6.4
Interior counties	3,377	2,779	338	260	82.3	10.0	7.7
Southern California	7,083	5,750	757	576	81.2	10.7	8.1
Los Angeles	4,696	3,868	464	364	82.4	9.9	7.7
Other counties	2,387	1,882	293	212	78.8	12.3	8.9
Northern and Central California	15,509	12,943	1,483	1,083	83.4	9.6	7.0
Coast counties	11,039	9,248	1,030	761	83.8	9.3	6.9
Interior counties	4,470	3,695	453	322	82.7	10.1	7.2
Metropolitan area	8,196	6,880	730	586	83.9	8.9	7.2
Rural counties	7,313	6,063	753	497	82.9	10.3	6.8
1906.							
THE STATE	20,955	17,209	2,104	1,642	82.1	10.1	7.8
Northern California	2,043	1,707	199	137	83.6	9.7	6.7
Coast counties	1,041	872	94	75	83.8	9.0	7.2
Interior counties	1,002	835	105	62	83.3	10.5	6.2
Central California	12,381	10,179	1,198	1,004	82.2	9.7	8.1
San Francisco	3,489	2,951	290	248	84.6	8.3	7.1
Other bay counties	4,138	3,312	445	381	80.0	10.8	9.2
Coast counties	1,632	1,345	158	129	82.4	9.7	7.9
Interior counties	3,122	2,571	305	246	82.3	9.8	7.9
Southern California	6,531	5,323	707	501	81.5	10.8	7.7
Los Angeles	4,406	3,652	452	302	82.9	10.3	6.8
Other counties	2,125	1,671	255	199	78.6	12.0	9.4
Northern and Central California	14,424	11,886	1,397	1,141	82.4	9.7	7.9
Coast counties	10,300	8,480	987	833	82.3	9.6	8.1
Interior counties	4,124	3,406	410	308	82.6	9.9	7.5
Metropolitan area	7,627	6,263	735	629	82.1	9.6	8.3
Rural counties	6,797	5,623	662	512	82.7	9.8	7.5

It appears from this table that the per cent single among white brides was highest each year for Northern California (83.8 in 1907 and 83.6 in 1906), next for Central California (83.4 and 82.2), and lowest for Southern California (81.2 and 81.5). The per cent single for Northern and Central California together was 83.4 in 1907 and 82.4 in 1906. The per cent for the metropolitan area exceeded that for the rural counties by 1.0 in 1907 (83.9 against 82.9), but fell short by 0.6 in 1906 (82.1 against 82.7). The per cent of single white brides was highest each year among the geographic divisions for San Francisco, 86.4 in 1907 and 84.6 in 1906. At the same time, the corresponding per cents for the other bay counties were only 81.4 and 80.0, or the lowest outside Southern California. The per cents single for Los Angeles were 82.4 and 82.9 in 1907 and 1906, as compared with only 78.8 and 78.6 for the other counties south of Tehachapi.

The proportion of widows among white brides is higher for Southern California than for Northern California. The per cent widowed for the counties south of Tehachapi was 10.7 in 1907 and 10.8 in 1906 against 9.6 and 9.7, respectively, for the counties to the north. The per cents for Los Angeles were 9.9 and 10.3, and for the rest of Southern California no less than 12.3 and 12.0 in 1907 and 1906, respectively. The per cents were 8.9 and 9.6 for the metropolitan area, as compared with 10.3 and 9.8 for the rural counties north of Tehachapi. For San Francisco the per cents widowed were only 8.2 and 8.3, or the minimum each year, but for the other bay counties the per cents were considerably higher, 9.7 and 10.8. Of white widows it may therefore be said, as of widowers and widows of all races taken together, that more remarry in the rural counties than in urban centers, and that in the metropolitan area, more remarry in the suburbs than in the main city.

In general, the proportion of divorcees, as of widows, among white brides is somewhat greater for Southern California than for Northern or Central California. The per cents divorced in 1907 and 1906, respectively, were 8.1 and 7.7 for the counties south of Tehachapi, against 5.7 and 6.7 for Northern California, and 7.2 and 8.1 for Central California, or 7.0 and 7.9 for all north of Tehachapi. The per cents were 7.7 and 6.8 for Los Angeles in 1907 and 1906, against no less than 8.9 and 9.4 for the other counties of Southern California. North of Tehachapi, on the other hand, the proportion of divorcees is greater for the metropolitan area than for the rural counties, the per cents for the former being 7.2 and 8.3, against 6.8 and 7.5 for the latter. Within the urban district, however, the proportion of divorcees among white brides is much less for San Francisco than for the other bay counties, the per cents being only 5.4 and 7.1 for the metropolis proper, but as much as 8.9 and 9.2 for the surrounding suburbs. Divorcees, unlike widows, remarry more in the metropolitan area than in the rural counties, while both divorcees and widows, like divorced men and widowers, remarry more in the suburbs of a great city than within the metropolis itself.

Status of White Brides (by Nativity).—The following table shows, for the several geographic divisions in 1907 and 1906, the civil status or marital condition—as single, widowed or divorced—of the white brides classified by nativity—as born in California, born in other states, or foreign born. For convenience in presentation, the absolute numbers are omitted and only the per cent distributions are given:

TABLE 10.—*Per Cent Distribution, by Marital Condition, of White Brides classified by Nativity, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	White Brides.								
	Per Cent Single Among those—			Per Cent Widowed Among those—			Per Cent Divorced Among those—		
	Born in California.	Born in Other States.	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
1907.									
THE STATE	87.9	77.9	81.7	6.1	12.1	13.5	6.0	10.0	4.8
Northern California	89.8	74.2	76.5	6.0	17.2	17.2	4.2	8.6	6.3
Coast counties	89.6	73.0	78.3	5.4	19.2	15.9	5.0	7.8	5.8
Interior counties	89.9	75.2	70.5	6.6	15.6	21.3	3.5	9.2	8.2
Central California	87.6	76.3	83.1	6.1	12.6	12.5	6.3	11.1	4.4
San Francisco	89.6	79.5	86.8	5.6	10.7	10.0	4.8	9.8	3.2
Other bay counties	86.1	74.0	80.6	6.1	13.3	12.9	7.8	12.7	6.5
Coast counties	88.0	76.5	78.8	6.5	14.3	16.8	5.5	9.2	4.4
Interior counties	87.0	75.9	80.6	6.6	12.5	15.6	6.4	11.6	3.8
Southern California	87.5	79.6	79.4	5.9	11.1	15.2	6.6	9.3	5.4
Los Angeles	89.0	81.2	80.3	5.3	10.0	14.0	5.7	8.8	5.7
Other counties	85.6	76.5	77.4	6.7	13.2	18.1	7.7	10.3	4.5
Northern and Central California	88.0	76.0	82.5	6.1	13.2	12.9	5.9	10.8	4.6
Coast counties	88.0	76.1	83.2	5.9	13.2	12.2	6.1	10.7	4.6
Interior counties	87.8	75.7	79.6	6.6	13.3	16.2	5.6	11.0	4.2
Metropolitan area	87.8	76.4	84.2	5.8	12.2	11.2	6.4	11.4	4.6
Rural counties	88.2	75.6	79.1	6.3	4.2	16.3	5.5	10.2	4.6
1906.									
THE STATE	87.6	77.1	80.7	5.8	12.5	14.2	6.6	10.4	5.1
Northern California	89.9	70.1	80.8	4.9	18.6	15.3	5.2	11.3	3.9
Coast counties	90.4	69.1	82.1	4.6	17.4	12.5	5.0	13.5	5.4
Interior counties	89.4	70.9	77.0	5.2	19.7	23.0	5.4	9.4	------
Central California	87.2	74.7	80.9	5.8	13.2	14.0	7.0	12.1	5.1
San Francisco	88.8	75.4	85.0	4.9	12.0	10.9	6.3	12.6	4.1
Other bay counties	85.3	73.4	76.6	6.7	13.5	16.4	8.0	13.1	7.0
Coast counties	87.2	75.3	80.4	5.6	13.8	15.1	7.2	10.9	4.5
Interior counties	87.8	75.4	80.2	5.6	13.3	15.8	6.6	11.3	4.0
Southern California	87.2	80.0	80.2	6.8	11.2	14.6	6.0	8.8	5.2
Los Angeles	87.5	81.7	82.7	6.6	10.7	12.5	5.9	7.6	4.8
Other counties	86.9	76.2	74.5	7.1	12.2	19.4	6.0	11.6	6.1
Northern and Central California	87.6	74.1	80.9	5.6	13.9	14.1	6.8	12.0	5.0
Coast counties	87.4	73.9	81.1	5.7	13.5	13.6	6.9	12.6	5.3
Interior counties	88.3	74.5	79.9	5.5	14.6	16.6	6.2	10.9	3.5
Metropolitan area	86.9	74.2	81.1	5.9	12.9	13.5	7.2	12.9	5.4
Rural counties	88.4	74.0	80.4	5.3	14.8	15.5	6.3	11.2	4.1

The table shows that the per cents single were no less than 87.9 and 87.6 in 1907 and 1906 among white brides born in California, as compared with only 81.7 and 80.7 among the foreign born brides and 77.9 and 77.1 among those born in other states. In every part of the State each year the per cent single is highest of all for brides who were born in California. As a rule, too, the per cent single is next highest for foreign born brides and lowest of all for those born elsewhere in the United States than here. Exceptions to this rule appear only for the interior counties of Northern California and for Los Angeles in 1907, and for the counties of Southern California other than Los Angeles in 1906.

In both 1907 and 1906 the per cent single was much higher for each class of brides in Los Angeles than for those in the other counties of Southern California. Differences appear, however, in a comparison of the per cents for the metropolitan area in contrast with the rural counties of Northern and Central California. Each year the per cent single was less for the metropolitan area than for the rural counties among brides born in California, but on the other hand the per cents single were somewhat greater for the urban center than for the country districts in the case of brides born in other states, and much greater in the case of foreign born brides. In both years the per cents single were much greater for brides of each class by nativity in San Francisco than for the corresponding class in the other bay counties.

The per cents widowed were no less than 13.5 and 14.2 in 1907 and 1906 among foreign born brides and 12.1 and 12.5 among those born in other states, against only 6.1 and 5.8 among white brides born in California. In San Francisco and in the coast counties of Northern California in both 1907 and 1906, as well as in the bay counties other than San Francisco in 1907, the per cent widowed was highest among brides born elsewhere in the United States than California. In all other geographic divisions, however, the per cent widowed was highest of all each year among foreign born brides. Without exception, the per cent widowed is decidedly lowest among white brides born in the Golden State.

The per cent widowed was less among brides of each class by nativity for Los Angeles than for the other counties south of Tehachapi; for San Francisco than for the other bay counties; and, generally speaking, also for the metropolitan area than for the rural counties north of Tehachapi. In 1906 the per cent widowed was somewhat greater for the metropolitan area than for the rural counties in the case of brides born in California, but this exceptional contrast did not appear in 1907, so that the general rule holds good that in each element of the population more widows remarry in rural counties than in urban centers, and in the latter, more remarry in the suburbs than in the main city.

The per cents divorced were as great as 10.0 and 10.4 in 1907 and 1906 among white brides born in other states, but only 6.0 and 6.6 among those born in California and 4.8 and 5.1 among foreign born brides. Everywhere in California each year the per cent divorced was greatest among brides born in other states, next among those born in this State, and lowest of all among the foreign born. The only marked exception to the rule is due to an abnormally high per cent divorced among foreign born brides in the interior counties of Northern California in 1907.

In general, the per cent divorced was less among each class of brides in Los Angeles than in the other counties of Southern California, and in San Francisco than in the other bay counties, but, on the other hand, was greater in the metropolitan area than in the rural counties of Northern and Central California. In 1907 the per cent divorced was greater among foreign born brides in Los Angeles than in the other counties south of Tehachapi, and the per cents were exactly the same among foreign born brides in the metropolitan area as in the rural counties north of Tehachapi. While more widows of each nativity remarry in country districts than in urban centers, more divorcees—whether born in California, in other states, or in foreign countries—remarry in the metropolitan area than in rural counties. Within the metropolitan area more divorcees, as well as widows, of each element of the population remarry in the suburban territory than in the metropolis proper.

Nativity of White Brides.—The following table shows, by numbers and per cents, the nativity of white brides—as born in California, born in other states, or foreign born—for the several geographic divisions in 1907 and 1906:

TABLE 11.—*White Brides classified by Nativity, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	White Brides.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
1907.							
THE STATE	22,592	9,245	8,842	4,505	40.9	39.2	19.9
Northern California	2,256	1,347	641	268	59.7	28.4	11.9
Coast counties	1,163	686	270	207	59.0	23.2	17.8
Interior counties	1,093	661	371	61	60.5	33.9	5.6
Central California	13,253	6,485	3,683	3,085	48.9	27.8	23.3
San Francisco	4,095	1,872	895	1,328	45.7	21.9	32.4
Other bay counties	4,101	2,020	1,168	913	49.2	28.5	22.3
Coast counties	1,680	885	503	292	52.7	29.9	17.4
Interior counties	3,777	1,708	1,117	552	50.6	33.1	16.3
Southern California	7,083	1,413	4,518	1,152	19.9	63.8	16.3
Los Angeles	4,696	818	3,057	821	17.4	65.1	17.5
Other counties	2,387	595	1,461	331	24.9	61.2	13.9
Northern and Central California	15,509	7,832	4,324	3,353	50.5	27.9	21.6
Coast counties	11,039	5,463	2,836	2,740	49.5	25.7	24.8
Interior counties	4,470	2,369	1,488	613	53.0	33.3	13.7
Metropolitan area	8,196	3,892	2,063	2,241	47.5	25.2	27.3
Rural counties	7,313	3,940	2,261	1,112	53.9	30.9	15.2

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* Includes those of unknown nativity, numbering in the entire State only 161, or 0.7 per cent, in 1907 and 222, or 1.1 per cent, in 1906.

TABLE 11.—*White Brides classified by Nativity, with Per Cents, for Geographic Divisions: 1907 and 1906—Continued.*

GEOGRAPHIC DIVISION.	White Brides.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
1906.							
THE STATE	20,955	8,710	8,315	3,930	41.6	39.7	18.7
Northern California	2,043	1,266	548	229	62.0	26.8	11.2
Coast counties	1,041	614	259	168	59.0	24.9	16.1
Interior counties	1,002	652	289	61	65.0	28.9	6.1
Central California	12,381	6,137	3,584	2,660	49.6	28.9	21.5
San Francisco	3,489	1,642	809	1,038	47.1	23.2	29.7
Other bay counties	4,138	2,060	1,171	907	49.8	28.3	21.9
Coast counties	1,632	861	506	265	52.8	31.0	16.2
Interior counties	3,122	1,574	1,098	450	50.4	35.2	14.4
Southern California	6,531	1,307	4,183	1,041	20.0	64.1	15.9
Los Angeles	4,406	774	2,905	727	17.6	65.9	16.5
Other counties	2,125	533	1,278	314	25.1	60.1	14.8
Northern and Central California	14,424	7,403	4,132	2,889	51.3	28.6	20.1
Coast counties	10,300	5,177	2,745	2,378	50.3	26.6	23.1
Interior counties	4,124	2,226	1,387	511	54.0	33.6	12.4
Metropolitan area	7,627	3,702	1,980	1,945	48.5	26.0	25.5
Rural counties	6,797	3,701	2,152	944	54.4	31.7	13.9

*Includes those of unknown nativity, numbering in the entire State only 161, or 0.7 per cent, in 1907 and 222, or 1.1 per cent, in 1906.

It appears from this table that of 22,592 white brides in 1907, 9,245, or 40.9 per cent, were born in California; 8,842, or 39.2 per cent, were born in other states, including a few of unknown nativity; and 4,505, or 19.9 per cent, were foreign born. Of the 20,955 white brides in 1906, those born in California were 8,710, or 41.6 per cent; those born in other states, including the few unknown, were 8,315, or 39.7 per cent; and the foreign born were 3,930, or 18.7 per cent. While there were decreases of 0.7 and 0.5, respectively, in the per cents born in California and born in other states, there was, on the other hand, an increase of 1.2 in the per cent foreign born among white brides.

The proportion of native daughters among the brides is very high for Northern as well as Central California, but very low indeed for Southern California. The per cents born in the Golden State in 1907 and 1906, respectively, were 59.7 and 62.0 for Northern California, and 48.9 and 49.6 for Central California, or 50.5 and 51.3 for both together, against as little as 19.9 and 20.0 for Southern California. The per cents were only 17.4 and 17.6 for Los Angeles and 24.9 and 25.1 for the other counties south of Tehachapi. Similarly, north of Tehachapi the per cents were less for the metropolitan area (47.5 and 48.5) than for the rural counties (53.9 and 54.4), and also less for San Francisco (45.7 and 47.1) than for the other bay counties (49.2 and 49.8).

The proportion of white brides born elsewhere in the United States than California is very high indeed for the counties south of Tehachapi, but is quite low for those to the north. The per cents born in other states were 63.8 and 64.1 for Southern California in 1907 and 1906, being no less than 65.1 and 65.9 for Los Angeles and 61.2 and 60.1 for the other counties. On the other hand, the corresponding per cents for the counties north of Tehachapi were only 27.9 and 28.6, being 28.4 and 26.8 for Northern California and 27.8 and 28.9 for Central California. The per cents born in other states were 25.2 and 26.0 for the metropolitan area, as compared with 30.9 and 31.7 for the rural counties. For San Francisco the per cents were only 21.9 and 23.2 against 28.5 and 28.3 for the other bay counties.

The proportion of foreign born brides is notably high only for Central California, especially in San Francisco and the other bay counties. The per cents foreign born among white brides in 1907 and 1906 were 23.3 and 21.5 for Central California, as compared with only 16.3 and 15.9 for Southern California and 11.9 and 11.2 for Northern California. The per cents for the counties north of Tehachapi were 21.6 and 20.1, being no less than 27.3 and 25.5 for the metropolitan area, but only 15.2 and 13.9 for the rural counties. The per cents foreign born were no less than 32.4 and 29.7 for San Francisco alone, as compared with 22.3 and 21.9 for the other counties on the bay. Similarly, the per cents were greater for Los Angeles (17.5 and 16.5) than for the other counties of Southern California (13.9 and 14.8).

Nativity of White Brides (by Status).—The following table shows, for the several geographic divisions in 1907 and 1906, the nativity—as born in California, born in other states, or foreign born—of white brides classified by civil status or marital condition—as single, widowed, or divorced. For convenience in presentation, the absolute numbers are omitted and only the per cent distributions are given:

TABLE 12.—*Per Cent Distribution, by Nativity, of White Brides classified by Marital Condition, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	White Brides.								
	Per Cent Born in California Among the—			Per Cent Born in Other States Among the—			Per Cent Foreign Born Among the—		
	Single.	Widowed.	Divorced	Single.	Widowed.	Divorced	Single.	Widowed.	Divorced
1907.									
THE STATE	43.5	25.0	33.6	36.8	47.9	53.5	19.7	27.1	12.9
Northern California	64.0	34.2	44.2	25.2	46.4	42.6	10.8	19.4	13.2
Coast counties	63.2	30.3	50.7	20.2	42.6	31.4	16.6	27.1	17.9
Interior counties	64.8	38.3	37.1	30.5	50.4	54.8	4.7	11.3	8.1
Central California	51.4	31.9	42.7	25.4	37.1	43.1	23.2	31.0	14.2
San Francisco	47.4	31.4	40.7	20.1	28.8	39.8	32.5	39.8	19.5
Other bay counties	52.1	31.1	43.3	25.9	39.1	40.5	22.0	29.8	16.2
Coast counties	55.9	32.0	45.4	27.6	40.5	42.6	16.5	27.5	12.0
Interior counties	53.5	33.1	42.3	30.5	41.4	49.6	16.0	25.5	8.1
Southern California	21.5	11.0	16.1	62.6	65.9	73.1	15.9	23.1	10.8
Los Angeles	18.8	9.3	12.9	64.2	65.9	74.2	17.0	24.8	12.9
Other counties	27.0	13.6	21.7	59.4	65.9	71.2	13.6	20.5	7.1
Northern and Central California	53.2	32.2	42.9	25.4	38.7	43.0	21.4	29.1	14.1
Coast counties	52.0	31.3	43.5	23.3	36.4	39.8	24.7	32.3	16.7
Interior counties	56.3	34.4	41.3	30.5	43.7	50.6	13.2	21.9	8.1
Metropolitan area	49.7	31.2	42.3	22.9	34.4	40.3	27.4	34.4	17.4
Rural counties	57.3	33.2	43.4	28.2	42.8	46.3	14.5	24.0	10.3

TABLE 12.—*Per Cent Distribution, by Nativity, of White Brides classified by Marital Condition, for Geographic Divisions: 1907 and 1906—Continued.*

GEOGRAPHIC DIVISION.	White Brides.								
	Per Cent Born in California Among the—			Per Cent Born in Other States Among the—			Per Cent Foreign Born Among the—		
	Single.	Widowed.	Divorced	Single.	Widowed.	Divorced	Single.	Widowed.	Divorced
1906.									
THE STATE	44.3	24.0	35.1	37.3	49.4	52.8	18.4	26.6	12.1
Northern California	66.7	31.1	48.2	22.5	51.3	45.2	10.8	17.6	6.6
Coast counties	63.7	29.8	41.3	20.5	47.9	46.7	15.8	22.3	12.0
Interior counties	69.8	32.4	56.5	24.6	54.3	43.5	5.6	13.3	-------
Central California	52.6	29.6	43.1	26.3	39.3	43.3	21.1	31.1	13.6
San Francisco	49.4	27.6	41.5	20.7	33.4	41.1	29.9	39.0	17.4
Other bay counties	53.1	31.0	43.1	25.9	35.5	40.4	21.0	33.5	16.5
Coast counties	55.9	30.4	48.1	28.3	44.3	42.6	15.8	25.3	9.3
Interior counties	53.8	28.9	42.3	32.2	47.9	50.4	14.0	23.2	7.3
Southern California	21.4	12.6	15.6	62.9	65.9	73.6	15.7	21.5	10.8
Los Angeles	18.5	11.3	15.2	65.0	68.6	73.2	16.5	20.1	11.6
Other counties	27.7	14.9	16.1	58.3	61.2	74.4	14.0	23.9	9.5
Northern and Central California	54.6	29.8	43.7	25.8	41.0	43.6	19.6	29.2	12.7
Coast counties	53.4	29.8	43.2	23.9	37.5	41.5	22.7	32.7	15.3
Interior counties	57.7	29.8	45.1	30.3	49.5	49.0	12.0	20.7	5.9
Metropolitan area	51.4	29.7	42.4	23.4	34.7	40.7	25.2	35.6	16.9
Rural counties	58.2	29.9	45.3	28.3	48.0	47.1	13.5	22.1	7.6

This table shows that in 1907 and 1906, respectively, the per cents born in California were 43.5 and 44.3 among the single white brides; 33.6 and 35.1 among the divorced; and 25.0 and 24.0 among the widowed. In all parts of the State both years the native daughters formed the bulk of the single brides and a large proportion of the divorced, but a small proportion of the widowed. The sole exception is that in the interior counties of Northern California in 1907 the per cent born in California was slightly higher for the widows than for the divorcees remarrying.

The per cents born in the Golden State among the single, widowed and divorced brides were very much less for Southern California each year than for Northern or Central California. The per cents born in California were also less for Los Angeles in all cases than for the other counties south of Tehachapi, and were likewise less for the metropolitan area than for the rural counties north of Tehachapi. Except that in 1907 alone the per cent born in California was greater among the widowed brides in San Francisco than in the other bay counties, the rule is also that the proportion of native daughters among each class of brides is less for the metropolis proper than for the surrounding suburbs.

In 1907 and 1906, respectively, the per cents born in other states than California were 53.5 and 52.8 among the divorced and 47.9 and 49.4 among the widowed, as compared with only 36.8 and 37.3 among the single white brides. In the coast counties of Northern California in 1907 and in the interior counties of Northern California and the coast counties of Central California in 1906 alone, the per cent born in other states was greater among widowed than divorced brides. But for every other geographic division each year a larger proportion of the divorcees than of the widows remarrying were born elsewhere in the United States than California. In Los Angeles the per cents born in other states were no less than 74.2 and 73.2 among the divorced brides in 1907 and 1906, and 65.9 and 68.6 among the widowed; for the other counties south of Tehachapi the per cents for divorcees were 71.2 and 74.4, and for widows 65.9 and 61.2.

The per cents born in other states among single, widowed and divorced brides were much greater each year for Southern California than for Northern or Central California. North of Tehachapi the per cents born in other states were less among brides of each class in the metropolitan area than in the rural counties, and were also less in San Francisco in all cases than in the other bay counties (except that in 1906 the per cent born in other states was slightly greater among divorcees in the metropolis than in the suburbs). Generally speaking, the per cents born elsewhere in the United States were greater for Los Angeles than for the other counties south of Tehachapi, though among divorcees remarrying in 1906 the per cent was somewhat less for Los Angeles than for the other counties.

The per cents foreign born in 1907 and 1906, respectively, were 27.1 and 26.6 among the widowed, as compared with 19.7 and 18.4 among the single white brides and only 12.9 and 12.1 among the divorced. In the coast and interior counties of Northern California in 1907 alone, the per cents foreign born were somewhat greater among the divorced than among the single brides, being greatest as usual among the widowed. As a rule, though, the per cent of foreign born brides was highest in every instance each year among the widowed, next highest among the single, and lowest of all among the divorced.

The per cents foreign born were higher in all cases for San Francisco than for the other bay counties, and likewise higher for the metropolitan area than for the rural counties north of Tehachapi. In 1906 alone the per cent foreign born among widowed brides was somewhat less for Los Angeles than for the other counties south of Tehachapi, but as a rule the per cent foreign born was higher among all classes of brides in Los Angeles than in the rest of Southern California.

Of all the single brides in 1907 and 1906, the per cents born in California were 43.5 and 44.3; the per cents born in other states were 36.8 and 37.3; and the per cents foreign born were only 19.7 and 18.4. That is, the California girls form the bulk of the single brides and those born in other states form a considerable proportion, while comparatively few single brides in this State were foreign born.

Of all the widows remarrying in 1907 and 1906, the per cents born elsewhere in the United States than California were 47.9 and 49.4; the per cents foreign born were 27.1 and 26.6; and the per cents born in California were 25.0 and 24.0. As compared with the per cent distributions of all white brides taken together, the per cents among the widowed brides are very high for those born outside California, whether in other states or foreign countries, while the per cents are relatively very low for the widowed brides born in the Golden State.

Of all the divorcees remarrying in 1907 and 1906, the per cents born in other states were no less than 53.5 and 52.8; the per cents born in California were 33.6 and 35.1; and the per cents foreign born were only 12.9 and 12.1. In other words, American women born in other states comprise the great bulk of the divorced brides in California, and while the native daughters form a considerable proportion of the divorcees remarrying, the foreign born constitute a very small proportion indeed.

Conclusion.—That the native daughters should constitute the bulk of the single brides necessarily follows from the fact that most of the marriageable young women in this State were born here, and incidentally from the fact that the sunny climate makes California girls especially attractive. That the great bulk of the widowed brides were born outside California, and only a comparatively small proportion were born within the Golden State, would naturally be expected from the fact that very few women born in California are old enough to have been married and become widows, so that nearly all the widows remarrying here must necessarily have come from other states or foreign countries. The very great disparity between the proportions for the American born and the foreign born among divorced brides is evidently due to a difference in the attitude toward divorce and remarriage between the American and foreign elements of the white population.

TABLE 13.—*Marriages classified by Number in Order and Marital Condition*

COUNTY.	Total Marriages.	Number of Marriage.				Groom.		
		1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Widowed.	Divorc'd.
THE STATE	23,005	17,253	2,320	1,742	1,690	19,573	2,108	1,324
Northern California	2,278	1,754	206	157	161	1,960	198	120
Coast counties	1,168	897	106	82	83	1,003	107	58
Del Norte	8	5	1	------	2	6	1	1
Humboldt	320	243	26	24	27	269	31	20
Lake	34	26	2	3	3	28	3	3
Mendocino	191	148	20	13	10	168	13	10
Napa	206	157	17	16	16	174	28	4
Sonoma	398	310	37	26	25	347	31	20
Trinity	11	8	3	------	------	11	------	------
Interior counties	1,110	857	100	75	78	957	91	62
Butte	222	171	23	9	19	194	15	13
Colusa	34	28	2	3	1	30	2	2
Glenn	40	35	2	1	2	37	2	1
Lassen	27	23	1	2	1	24	2	1
Modoc	38	31	2	2	3	33	3	2
Nevada	117	93	7	10	7	100	9	8
Placer	90	71	8	6	5	79	8	3
Plumas	21	15	3	2	1	18	1	2
Shasta	144	105	24	7	8	129	9	6
Sierra	8	8	------	------	------	8	------	------
Siskiyou	120	88	11	9	12	99	10	11
Sutter	29	21	2	4	2	23	5	1
Tehama	124	95	7	10	12	102	15	7
Yuba	96	73	8	10	5	81	10	5
Central California	13,450	10,264	1,354	945	887	11,618	1,087	745
San Francisco	4,158	3,316	372	281	189	3,688	279	191
Other bay counties	4,169	3,045	466	345	313	3,511	368	290
Alameda	3,009	2,258	300	247	204	2,558	263	188
Contra Costa	200	165	18	8	9	183	13	4
Marin	703	450	112	68	73	562	69	72
San Mateo	257	172	36	22	27	208	23	26
Coast counties	1,697	1,299	169	108	121	1,468	144	85
Monterey	196	162	22	8	4	184	9	3
San Benito	47	37	3	4	3	40	5	2
San Luis Obispo	196	159	14	9	14	173	17	6
Santa Clara	961	711	100	71	79	811	93	57
Santa Cruz	297	230	30	16	21	260	20	17
Interior counties	3,426	2,604	347	211	264	2,951	296	179
Alpine	------	------	------	------	------	------	------	------
Amador	66	50	9	3	4	59	3	4
Calaveras	52	39	5	5	3	44	4	4
El Dorado	45	33	6	4	2	39	2	4
Fresno	630	495	56	42	37	551	54	25
Inyo	40	32	2	2	4	34	4	2
Kern	206	155	22	17	12	177	17	12
Kings	144	116	9	6	13	125	14	5
Madera	59	39	11	4	5	50	8	1
Mariposa	15	11	3	------	1	14	1	------
Merced	81	65	6	6	4	71	9	1
Mono	5	4	1	------	------	5	------	------
Sacramento	950	689	124	56	81	813	72	65
San Joaquin	470	350	44	34	42	394	45	31
Solano	154	124	15	6	9	139	12	3
Stanislaus	104	75	11	9	9	86	10	8
Tulare	250	196	15	12	27	211	30	9
Tuolumne	62	50	3	3	6	53	6	3
Yolo	93	81	5	2	5	86	5	2

of Parties, with Per Cents, for Counties arranged Geographically: 1907.

Bride.			Per Cent of Marriages.				Per Cent of Grooms.			Per Cent of Brides.		
Single.	Widowed.	Divorced.	1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Widowed.	Divorc'd	Single	Widowed.	Divorc'd
18,995	2,312	1,698	75.0	10.1	7.6	7.3	85.1	9.2	5.7	82.6	10.0	7.4
1,911	238	129	77.0	9.0	6.9	7.1	86.0	8.7	5.3	83.9	10.4	5.7
979	122	67	76.8	9.1	7.0	7.1	85.9	9.1	5.0	83.8	10.5	5.7
5	2	1	62.5	12.5	------	25.0	75.0	12.5	12.5	62.5	25.0	12.5
267	30	23	76.0	8.1	7.5	8.4	84.1	9.7	6.2	83.4	9.4	7.2
29	3	2	76.5	5.9	8.8	8.8	82.4	8.8	8.8	85.3	8.8	5.9
161	21	9	77.5	10.5	6.8	5.2	88.0	6.8	5.2	84.3	11.0	4.7
173	20	13	76.2	8.2	7.8	7.8	84.5	13.6	1.9	84.0	9.7	6.3
336	44	18	77.9	9.3	6.5	6.3	87.2	7.8	5.0	84.4	11.1	4.5
8	2	1	72.7	27.3	------	------	100.0	------	------	72.7	18.2	9.1
932	116	62	77.2	9.0	6.8	7.0	86.2	8.2	5.6	84.0	10.4	5.6
180	26	16	77.0	10.4	4.0	8.6	87.4	6.8	5.8	81.1	11.7	7.2
31	1	2	82.4	5.9	8.8	2.9	88.2	5.9	5.9	91.2	2.9	5.9
36	3	1	87.5	5.0	2.5	5.0	92.5	5.0	2.5	90.0	7.5	2.5
25	2	--------	85.2	3.7	7.4	3.7	88.9	7.4	3.7	92.6	7.4	------
33	3	2	81.6	5.3	5.2	7.9	86.8	7.9	5.3	86.8	7.9	5.3
103	9	5	79.5	6.0	8.5	6.0	85.5	7.7	6.8	88.0	7.7	4.3
77	10	3	78.9	8.9	6.7	5.5	87.8	8.9	3.3	85.6	11.1	3.3
17	2	2	71.4	14.3	9.5	4.8	85.7	4.8	9.5	81.0	9.5	9.5
112	22	10	72.9	16.7	4.9	5.5	89.6	6.2	4.2	77.8	15.3	6.9
8	--------	--------	100.0	------	------	------	100.0	------	------	100.0	------	------
97	15	8	73.3	9.2	7.5	10.0	82.5	8.3	9.2	80.8	12.5	6.7
25	1	3	72.4	6.9	13.8	6.9	79.3	17.2	3.5	86.2	3.5	10.3
105	12	7	76.6	5.6	8.1	9.7	82.3	12.1	5.6	84.7	9.7	5.6
83	10	3	76.1	8.3	10.4	5.2	84.4	10.4	5.2	86.5	10.4	3.1
11,209	1,273	968	76.3	10.1	7.0	6.6	86.4	8.1	5.5	83.3	9.5	7.2
3,597	337	224	79.8	8.9	6.8	4.5	88.7	6.7	4.6	86.5	8.1	5.4
3,390	409	370	73.0	11.2	8.3	7.5	84.2	8.8	7.0	81.3	9.8	8.9
2,505	280	224	75.0	10.0	8.2	6.8	85.0	8.7	6.3	83.3	9.3	7.4
173	16	11	82.5	9.0	4.0	4.5	91.5	6.5	2.0	86.5	8.0	5.5
518	87	98	64.0	15.9	9.7	10.4	80.0	9.8	10.2	73.7	12.4	13.9
194	26	37	66.9	14.0	8.6	10.5	80.9	9.0	10.1	75.5	10.1	14.4
1,407	181	109	76.5	10.0	6.4	7.1	86.5	8.5	5.0	82.9	10.7	6.4
170	18	8	82.7	11.2	4.1	2.0	93.9	4.6	1.5	86.7	9.2	4.1
41	2	4	78.7	6.4	8.5	6.4	85.1	10.6	4.3	87.2	4.3	8.5
168	17	11	81.1	7.2	4.6	7.1	88.3	8.7	3.0	85.7	8.7	5.6
782	112	67	74.0	10.4	7.4	8.2	84.4	9.7	5.9	81.4	11.6	7.0
246	32	19	77.4	10.1	5.4	7.1	87.6	6.7	5.7	82.8	10.8	6.4
2,815	346	265	76.0	10.1	6.2	7.7	86.1	8.7	5.2	82.2	10.1	7.7
53	5	8	75.8	13.6	4.5	6.1	89.4	4.5	6.1	80.3	7.6	12.1
44	4	4	75.0	9.6	9.6	5.8	84.6	7.7	7.7	84.6	7.7	7.7
37	6	2	73.3	13.3	8.9	4.5	86.7	4.4	8.9	82.2	13.3	4.5
537	61	32	78.6	8.9	6.6	5.9	87.4	8.6	4.0	85.2	9.7	5.1
34	4	2	80.0	5.0	5.0	10.0	85.0	10.0	5.0	85.0	10.0	5.0
172	17	17	75.2	10.7	8.3	5.8	85.9	8.3	5.8	83.5	8.3	8.2
122	12	10	80.6	6.2	4.2	9.0	86.8	9.7	3.5	84.7	8.3	7.0
43	9	7	66.1	18.6	6.8	8.5	84.7	13.6	1.7	72.9	15.2	11.9
11	3	1	73.3	20.0	------	6.7	93.3	6.7	------	73.3	20.0	6.7
71	6	4	80.3	7.4	7.4	4.9	87.7	11.1	1.2	87.7	7.4	4.9
4	1	--------	80.0	20.0	------	------	100.0	------	------	80.0	20.0	------
745	101	104	72.5	13.1	5.9	8.5	85.6	7.6	6.8	78.4	10.6	11.0
384	50	36	74.5	9.4	7.2	8.9	83.8	9.6	6.6	81.7	10.6	7.7
130	17	7	80.5	9.7	3.9	5.9	90.3	7.8	1.9	84.4	11.0	4.6
84	14	6	72.1	10.6	8.7	8.6	82.7	9.6	7.7	80.8	13.4	5.8
208	24	18	78.4	6.0	4.8	10.8	84.4	12.0	3.6	83.2	9.6	7.2
53	7	2	80.7	4.8	4.8	9.7	85.5	9.7	4.8	85.5	11.3	3.2
83	5	5	87.1	5.4	2.1	5.4	92.5	5.4	2.1	89.2	5.4	5.4

TABLE 13.—*Marriages classified by Number in Order and Marital Condition of*

County.	Total Marriages.	Number of Marriage.				Groom.		
		1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Widowed.	Divorc'd
Southern California	7,277	5,235	760	640	642	5,995	823	459
Los Angeles	4,847	3,541	479	418	409	4,020	540	287
Other counties	2,430	1,694	281	222	233	1,975	283	172
Orange	638	426	93	58	61	519	86	33
Riverside	299	207	28	35	29	235	36	28
San Bernardino	458	332	42	39	45	374	55	29
San Diego*	628	433	75	50	70	508	65	55
Santa Barbara	274	190	33	29	22	223	28	23
Ventura	133	106	10	11	6	116	13	4
Northern and Central California	15,728	12,018	1,560	1,102	1,048	13,578	1,285	865
Coast counties	11,192	8,557	1,113	816	706	9,670	898	624
Interior counties	4,536	3,461	447	286	342	3,908	387	241
Metropolitan area	8,327	6,361	838	626	502	7,199	647	481
Rural counties	7,401	5,657	722	476	546	6,379	638	384

* Includes 5 marriages in Imperial County, formed August 15, 1907.

Parties, with Per Cents, for Counties arranged Geographically: 1907—Continued.

Bride.			Per Cent of Marriages.				Per Cent of Grooms.			Per Cent of Brides.		
Single.	Widowed.	Divorced.	1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Widowed.	Divorc'd	Single	Widowed.	Divorc'd
5,875	801	601	71.9	10.5	8.8	8.8	82.4	11.3	6.3	80.7	11.0	8.3
3,959	503	385	73.1	9.9	8.6	8.4	82.9	11.2	5.9	81.7	10.4	7.9
1,916	298	216	69.7	11.6	9.1	9.6	81.3	11.6	7.1	78.8	12.3	8.9
484	89	65	66.8	14.6	9.1	9.5	81.3	13.5	5.2	75.9	13.9	10.2
242	31	26	69.2	9.4	11.7	9.7	78.6	12.0	9.4	80.9	10.4	8.7
371	52	35	72.5	9.2	8.5	9.8	81.7	12.0	6.3	81.0	11.4	7.6
483	90	55	68.9	11.9	8.0	11.2	80.9	10.3	8.8	76.9	14.3	8.8
219	31	24	69.3	12.1	10.6	8.0	81.4	10.2	8.4	79.9	11.3	8.8
117	5	11	79.7	7.5	8.3	4.5	87.2	9.8	3.0	88.0	3.7	8.3
13,120	1,511	1,097	76.4	9.9	7.0	6.7	86.3	8.2	5.5	83.4	9.6	7.0
9,373	1,049	770	76.5	9.9	7.3	6.3	86.4	8.0	5.6	83.7	9.4	6.9
3,747	462	327	76.3	9.9	6.3	7.5	86.2	8.5	5.3	82.6	10.2	7.2
6,987	746	594	76.4	10.1	7.5	6.0	86.4	7.8	5.8	83.9	9.0	7.1
6,133	765	503	76.4	9.8	6.4	7.4	86.2	8.6	5.2	82.9	10.3	6.8

TABLE 14.—*Marriages classified by Number in Order and Marital Condition*

County.	Total Marriages.	Number of Marriage.				Groom.		
		1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Widowed.	Divorc'd
The State	21,317	15,790	2,238	1,674	1,615	18,028	1,988	1,301
Northern California	2,077	1,600	201	133	143	1,801	197	79
Coast counties	1,047	809	101	67	70	910	95	42
Del Norte	12	10	1		1	11	1	
Humboldt	266	207	26	16	17	233	24	9
Lake	33	27		2	4	27	4	2
Mendocino	176	138	17	12	9	155	14	7
Napa	162	123	19	10	10	142	13	7
Sonoma	380	288	36	27	29	324	39	17
Trinity	18	16	2			18		
Interior counties	1,030	791	100	66	73	891	102	37
Butte	169	130	15	14	10	145	17	7
Colusa	38	32	2	1	3	34	2	2
Glenn	36	27	5	2	2	32	3	1
Lassen	33	27	1	3	2	28	4	1
Modoc	33	29	3		1	32	1	
Nevada	104	78	9	9	8	87	13	4
Placer	88	66	13	5	4	79	2	7
Plumas	21	20	1			21		
Shasta	161	116	23	7	15	139	16	6
Sierra	16	14	1		1	15	1	
Siskiyou	127	93	12	13	9	105	17	5
Sutter	33	25	2	3	3	27	5	1
Tehama	89	66	8	5	10	74	13	2
Yuba	82	68	5	4	5	73	8	1
Central California	12,573	9,377	1,362	946	888	10,739	1,054	780
San Francisco	3,539	2,742	353	255	189	3,095	261	183
Other bay counties	4,217	3,026	515	336	340	3,541	376	300
Alameda	3,019	2,247	312	231	229	2,559	265	195
Contra Costa	196	152	24	9	11	176	15	5
Marin	750	460	140	70	80	600	73	77
San Mateo	252	167	39	26	20	206	23	23
Coast counties	1,642	1,208	172	144	118	1,380	146	116
Monterey	174	128	19	14	13	147	15	12
San Benito	58	48	3	4	3	51	3	4
San Luis Obispo	185	147	18	16	4	165	16	4
Santa Clara	956	699	100	84	73	799	78	79
Santa Cruz	269	186	32	26	25	218	34	14
Interior counties	3,175	2,401	322	211	241	2,723	271	181
Alpine	1	1				1		
Amador	74	59	10	4	1	69	3	2
Calaveras	41	34	4	1	2	38	2	1
El Dorado	48	44	3	1		47	1	
Fresno	549	432	39	30	48	471	53	25
Inyo	13	12	1			13		
Kern	152	105	20	14	13	125	17	10
Kings	120	99	7	9	5	106	11	3
Madera	49	39	7	1	2	46	2	1
Mariposa	17	17				17		
Merced	80	66	7	4	3	73	5	2
Mono	4	3			1	3		1
Sacramento	834	611	98	61	64	709	67	58
San Joaquin	520	357	69	47	47	426	46	48
Solano	186	133	21	13	19	154	20	12
Stanislaus	100	83	8	3	6	91	7	2
Tulare	222	178	17	12	15	195	19	8
Tuolumne	60	44	3	5	8	47	10	3
Yolo	105	84	8	6	7	92	8	5

of Parties, with Per Cents, for Counties arranged Geographically: 1906.

Bride.			Per Cent of Marriages.				Per Cent of Grooms.			Per Cent of Brides.		
Single.	Widowed.	Divorced.	1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Widowed.	Divorc'd	Single	Widowed.	Divorc'd
17,464	2,174	1,679	74.1	10.5	7.8	7.6	84.6	9.3	6.1	81.9	10.2	7.9
1,733	206	138	77.0	9.7	6.4	6.9	86.7	9.5	3.8	83.4	9.9	6.7
876	96	75	77.3	9.6	6.4	6.7	86.9	9.1	4.0	83.7	9.2	7.1
10	1	1	83.3	8.4	------	8.3	91.7	8.3	------	83.3	8.4	8.3
223	25	18	77.8	9.8	6.0	6.4	87.6	9.0	3.4	83.8	9.4	6.8
29	1	3	81.8	------	6.1	12.1	81.8	12.1	6.1	87.9	3.0	9.1
150	13	13	78.4	9.7	6.8	5.1	88.1	7.9	4.0	85.2	7.4	7.4
133	14	15	75.9	11.7	6.2	6.2	87.7	8.0	4.3	82.1	8.6	9.3
315	40	25	75.8	9.5	7.1	7.6	85.3	10.2	4.5	82.9	10.5	6.6
16	2	--------	88.9	11.1	------	------	100.0	------	------	88.9	11.1	------
857	110	63	76.8	9.7	6.4	7.1	86.5	9.9	3.6	83.2	10.7	6.1
144	17	8	76.9	8.9	8.3	5.9	85.8	10.1	4.1	85.2	10.1	4.7
33	4	1	84.2	5.3	2.6	7.9	89.5	5.3	5.2	86.9	10.5	2.6
29	5	2	75.0	13.9	5.6	5.5	88.9	8.3	2.8	80.6	13.9	5.5
30	3	--------	81.8	3.0	9.1	6.1	84.9	12.1	3.0	90.9	9.1	------
29	3	1	87.9	9.1	------	3.0	97.0	3.0	------	87.9	9.1	3.0
87	10	7	75.0	8.7	8.6	7.7	83.7	12.5	3.8	83.7	9.6	6.7
71	10	7	75.0	14.8	5.7	4.5	89.8	2.3	7.9	80.7	11.4	7.9
20	1	--------	95.2	4.8	------	------	100.0	------	------	95.2	4.8	------
123	21	17	72.1	14.3	4.3	9.3	86.4	9.9	3.7	76.4	13.0	10.6
14	1	1	87.5	6.3	------	6.2	93.8	6.2	------	87.5	6.3	6.2
106	13	8	73.2	9.5	10.2	7.1	82.7	13.4	3.9	83.5	10.2	6.3
28	2	3	75.7	6.1	9.1	9.1	81.8	15.2	3.0	84.8	6.1	9.1
71	13	5	74.2	9.0	5.6	11.2	83.1	14.6	2.3	79.8	14.6	5.6
72	7	3	82.9	6.1	4.9	6.1	89.0	9.8	1.2	87.8	8.5	3.7
10,323	1,228	1,022	74.6	10.8	7.5	7.1	85.4	8.4	6.2	82.1	9.8	8.1
2,997	293	249	77.5	10.0	7.2	5.3	87.4	7.4	5.2	84.7	8.3	7.0
3,362	462	393	71.7	12.2	8.0	8.1	84.0	8.9	7.1	79.7	11.0	9.3
2,478	301	240	74.4	10.3	7.7	7.6	84.7	8.8	6.5	82.1	10.0	7.9
161	22	13	77.6	12.2	4.6	5.6	89.8	7.7	2.5	82.2	11.2	6.6
530	111	109	61.3	18.7	9.3	10.7	80.0	9.7	10.3	70.7	14.8	14.5
193	28	31	66.3	15.5	10.3	7.9	81.8	9.1	9.1	76.6	11.1	12.3
1,352	161	129	73.6	10.5	8.8	7.1	84.0	8.9	7.1	82.3	9.8	7.9
142	19	13	73.6	10.9	8.0	7.5	84.5	8.6	6.9	81.6	10.9	7.5
52	4	2	82.7	5.2	6.9	5.2	87.9	5.2	6.9	89.7	6.9	3.4
163	16	6	79.5	9.7	8.6	2.2	89.2	8.6	2.2	88.1	8.7	3.4
783	86	87	73.1	10.5	8.8	7.6	83.6	8.1	8.3	81.9	9.0	9.1
212	36	21	69.1	11.9	9.7	9.3	81.1	12.6	6.3	78.8	13.4	7.8
2,612	312	251	75.6	10.1	6.7	7.6	85.8	8.5	5.7	82.3	9.8	7.9
1	--------	--------	100.0	------	------	------	100.0	------	------	100.0	------	------
63	10	1	79.7	13.5	5.4	1.4	93.2	4.1	2.7	85.1	13.5	1.4
35	3	3	82.9	9.8	2.4	4.9	92.7	4.9	2.4	85.4	7.3	7.3
45	1	2	91.7	6.2	2.1	------	97.9	2.1	------	93.7	2.1	4.2
462	55	32	78.7	7.1	5.5	8.7	85.8	9.7	4.5	84.2	10.0	5.8
12	1	--------	92.3	7.7	------	------	100.0	------	------	92.3	7.7	------
119	20	13	69.1	13.2	9.2	8.5	82.2	11.2	6.6	78.3	13.2	8.5
108	6	6	82.5	5.8	7.5	4.2	88.3	9.2	2.5	90.0	5.0	5.0
40	5	4	79.6	14.3	2.0	4.1	93.9	4.1	2.0	81.6	10.2	8.2
17	--------	--------	100.0	------	------	------	100.0	------	------	100.0	------	------
70	6	4	82.5	8.8	5.0	3.7	91.3	6.2	2.5	87.5	7.5	5.0
3	--------	1	75.0	------	------	25.0	75.0	------	25.0	75.0	------	25.0
672	84	78	73.3	11.7	7.3	7.7	85.0	8.0	7.0	80.6	10.1	9.3
404	61	55	68.7	13.3	9.0	9.0	81.9	8.9	9.2	77.7	11.7	10.6
146	19	21	71.5	11.3	7.0	10.2	82.8	10.8	6.4	78.5	10.2	11.3
86	7	7	83.0	8.0	3.0	6.0	91.0	7.0	2.0	86.0	7.0	7.0
190	18	14	80.2	7.7	5.4	6.7	87.8	8.6	3.6	85.6	8.1	6.3
49	9	2	73.4	5.0	8.3	13.3	78.3	16.7	5.0	81.7	15.0	3.3
90	7	8	80.0	7.6	5.7	6.7	87.6	7.6	4.8	85.7	6.7	7.6

TABLE 14.—*Marriages classified by Number in Order and Marital Condition of*

COUNTY.	Total Marriages.	Number of Marriage.				Groom.		
		1st of Both Parties.	1s of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Widowed.	Divorc'd
Southern California	6,667	4,813	675	595	584	5,488	737	442
Los Angeles	4,506	3,329	417	383	377	3,746	470	290
Other counties	2,161	1,484	258	212	207	1,742	267	152
Orange	524	342	71	54	57	413	65	46
Riverside	287	214	31	24	18	245	27	15
San Bernardino	404	287	38	38	41	325	54	25
San Diego	581	387	74	63	57	461	83	37
Santa Barbara	236	161	26	26	23	187	25	24
Ventura	129	93	18	7	11	111	13	5
Northern and Central California	14,650	10,977	1,563	1,079	1,031	12,540	1,251	859
Coast counties	10,445	7,785	1,141	802	717	8,926	878	641
Interior counties	4,205	3,192	422	277	314	3,614	373	218
Metropolitan area	7,756	5,768	868	591	529	6,636	637	483
Rural counties	6,894	5,209	695	488	502	5,904	614	376

Parties, with Per Cents, for Counties arranged Geographically: 1906—Continued.

Bride.			Per Cent of Marriages.				Per Cent of Grooms.			Per Cent of Brides.		
Single.	Widowed.	Divorced.	1st of Both Parties.	1st of Gro'm Only.	1st of Bride Only.	2d or Over of Both.	Single.	Widowed.	Divorc'd	Single	Widowed.	Divorc'd
5,408	740	519	72.2	10.1	8.9	8.8	82.3	11.1	6.6	81.1	11.1	7.8
3,712	480	314	73.9	9.2	8.5	8.4	83.2	10.4	6.4	82.4	10.6	7.0
1,696	260	205	68.7	11.9	9.8	9.6	80.6	12.4	7.0	78.5	12.0	9.5
396	62	66	65.3	13.5	10.3	10.9	78.8	12.4	8.8	75.6	11.8	12.6
238	25	24	74.5	10.8	8.4	6.3	85.4	9.4	5.2	82.9	8.7	8.4
325	47	32	71.0	9.4	9.4	10.2	80.4	13.4	6.2	80.5	11.6	7.9
450	78	53	66.6	12.7	10.9	9.8	79.3	14.3	6.4	77.5	13.4	9.1
187	28	21	68.2	11.0	11.0	9.8	79.2	10.6	10.2	79.2	11.9	8.9
100	20	9	72.1	14.0	5.4	8.5	86.0	10.1	3.9	77.5	15.5	7.0
12,056	1,434	1,160	74.9	10.7	7.4	7.0	85.6	8.5	5.9	82.3	9.8	7.9
8,587	1,012	846	74.5	10.9	7.7	6.9	85.5	8.4	6.1	82.2	9.7	8.1
3,469	422	314	75.9	10.0	6.6	7.5	85.9	8.9	5.2	82.5	10.0	7.5
6,359	755	642	74.4	11.2	7.6	6.8	85.6	8.2	6.2	82.0	9.7	8.3
5,697	679	518	75.5	10.1	7.1	7.3	85.6	8.9	5.5	82.6	9.9	7.5

TABLE 15.—*Brides classified by Race, Nativity, and Marital Condition, with Per Cent Distribution by Marital Condition, for Geographic Divisions: 1907.*

GEOGRAPHIC DIVISION.	Brides.				Per Cent.		
	Total.	Single.	Widowed	Divorced.	Single.	Widowed	Divorced.
THE STATE	23,005	18,995	2,312	1,698	82.6	10.0	7.4
White	22,592	18,693	2,240	1,659	82.7	9.9	7.4
Born in California	9,245	8,127	561	557	87.9	6.1	6.0
Born in other states*	8,842	6,883	1,072	887	77.9	12.1	10.0
Foreign born	4,505	3,683	607	215	81.7	13.5	4.8
Non-Caucasian	413	302	72	39	73.1	17.4	9.5
Northern California	2,278	1,911	238	129	83.9	10.4	5.7
White	2,256	1,890	237	129	83.8	10.5	5.7
Born in California	1,347	1,209	81	57	89.8	6.0	4.2
Born in other states*	641	476	110	55	74.2	17.2	8.6
Foreign born	268	205	46	17	76.5	17.2	6.3
Non-Caucasian	22	21	1	---------	95.5	4.5	---------
Coast counties	1,168	979	122	67	83.8	10.5	5.7
White	1,163	974	122	67	83.7	10.5	5.8
Born in California	686	615	37	34	89.6	5.4	5.0
Born in other states*	270	197	52	21	73.0	19.2	7.8
Foreign born	207	162	33	12	78.3	15.9	5.8
Non-Caucasian	5	5	---------	---------	100.0	---------	---------
Interior counties	1,110	932	116	62	84.0	10.4	5.6
White	1,093	916	115	62	83.8	10.5	5.7
Born in California	661	594	44	23	89.9	6.6	3.5
Born in other states*	371	279	58	34	75.2	15.6	9.2
Foreign Born	61	43	13	5	70.5	21.3	8.2
Non-Caucasian	17	16	1	---------	94.1	5.9	---------
Central California	13,450	11,209	1,273	968	83.3	9.5	7.2
White	13,253	11,053	1,246	954	83.4	9.4	7.2
Born in California	6,485	5,681	397	407	87.6	6.1	6.3
Born in other states*	3,683	2,809	463	411	76.3	12.6	11.1
Foreign born	3,085	2,563	386	136	83.1	12.5	4.4
Non-Caucasian	197	156	27	14	79.2	13.7	7.1
San Francisco	4,158	3,597	337	224	86.5	8.1	5.4
White	4,095	3,540	334	221	86.4	8.2	5.4
Born in California	1,872	1,677	105	90	89.6	5.6	4.8
Born in other states*	895	711	96	88	79.5	10.7	9.8
Foreign born	1,328	1,152	133	43	86.8	10.0	3.2
Non-Caucasian	63	57	3	3	90.5	4.8	4.7
Other bay counties	4,169	3,390	409	370	81.3	9.8	8.9
White	4,101	3,340	396	365	81.4	9.7	8.9
Born in California	2,020	1,739	123	158	86.1	6.1	7.8
Born in other states*	1,168	865	155	148	74.0	13.3	12.7
Foreign born	913	736	118	59	80.6	12.9	6.5
Non-Caucasian	68	50	13	5	73.5	19.1	7.4
Coast counties	1,697	1,407	181	109	82.9	10.7	6.4
White	1,680	1,394	178	108	83.0	10.6	6.4
Born in California	885	779	57	49	88.0	6.5	5.5
Born in other states*	503	385	72	46	76.5	14.3	9.2
Foreign born	292	230	49	13	78.8	16.8	4.4
Non-Caucasian	17	13	3	1	76.5	17.6	5.9
Interior counties	3,426	2,815	346	265	82.2	10.1	7.7
White	3,377	2,779	338	260	82.3	10.0	7.7
Born in California	1,708	1,486	112	110	87.0	6.6	6.4
Born in other states*	1,117	848	140	129	75.9	12.5	11.6
Foreign born	552	445	86	21	80.6	15.6	3.8
Non-Caucasian	49	36	8	5	73.5	16.3	10.2

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*Includes those of unknown nativity, numbering only 161, or 0.7 per cent of all in the entire State.

TABLE 15.—*Brides classified by Race, Nativity, and Marital Condition, with Per Cent Distribution by Marital Condition, for Geographic Divisions: 1907—Continued.*

Geographic Division.	Brides.				Per Cent.		
	Total.	Single.	Widowed	Divorced.	Single.	Widowed	Divorced.
Southern California	7,277	5,875	801	601	80.7	11.0	8.3
White	7,083	5,750	757	576	81.2	10.7	8.1
Born in California	1,413	1,237	83	93	87.5	5.9	6.6
Born in other states*	4,518	3,598	499	421	79.6	11.1	9.3
Foreign born	1,152	915	175	62	79.4	15.2	5.4
Non-Caucasian	194	125	44	25	64.4	22.7	12.9
Los Angeles	4,847	3,959	503	385	81.7	10.4	7.9
White	4,696	3,868	464	364	82.4	9.9	7.7
Born in California	818	728	43	47	89.0	5.3	5.7
Born in other states*	3,057	2,481	306	270	81.2	10.0	8.8
Foreign born	821	659	115	47	80.3	14.0	5.7
Non-Caucasian	151	91	39	21	60.3	25.8	13.9
Other counties	2,430	1,916	298	216	78.8	12.3	8.9
White	2,387	1,882	293	212	78.8	12.3	8.9
Born in California	595	509	40	46	85.6	6.7	7.7
Born in other states*	1,461	1,117	193	151	76.5	13.2	10.3
Foreign born	331	256	60	15	77.4	18.1	4.5
Non-Caucasian	43	34	5	4	79.1	11.6	9.3
Northern and Central California	15,728	13,120	1,511	1,097	83.4	9.6	7.0
White	15,509	12,943	1,483	1,083	83.4	9.6	7.0
Born in California	7,832	6,890	478	464	88.0	6.1	5.9
Born in other states*	4,324	3,285	573	466	76.0	13.2	10.8
Foreign born	3,353	2,768	432	153	82.5	12.9	4.6
Non-Caucasian	219	177	28	14	80.8	12.8	6.4
Coast counties	11,192	9,373	1,049	770	83.7	9.4	6.9
White	11,039	9,248	1,030	761	83.8	9.3	6.9
Born in California	5,463	4,810	322	331	88.0	5.9	6.1
Born in other states*	2,836	2,158	375	303	76.1	13.2	10.7
Foreign born	2,740	2,280	333	127	83.2	12.2	4.6
Non-Caucasian	153	125	19	9	81.7	12.4	5.9
Interior counties	4,536	3,747	462	327	82.6	10.2	7.2
White	4,470	3,695	453	322	82.7	10.1	7.2
Born in California	2,369	2,080	156	133	87.8	6.6	5.6
Born in other states*	1,488	1,127	198	163	75.7	13.3	11.0
Foreign born	613	488	99	26	79.6	16.2	4.2
Non-Caucasian	66	52	9	5	78.8	13.6	7.6
Metropolitan area	8,327	6,987	746	594	83.9	9.0	7.1
White	8,196	6,880	730	586	83.9	8.9	7.2
Born in California	3,892	3,416	228	248	87.8	5.8	6.4
Born in other states*	2,063	1,576	251	236	76.4	12.2	11.4
Foreign born	2,241	1,888	251	102	84.2	11.2	4.6
Non-Caucasian	131	107	16	8	81.7	12.2	6.1
Rural counties	7,401	6,133	765	503	82.9	10.3	6.8
White	7,313	6,063	753	497	82.9	10.3	6.8
Born in California	3,940	3,474	250	216	88.2	6.3	5.5
Born in other states*	2,261	1,709	322	230	75.6	14.2	10.2
Foreign born	1,112	880	181	51	79.1	16.3	4.6
Non-Caucasian	88	70	12	6	79.6	13.6	6.8

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*Includes those of unknown nativity, numbering only 161, or 0.7 per cent of all in the entire State.

TABLE 16.—*Brides classified by Race, Nativity, and Marital Condition, with Per Cent Distribution by Marital Condition, for Geographic Divisions: 1906.*

Geographic Division.	Brides.				Per Cent.		
	Total.	Single.	Widowed	Divorced.	Single.	Widow'd	Divorced.
The State	21,317	17,464	2,174	1,679	81.9	10.2	7.9
White	20,955	17,209	2,104	1,642	82.1	10.1	.86
Born in California	8,710	7,628	505	577	87.6	5.8	6.4
Born in other states*	8,315	6,410	1,039	866	77.1	12.5	10.1
Foreign born	3,930	3,171	560	199	80.7	14.2	5.2
Non-Caucasian	362	255	70	37	70.5	19.3	10.7
Northern California	2,077	1,733	206	138	83.4	9.9	6.7
White	2,043	1,707	199	137	83.6	9.7	6.7
Born in California	1,266	1,138	62	66	89.9	4.9	5.2
Born in other states*	548	384	102	62	70.1	18.6	11.3
Foreign born	229	185	35	9	80.8	15.3	3.9
Non-Caucasian	34	26	7	1	76.5	20.6	2.9
Coast counties	1,047	876	96	75	83.7	9.2	7.1
White	1,041	872	94	75	83.8	9.0	7.2
Born in California	614	555	28	31	90.4	4.6	5.0
Born in other states*	259	179	45	35	69.1	17.4	13.5
Foreign born	168	138	21	9	82.1	12.5	5.4
Non-Caucasian	6	4	2	---------	66.7	33.3	---------
Interior counties	1,030	857	110	63	83.2	10.7	6.1
White	1,002	835	105	62	83.3	10.5	6.2
Born in California	652	583	34	35	89.4	5.2	5.4
Born in other states*	289	205	57	27	70.9	19.7	9.4
Foreign born	61	47	14	---------	77.0	23.0	---------
Non-Caucasian	28	22	5	1	78.6	17.8	3.6
Central California	12,573	10,323	1,228	1,022	82.1	9.8	8.1
White	12,381	10,179	1,198	1,004	82.2	9.7	8.1
Born in California	6,137	5,350	354	433	87.2	5.8	7.0
Born in other states*	3,584	2,678	471	435	74.7	13.2	12.1
Foreign born	2,660	2,151	373	136	80.9	14.0	5.1
Non-Caucasian	192	144	30	18	75.0	15.6	9.4
San Francisco	3,539	2,997	293	249	84.7	8.3	7.0
White	3,489	2,951	290	248	84.6	8.3	7.1
Born in California	1,642	1,459	80	103	88.8	4.9	6.3
Born in other states*	809	610	97	102	75.4	12.0	12.6
Foreign born	1,038	882	113	43	85.0	10.9	4.1
Non-Caucasian	50	46	3	1	92.0	6.0	2.0
Other bay counties	4,217	3,362	462	393	79.7	11.0	9.3
White	4,138	3,312	445	381	80.0	10.8	9.2
Born in California	2,060	1,758	138	164	85.3	6.7	8.0
Born in other states*	1,171	859	158	154	73.4	13.5	13.1
Foreign born	907	695	149	63	76.6	16.4	7.0
Non-Caucasian	79	50	17	12	63.3	21.5	15.2
Coast counties	1,642	1,352	161	129	82.3	9.8	7.9
White	1,632	1,345	158	129	82.4	9.7	7.9
Born in California	861	751	48	62	87.2	5.6	7.2
Born in other states*	506	381	70	55	75.3	13.8	10.9
Foreign born	265	213	40	12	80.4	15.1	4.5
Non-Caucasian	10	7	3	---------	70.0	30.0	---------
Interior counties	3,175	2,612	312	251	82.3	9.8	7.9
White	3,122	2,571	305	246	82.3	9.8	7.9
Born in California	1,574	1,382	88	104	87.8	5.6	6.6
Born in other states*	1,098	828	146	124	75.4	13.3	11.3
Foreign born	450	361	71	18	80.2	15.8	4.0
Non-Caucasian	53	41	7	5	77.4	13.2	9.4

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*Includes those of unknown nativity, numbering only 222, or 1.1 per cent of all in the entire State.

TABLE 16.—*Brides classified by Race Nativity, and Marital Condition, with Per Cent Distribution by Marital Condition, for Geographic Divisions: 1906—Continued.*

GEOGRAPHIC DIVISION.	Brides.				Per Cent.		
	Total.	Single.	Widowed	Divorced.	Single.	Widowed	Divorced.
Southern California	6,667	5,408	740	519	81.1	11.1	7.8
White	6,531	5,323	707	501	81.5	10.8	7.7
Born in California	1,307	1,140	89	78	87.2	6.8	6.0
Born in other states *	4,183	3,348	466	369	80.0	11.2	8.8
Foreign born	1,041	835	152	54	80.2	14.6	5.2
Non-Caucasian	136	85	33	18	62.5	24.3	13.2
Los Angeles	506	3,712	480	314	82.4	10.6	7.0
White	4,406	3,652	452	302	82.9	10.3	6.8
Born in California	4,774	677	51	46	87.5	6.6	5.9
Born in other states *	905	2,374	310	221	81.7	10.7	7.6
Foreign born	2,727	601	91	35	82.7	12.5	4.8
Non-Caucasian	100	60	28	12	60.0	28.0	12.0
Other counties	161	1,696	260	205	78.5	12.0	9.5
White	2,125	1,671	255	199	78.6	12.0	9.4
Born in California	2,533	463	38	32	86.9	7.1	6.0
Born in other states*	278	974	156	148	76.2	12.2	11.6
Foreign born	1,314	234	61	19	74.5	19.4	6.1
Non-Caucasian	36	25	5	6	69.4	13.9	16.7
Northern and Central California	14,650	12,056	1,434	1,160	82.3	9.8	7.9
White	14,424	11,886	1,397	1,141	82.4	9.7	7.9
Born in California	7,403	6,488	416	499	87.6	5.6	6.8
Born in other states*	4,132	3,062	573	497	74.1	13.9	12.0
Foreign born	2,889	2,336	408	145	80.9	14.1	5.0
Non-Caucasian	226	170	37	19	75.2	16.4	8.4
Coast counties	10,445	8,587	1,012	846	82.2	9.7	8.1
White	10,300	8,480	987	833	82.3	9.6	8.1
Born in California	5,177	4,523	294	360	87.4	5.7	6.9
Born in other states*	2,745	2,029	370	346	73.9	13.5	12.6
Foreign born	2,378	1,928	323	127	81.1	13.6	5.3
Non-Caucasian	145	107		13	73.8	17.2	9.0
			25				
Interior counties	4,205	3,469	422	314	82.5	10.0	7.5
White	4,124	3,406	410	308	82.6	9.9	7.5
Born in California	2,226	1,965	122	139	88.3	5.5	6.2
Born in other states*	1,387	1,033	203	151	74.5	14.6	10.9
Foreign born	511	408	85	18	79.9	16.6	3.5
Non-Caucasian	81	63	12	6	77.8	14.8	7.4
Metropolitan area	7,756	6,359	755	642	82.0	9.7	8.3
White	7,627	6,263	735	629	82.1	9.6	8.3
Born in California	3,702	3,217	218	267	86.9	5.9	7.2
Born in other states*	1,980	1,469	255	256	74.2	12.9	12.9
Foreign born	1,945	1,577	262	106	81.1	13.5	5.4
Non-Caucasian	129	96	20	13	74.4	15.5	10.1
					82.6	9.9	7.5
Rural counties	6,894	5,697	679	518			
White	6,797	5,623	662	512	82.7	9.8	7.5
Born in California	3,701	3,271	198	232	88.4	5.3	6.3
Born in other states*	2,152	1,593	318	241	74.0	14.8	11.2
Foreign born	944	759	146	39	80.4	15.5	4.1
Non-Caucasian	97	74	17	6	76.3	17.5	6.2

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*Includes those of unknown nativity, numbering only 222, or 1.1 per cent of all in the entire State.

TABLE 17.—*White Brides classified by Marital Condition and Nativity, with Per Cent Distribution by Nativity, for Geographic Divisions: 1907.*

GEOGRAPHIC DIVISION.	White Brides.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
THE STATE	22,592	9,245	8,842	4,505	40.9	39.2	19.9
Single	18,693	8,127	6,883	3,683	43.5	36.8	19.7
Widowed	2,240	561	1,072	607	25.0	47.9	27.1
Divorced	1,659	557	887	215	33.6	53.5	12.9
Northern California	2,256	1,347	641	268	59.7	28.4	11.9
Single	1,890	1,209	476	205	64.0	25.2	10.8
Widowed	237	81	110	46	34.2	46.4	19.4
Divorced	129	57	55	17	44.2	42.6	13.2
Coast counties	1,163	686	270	207	59.0	23.2	17.8
Single	974	615	197	162	63.2	20.2	16.6
Widowed	122	37	52	33	30.3	42.6	27.1
Divorced	67	34	21	12	50.7	31.4	17.9
Interior counties	1,093	661	371	61	60.5	33.9	5.6
Single	916	594	279	43	64.8	30.5	4.7
Widowed	115	44	58	13	38.3	50.4	11.3
Divorced	62	23	34	5	37.1	54.8	8.1
Central California	13,253	6,485	3,683	3,085	48.9	27.8	23.3
Single	11,053	5,681	2,809	2,563	51.4	25.4	23.2
Widowed	1,246	397	463	386	31.9	37.1	31.0
Divorced	954	407	411	136	42.7	43.1	14.2
San Francisco	4,095	1,872	895	1,328	45.7	21.9	32.4
Single	3,540	1,677	711	1,152	47.4	20.1	32.5
Widowed	334	105	96	133	31.4	28.8	39.8
Divorced	221	90	88	43	40.7	39.8	19.5
Other bay counties	4,101	2,020	1,168	913	49.2	28.5	22.3
Single	3,340	1,739	865	736	52.1	25.9	22.0
Widowed	396	123	155	118	31.1	39.1	29.8
Divorced	365	158	148	59	43.3	40.5	16.2
Coast counties	1,680	885	503	292	52.7	29.9	17.4
Single	1,394	779	385	230	55.9	27.6	16.5
Widowed	178	57	72	49	32.0	40.5	27.5
Divorced	108	49	46	13	45.4	42.6	12.0
Interior counties	3,377	1,708	1,117	552	50.6	33.1	16.3
Single	2,779	1,486	848	445	53.5	30.5	16.0
Widowed	338	112	140	86	33.1	41.4	25.5
Divorced	260	110	129	21	42.3	49.6	8.1
Southern California	7,083	1,413	4,518	1,152	19.9	63.8	16.3
Single	5,750	1,237	3,598	915	21.5	62.6	15.9
Widowed	757	83	499	175	11.0	65.9	23.1
Divorced	576	93	421	62	16.1	73.1	10.8
Los Angeles	4,696	818	3,057	821	17.4	65.1	17.5
Single	3,868	728	2,481	659	18.8	64.2	17.0
Widowed	464	43	306	115	9.3	65.9	24.8
Divorced	364	47	270	47	12.9	74.2	12.9
Other counties	2,387	595	1,461	331	24.9	61.2	13.9
Single	1,882	509	1,117	256	27.0	59.4	13.6
Widowed	293	40	193	60	13.6	65.9	20.5
Divorced	212	46	151	15	21.7	71.2	7.1

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*Includes those of unknown nativity, numbering only 161, or 0.7 per cent of all in the entire State.

TABLE 17.—*White Brides classified by Marital Condition and Nativity, with Per Cent Distribution by Nativity, for Geographic Divisions: 1907—Continued.*

GEOGRAPHIC DIVISION.	White Brides.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
Northern and Central California	15,509	7,832	4,324	3,353	50.5	27.9	21.6
Single	12,943	6,890	3,285	2,768	53.2	25.4	21.4
Widowed	1,483	478	573	432	32.2	38.7	29.1
Divorced	1,083	464	466	153	42.9	43.0	14.1
Coast counties	11,039	5,463	2,836	2,740	49.5	25.7	24.8
Single	9,248	4,810	2,158	2,280	52.0	23.3	24.7
Widowed	1,030	322	375	333	31.3	36.4	32.3
Divorced	761	331	303	127	43.5	39.8	16.7
Interior counties	4,470	2,369	1,488	613	53.0	33.3	13.7
Single	3,695	2,080	1,127	488	56.3	30.5	13.2
Widowed	453	156	198	99	34.4	43.7	21.9
Divorced	322	133	163	26	41.3	50.6	8.1
Metropolitan area	8,196	3,892	2,063	2,241	47.5	25.2	27.3
Single	6,880	3,416	1,576	1,888	49.7	22.9	27.4
Widowed	730	228	251	251	31.2	34.4	34.4
Divorced	586	248	236	102	42.3	40.3	17.4
Rural counties	7,313	3,940	2,261	1,112	53.9	30.9	15.2
Single	6,063	3,474	1,709	880	57.3	28.2	14.5
Widowed	753	250	322	181	33.2	42.8	24.0
Divorced	497	216	230	51	43.4	46.3	10.3

* Includes those of unknown nativity, numbering only 161, or 0.7 per cent of all in the entire State.

TABLE 18.—*White Brides classified by Marital Condition and Nativity, with Per Cent Distribution by Nativity, for Geographic Divisions: 1906.*

GEOGRAPHIC DIVISION.	White Brides.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
THE STATE	20,955	8,710	8,315	3,930	41.6	39.7	18.7
Single	17,209	7,628	6,410	3,171	44.3	37.3	18.4
Widowed	2,104	505	1,039	560	24.0	49.4	26.6
Divorced	1,642	577	866	199	35.1	52.8	12.1
Northern California	2,043	1,266	548	229	62.0	26.8	11.2
Single	1,707	1,138	384	185	66.7	22.5	10.8
Widowed	199	62	102	35	31.1	51.3	17.6
Divorced	137	66	62	9	48.2	45.2	6.6
Coast counties	1,041	614	259	168	59.0	24.9	16.1
Single	872	555	179	138	63.7	20.5	15.8
Widowed	94	28	45	21	29.8	47.9	22.3
Divorced	75	31	35	9	41.3	46.7	12.0
Interior counties	1,002	652	289	61	65.0	28.9	6.1
Single	835	583	205	47	69.8	24.6	5.6
Widowed	105	34	57	14	32.4	54.3	13.3
Divorced	62	35	27	--------	56.5	43.5	--------
Central California	12,381	6,137	3,584	2,660	49.6	28.9	21.5
Single	10,179	5,350	2,678	2,151	52.6	26.3	21.1
Widowed	1,198	354	471	373	29.6	39.3	31.1
Divorced	1,004	433	435	136	43.1	43.3	13.6
San Francisco	3,489	1,642	809	1,038	47.1	23.2	29.7
Single	2,951	1,459	610	882	49.4	20.7	29.9
Widowed	290	80	97	113	27.6	33.4	39.0
Divorced	248	103	102	43	41.5	41.1	17.4
Other bay counties	4,138	2,060	1,171	907	49.8	28.3	21 9
Single	3,312	1,758	859	695	53.1	25.9	21.0
Widowed	445	138	158	149	31.0	35.5	33.5
Divorced	381	164	154	63	43.1	40.4	16.5
Coast counties	1,632	861	506	265	52.8	31.0	16.2
Single	1,345	751	381	213	55.9	28.3	15 8
Widowed	158	48	70	40	30.4	44.3	25.3
Divorced	129	62	55	12	48.1	42.6	9.3
Interior counties	3,122	1,574	1,098	450	50.4	35.2	14.4
Single	2,571	1,382	828	361	53.8	32.2	14.0
Widowed	305	88	146	71	28.9	47.9	23.2
Divorced	246	104	124	18	42.3	50.4	7.3
Southern California	6,531	1,307	4,183	1,041	20.0	64.1	15.9
Single	5,323	1,140	3,348	835	21.4	62.9	15.7
Widowed	707	89	466	152	12.6	65.9	21.5
Divorced	501	78	369	54	15.6	73.6	10.8
Los Angeles	4,406	774	2,905	727	17.6	65.9	16.5
Single	3,652	677	2,374	601	18.5	65.0	16.5
Widowed	452	51	310	91	11.3	68.6	20.1
Divorced	302	46	221	35	15.2	73.2	11.6
Other counties	2,125	533	1,278	314	25.1	60.1	14.8
Single	1,671	463	974	234	27.7	58.3	14.0
Widowed	255	38	156	61	14.9	61.2	23.9
Divorced	199	32	148	19	16.1	74.4	9.5

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*Includes those of unknown nativity, numbering only 222, or 1.1 per cent of all in the entire State.

TABLE 18.—*White Brides classified by Marital Condition and Nativity, with Per Cent Distribution by Nativity, for Geographic Divisions: 1906—Continued.*

GEOGRAPHIC DIVISION.	White Brides.				Per Cent.		
	Total.	Born in California.	Born in Other States.*	Foreign Born.	Born in California.	Born in Other States.	Foreign Born.
Northern and Central California	14,424	7,403	4,132	2,889	51.3	28.6	20.1
Single	11,886	6,488	3,062	2,336	54.6	25.8	19.6
Widowed	1,397	416	573	408	29.8	41.0	29.2
Divorced	1,141	499	497	145	43.7	43.6	12.7
Coast counties	10,300	5,177	2,745	2,378	50.3	26.6	23.1
Single	8,480	4,523	2,029	1,928	53.4	23.9	22.7
Widowed	987	294	370	323	29.8	37.5	32.7
Divorced	833	360	346	127	43.2	41.5	15.3
Interior counties	4,124	2,226	1,387	511	54.0	33.6	12.4
Single	3,406	1,965	1,033	408	57.7	30.3	12.0
Widowed	410	122	203	85	29.8	49.5	20.7
Divorced	308	139	151	18	45.1	49.0	5.9
Metropolitan area	7,627	3,702	1,980	1,945	48.5	26.0	25.5
Single	6,263	3,217	1,469	1,577	51.4	23.4	25.2
Widowed	735	218	255	262	29.7	34.7	35.6
Divorced	629	267	256	106	42.4	40.7	16.9
Rural counties	6,797	3,701	2,152	944	54.4	31.7	13.9
Single	5,623	3,271	1,593	759	58.2	28.3	13.5
Widowed	662	198	318	146	29.9	48.0	22.1
Divorced	512	232	241	39	45.3	47.1	7.6

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* Includes those of unknown nativity, numbering only 222, or 1.1 per cent of all in the entire State.

TABLE 19.—*Brides classified by Race, Nativity, and Marital*

COUNTY.	Single Brides.						
	Total.	White.					Non-Caucasian.
		Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.	
THE STATE	18,995	18,693	8,127	6,742	3,683	141	302
Northern California	1,911	1,890	1,209	457	205	19	21
Coast counties	979	974	615	190	162	7	5
Del Norte	5	5	3	2	-------	-------	-------
Humboldt	267	265	162	42	57	4	2
Lake	29	29	23	4	2	-------	-------
Mendocino	161	159	111	20	28	-------	2
Napa	173	172	93	43	33	3	1
Sonoma	336	336	218	76	42	-------	-------
Trinity	8	8	5	3	-------	-------	-------
Interior counties	932	916	594	267	43	12	16
Butte	180	176	104	61	9	2	4
Colusa	31	31	27	2	1	1	-------
Glenn	36	36	27	5	2	2	-------
Lassen	25	24	17	6	1	-------	1
Modoc	33	33	22	10	1	-------	-------
Nevada	103	103	73	23	7	-------	-------
Placer	77	77	50	23	3	1	-------
Plumas	17	16	12	3	1	-------	1
Shasta	112	112	62	43	6	1	-------
Sierra	8	8	5	3	-------	-------	-------
Siskiyou	97	95	52	30	9	4	2
Sutter	25	24	21	3	-------	-------	1
Tehama	105	104	71	30	3	-------	1
Yuba	83	77	51	25	-------	1	6
Central California	11,209	11,053	5,681	2,722	2,563	87	156
San Francisco	3,597	3,540	1,677	666	1,152	45	57
Other bay counties	3,390	3,340	1,739	851	736	14	50
Alameda	2,505	2,460	1,210	674	566	10	45
Contra Costa	173	173	91	30	52	-------	-------
Marin	518	515	312	113	89	1	3
San Mateo	194	192	126	34	29	3	2
Coast counties	1,407	1,394	779	365	230	20	13
Monterey	170	168	109	34	21	4	2
San Benito	41	41	30	9	2	-------	-------
San Luis Obispo	168	168	99	48	18	3	-------
Santa Clara	782	771	414	207	144	6	11
Santa Cruz	246	246	127	67	45	7	-------
Interior counties	2,815	2,779	1,486	840	445	8	36
Alpine	-------	-------	-------	-------	-------	-------	-------
Amador	53	53	34	3	16	-------	-------
Calavaras	44	44	28	4	12	-------	-------
El Dorado	37	35	24	6	5	-------	2
Fresno	537	529	184	221	122	2	8
Inyo	34	34	17	14	3	-------	-------
Kern	172	170	67	71	32	-------	2
Kings	122	119	61	46	11	1	3
Madera	43	42	20	15	7	-------	1
Mariposa	11	11	10	1	-------	-------	-------
Merced	71	70	30	30	9	1	1
Mono	4	4	2	2	-------	-------	-------
Sacramento	745	737	439	187	110	1	8
San Joaquin	384	377	226	85	66	-------	7
Solano	130	130	91	26	12	1	-------
Stanislaus	84	83	42	27	14	-------	1
Tulare	208	207	111	80	15	1	1
Tuolumne	53	53	38	8	6	1	-------
Yolo	83	81	62	14	5	-------	2

Condition, for Counties arranged Geographically: 1907.

Widowed Brides.							Divorced Brides.						
	White.							White.					
Total.	Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown	Non-Caucasian.......	Total.	Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown	Non-Caucasian.......
2,312	2,240	561	1,057	607	15	72	1,698	1,659	557	882	215	5	39
238	237	81	106	46	4	1	129	129	57	55	17	----	----
122	122	37	48	33	4	----	67	67	34	21	12	----	----
2	2	1	1	----	----	----	1	1	----	----	1	----	----
30	30	7	14	7	2	----	23	23	13	6	4	----	----
3	3	1	1	1	----	----	2	2	1	1	----	----	----
21	21	6	9	6	----	----	9	9	5	2	2	----	----
20	20	6	3	10	1	----	13	13	6	5	2	----	----
44	44	14	20	9	1	----	18	18	9	6	3	----	----
2	2	2	----	----	----	----	1	1	----	1	----	----	----
116	115	44	58	13	----	1	62	62	23	34	5	----	----
26	26	6	18	2	----	----	16	16	5	8	3	----	----
1	1	----	1	----	----	----	2	2	1	1	----	----	----
3	3	2	1	----	----	----	1	1	----	1	----	----	----
2	2	----	1	1	----	----	----	----	----	----	----	----	----
3	3	1	2	----	----	----	2	2	1	1	----	----	----
9	9	6	1	2	----	----	5	5	2	2	1	----	----
10	10	4	4	2	----	----	3	3	----	3	----	----	----
2	2	1	----	1	----	----	2	2	1	1	----	----	----
22	22	12	8	2	----	----	10	10	4	5	1	----	----
----	----	----	----	----	----	----	----	----	----	----	----	----	----
15	15	4	8	3	----	----	8	8	4	4	----	----	----
1	1	1	----	----	----	----	3	3	----	3	----	----	----
12	12	3	9	----	----	----	7	7	2	5	----	----	----
10	9	4	5	----	----	1	3	3	3	----	----	----	----
1,273	1,246	397	461	386	2	27	968	954	407	409	136	2	14
337	334	105	95	133	1	3	224	221	90	88	43	----	3
409	396	123	154	118	1	13	370	365	158	148	59	----	5
280	267	79	104	84	----	13	224	221	86	99	36	----	3
16	16	6	3	7	----	----	11	11	4	5	2	----	----
87	87	30	38	18	1	----	98	98	54	26	18	----	----
26	26	8	9	9	----	----	37	35	14	18	3	----	2
181	178	57	72	49	----	3	109	108	49	46	13	----	1
18	17	5	7	5	----	1	8	7	3	3	1	----	1
2	2	----	2	----	----	----	4	4	2	1	1	----	----
17	17	6	7	4	----	----	11	11	5	5	1	----	----
112	110	37	38	35	----	2	67	67	30	28	9	----	----
32	32	9	18	5	----	----	19	19	9	9	1	----	----
346	338	112	140	86	----	8	265	260	110	127	21	2	5
----	----	----	----	----	----	----	----	----	----	----	----	----	----
5	5	----	----	5	----	----	8	7	4	2	----	1	1
4	4	2	1	1	----	----	4	4	4	----	----	----	----
6	6	3	1	2	----	----	2	2	1	1	----	----	----
61	60	16	29	15	----	1	32	31	9	16	5	1	1
4	4	----	2	2	----	----	2	2	1	1	----	----	----
17	14	5	5	4	----	3	17	16	7	9	----	----	1
12	12	3	8	1	----	----	10	10	3	7	----	----	----
9	8	4	3	1	----	1	7	6	3	3	----	----	1
3	3	3	----	----	----	----	1	1	----	1	----	----	----
6	6	3	2	1	----	----	4	4	2	2	----	----	----
1	1	1	----	----	----	----	----	----	----	----	----	----	----
101	98	35	39	24	----	3	104	103	41	52	10	----	1
50	50	19	17	14	----	----	36	36	19	11	6	----	----
17	17	5	7	5	----	----	7	7	1	6	----	----	----
14	14	4	7	3	----	----	6	6	3	3	----	----	----
24	24	4	15	5	----	----	18	18	6	12	----	----	----
7	7	1	4	2	----	----	2	2	2	----	----	----	----
5	5	4	----	1	----	----	5	5	4	1	----	----	----

TABLE 19.—*Brides classified by Race, Nativity, and Marital*

County.	Single Brides.						
	Total.	White.					Non-Caucasian.
		Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.	
Southern California	5,875	5,750	1,237	3,563	915	35	125
Los Angeles	3,959	3,868	728	2,458	659	23	91
Other counties	1,916	1,882	509	1,105	256	12	34
Orange	484	480	127	308	43	2	4
Riverside	242	231	55	151	25	--------	11
San Bernardino	371	363	69	232	54	8	8
San Diego*	483	475	119	279	77	--------	8
Santa Barbara	219	216	99	78	39	--------	3
Ventura	117	117	40	57	18	2	--------
Northern and Central California	13.120	12,943	6,890	3,179	2,768	106	177
Coast counties	9,373	9,248	4,810	2,072	2,280	86	125
Interior counties	3,747	3,695	2,080	1,107	488	20	52
Metropolitan area	6,987	6,880	3.416	1,517	1,888	59	107
Rural counties	6,133	6,063	3,474	1,662	880	47	70

*Includes 5 marriages in Imperial County, formed August 15, 1907.

Condition, for Counties arranged Geographically: 1907—Continued.

Widowed Brides.							Divorced Brides.						
Total.	White.					Non-Caucasian.	Total.	White.					Non-Caucasian.
	Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown			Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown	
801	757	83	490	175	9	44	601	576	93	418	62	3	25
503	464	43	299	115	7	39	385	364	47	268	47	2	21
298	293	40	191	60	2	5	216	212	46	150	15	1	4
89	88	11	63	14	----	1	65	65	10	52	3	----	----
31	30	2	20	8	----	1	26	25	2	21	2	----	1
52	52	8	35	8	1	-----	35	35	10	23	2	----	----
90	87	8	55	24	----	3	55	53	6	43	4	----	2
31	31	9	17	4	1	-----	24	23	10	9	4	----	1
5	5	2	1	2	----	-----	11	11	8	2	------	1	----
1,511	1,483	478	567	432	6	28	1,097	1,083	464	464	153	2	14
1,049	1,030	322	369	333	6	19	770	761	331	303	127	----	9
462	453	156	198	99	----	9	327	322	133	161	26	2	5
746	730	228	249	251	2	16	594	586	248	236	102	----	8
765	753	250	318	181	4	12	503	497	216	228	51	2	6

TABLE 20.—*Brides classified by Race, Nativity, and Marital*

COUNTY.	Single Brides.						
	Total.	White.					Non-Caucasian.
		Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.	
THE STATE	17,464	17,209	7,628	6,225	3,171	185	255
Northern California	1,733	1,707	1,138	368	185	16	26
Coast counties	876	872	555	172	138	7	4
Del Norte	10	9	5	4			1
Humboldt	223	221	135	31	54	1	2
Lake	29	29	24	4	1		
Mendocino	150	150	104	20	22	4	
Napa	133	133	79	38	15	1	
Sonoma	315	314	193	74	46	1	1
Trinity	16	16	15	1			
Interior counties	857	835	583	196	47	9	22
Butte	144	137	99	36	2		7
Colusa	33	31	27	3		1	2
Glenn	29	29	22	6	1		
Lassen	30	30	25	5			
Modoc	29	28	21	5	2		1
Nevada	87	87	67	7	13		
Placer	71	69	40	18	6	5	2
Plumas	20	20	15	5			
Shasta	123	120	84	28	7	1	3
Sierra	14	14	13		1		
Siskiyou	106	103	53	42	8		3
Sutter	28	28	24	3	1		
Tehama	71	70	43	26	1		1
Yuba	72	69	50	12	5	2	3
Central California	10,323	10,179	5,350	2,576	2,151	102	144
San Francisco	2,997	2,951	1,459	572	882	38	46
Other bay counties	3,362	3,312	1,758	830	695	29	50
Alameda	2,478	2,434	1,234	629	546	25	44
Contra Costa	161	160	92	23	44	1	1
Marin	530	527	325	127	72	3	3
San Mateo	193	191	107	51	33		2
Coast counties	1,352	1,345	751	368	213	13	7
Monterey	142	140	91	30	19		2
San Benito	52	51	35	8	7	1	1
San Luis Obispo	163	161	104	28	26	3	2
Santa Clara	783	781	401	248	124	8	2
Santa Cruz	212	212	120	54	37	1	
Interior counties	2,612	2,571	1,382	806	361	22	41
Alpine	1	1	1				
Amador	63	62	45	7	10		1
Calaveras	35	35	21	1	13		
El Dorado	45	43	36	6	1		2
Fresno	462	454	142	213	97	2	8
Inyo	12	12	8	2	2		
Kern	119	114	52	47	11	4	5
Kings	108	105	55	37	13		3
Madera	40	40	20	13	4	3	
Mariposa	17	17	11	4	2		
Merced	70	69	37	14	17	1	1
Mono	3	3	2	1			
Sacramento	672	661	395	183	79	4	11
San Joaquin	404	403	239	108	55	1	1
Solano	146	141	87	25	25	4	5
Stanislaus	86	85	43	27	14	1	1
Tulare	190	188	89	87	11	1	2
Tuolumne	49	49	34	10	4	1	
Yolo	90	89	65	21	3		1

Condition, for Counties arranged Geographically: 1906.

Widowed Brides.							Divorced Brides.						
Total.	White.					Non-Caucasian	Total.	White.					Non-Caucasian ....
	Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.			Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.	
2,174	2,104	505	1,018	560	21	70	1,679	1,642	577	850	199	16	37
206	199	62	99	35	3	7	138	137	66	62	9	----	1
96	94	28	42	21	3	2	75	75	31	35	9	----	----
1	1	----	----	----	1	----	1	1	----	1	----	----	----
25	25	8	9	7	1	----	18	18	9	7	2	----	----
1	1	----	1	----	----	----	3	3	1	1	1	----	----
13	12	2	5	4	1	1	13	13	5	8	----	----	----
14	14	3	9	2	----	----	15	15	6	8	1	----	----
40	39	14	17	8	----	1	25	25	10	10	5	----	----
2	2	1	1	----	----	----	----	----	----	----	----	----	----
110	105	34	57	14	----	5	63	62	35	27	----	----	1
17	17	5	10	2	----	----	8	8	4	4	----	----	----
4	4	----	4	----	----	----	1	1	1	----	----	----	----
5	5	2	3	----	----	----	2	2	1	1	----	----	----
3	3	----	2	1	----	----	----	----	----	----	----	----	----
3	3	1	2	----	----	----	1	1	----	1	----	----	----
10	10	4	3	3	----	----	7	7	6	1	----	----	----
10	9	3	4	2	----	1	7	7	3	4	----	----	----
1	----	----	----	----	----	1	----	----	----	----	----	----	----
21	19	7	10	2	----	2	17	16	8	8	----	----	1
1	1	----	----	1	----	----	1	1	1	----	----	----	----
13	13	4	9	----	----	----	8	8	5	3	----	----	----
2	2	1	1	----	----	----	3	3	3	----	----	----	----
13	12	4	6	2	----	1	5	5	2	3	----	----	----
7	7	3	3	1	----	----	3	3	1	2	----	----	----
1,228	1,198	354	461	373	10	30	1,022	1,004	433	424	136	11	18
293	290	80	92	113	5	3	249	248	103	99	43	3	1
462	445	138	156	149	2	17	393	381	164	152	63	2	12
301	287	78	99	109	1	14	240	233	97	98	36	2	7
22	21	7	9	5	----	1	13	12	6	5	1	----	1
111	109	44	38	27	----	2	109	105	46	40	19	----	4
28	28	9	10	8	1	----	31	31	15	9	7	----	----
161	158	48	69	40	1	3	129	129	62	52	12	3	----
19	18	7	9	2	----	1	13	13	4	6	2	1	----
4	4	4	----	----	----	----	2	2	1	1	----	----	----
16	15	6	7	1	1	1	6	6	3	3	----	----	----
86	85	22	34	29	----	1	87	87	43	36	6	2	----
36	36	9	19	8	----	----	21	21	11	6	4	----	----
312	305	88	144	71	2	7	251	246	104	121	18	3	5
----	----	----	----	----	----	----	----	----	----	----	----	----	----
10	10	4	2	4	----	----	1	1	----	----	1	----	----
3	3	----	2	1	----	----	3	3	3	----	----	----	----
1	1	1	----	----	----	----	2	2	1	1	----	----	----
55	55	9	34	11	1	----	32	32	11	19	2	----	----
1	1	1	----	----	----	----	----	----	----	----	----	----	----
20	18	6	10	2	----	2	13	13	2	11	----	----	----
6	6	1	4	1	----	----	6	5	2	3	----	----	1
5	5	1	3	1	----	----	4	4	2	2	----	----	----
----	----	----	----	----	----	----	----	----	----	----	----	----	----
6	6	3	----	3	----	----	4	4	2	1	1	----	----
----	----	----	----	----	----	----	1	1	----	1	----	----	----
84	82	26	37	19	----	2	78	75	39	30	4	2	3
61	60	22	22	15	1	1	55	55	23	25	6	1	----
19	17	4	7	6	----	2	21	20	9	9	2	----	1
7	7	1	4	2	----	----	7	7	3	4	----	----	----
18	18	5	9	4	----	----	14	14	4	10	----	----	----
9	9	2	6	1	----	----	2	2	1	1	----	----	----
7	7	2	4	1	----	----	8	8	2	4	2	----	----

TABLE 20.—*Brides classified by Race, Nativity, and Marital*

County.	Single Brides.						
	Total.	White.					Non-Caucasian.
		Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.	
Southern California	5,408	5,323	1,140	3,281	835	67	85
Los Angeles	3,712	3,652	677	2,324	601	50	60
Other counties	1,696	1,671	463	957	234	17	25
Orange	396	395	90	259	45	1	1
Riverside	238	228	46	152	24	6	10
San Bernardino	325	323	77	198	41	7	2
San Diego	450	442	106	255	79	2	8
Santa Barbara	187	183	88	61	33	1	4
Ventura	100	100	56	32	12	--------	--------
Northern and Central California	12,056	11,886	6,488	2,944	2,336	118	170
Coast counties	8,587	8,480	4,523	1,942	1,928	87	107
Interior counties	3,469	3,406	1,965	1,002	408	31	63
Metropolitan area	6,359	6,263	3,217	1,402	1,577	67	96
Rural counties	5,697	5,623	3,271	1,542	759	51	74

Condition, for Counties arranged Geographically: 1906—Continued.

Widowed Brides.							Divorced Brides.						
	White.							White.					
Total.	Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.	Non-Caucasian.	Total.	Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.	Non-Caucasian.
740	707	89	458	152	8	33	519	501	78	364	54	5	18
480	452	51	306	91	4	28	314	302	46	216	35	5	12
260	255	38	152	61	4	5	205	199	32	148	19	----	6
62	61	6	44	11	----	1	66	65	10	46	9	----	1
25	24	4	15	5	----	1	24	23	6	16	1	----	1
47	45	6	31	7	1	2	32	31	4	23	4	----	1
79	78	8	45	24	1	----	53	50	5	41	4	----	3
28	27	6	12	9	----	1	21	21	5	15	1	----	----
20	20	8	5	5	2	----	9	9	2	7	----	----	----
1,434	1,397	416	560	408	13	37	1,160	1,141	499	486	145	11	19
1,012	987	294	359	323	11	25	846	833	360	338	127	8	13
422	410	122	201	85	2	12	314	308	139	148	18	3	6
755	735	218	248	262	7	20	642	629	267	251	106	5	13
679	662	198	312	146	6	17	518	512	232	235	39	6	6

STATISTICS OF DEATHS: 1907 AND 1906.

SUMMARY.

Increase.—The deaths in California, exclusive of stillbirths, numbered 31,095 for 1907, against 29,303 in 1906, an increase of 1,792, or 6.1 per cent.

There were decreases for 1907 as compared with 1906 in San Francisco and in the coast counties of Central California, on account of the excessive mortality from earthquake and fire in April, 1906.

The per cent of increase in deaths was 11.8 for Northern California, and only 2.1 for Central California, or 3.7 for both together, against 12.4 for Southern California.

Death-rates.—For an estimated State population of 2,001,193 in 1907 and of 1,882,846 in 1906, the death-rates were respectively 15.5 and 15.6 per 1,000 inhabitants.

The death-rates in 1907 and 1906 were 18.5 and 18.6 for the counties south of Tehachapi and 14.6 and 14.7 for those to the north, being 14.6 and 15.1 for Central California and 14.4 and 13.0 for Northern California.

Causes of Death.—Tuberculosis causes over one seventh of all deaths in California, the per cent being 14.8 for 1907 and 15.1 for 1906. The tuberculosis death-rate per 100,000 population was 230.2 in 1907 and 235.7 in 1906.

For diseases of the circulatory system (heart disease, etc.), the per cents in 1907 and 1906 were 14.0 and 12.9 and the death-rates per 100,000 were 218.0 and 200.0, respectively.

The per cents of total deaths from pneumonia and other diseases of the respiratory system were 11.5 and 10.9, while the death-rates per 100,000 for this class of diseases were 179.4 and 169.2.

Diseases of the nervous system caused 9.8 per cent of all deaths in 1907 and 9.4 per cent in 1906, the death-rates per 100,000 being 152.9 and 146.7.

Other prominent causes of death in 1907 and 1906 were: diseases of the digestive system, miscellaneous violence, cancer, and Bright's disease.

Typhoid fever was the most fatal epidemic disease each year, causing 1.8 per cent of all deaths in 1907 and 2.2 per cent in 1906. Next were diphtheria and croup (1.2 per cent in 1907 and 0.8 per cent in 1906), measles, whooping-cough, influenza, plague (in 1907 alone), scarlet fever, malarial fever, and smallpox (causing only 6 deaths in 1907, but 36 in 1906).

Altogether 750 deaths, or 2.6 per cent of all in 1906, are known to have resulted directly or indirectly from earthquake and fire in April, distributed by counties as follows: San Francisco, 503; Santa Clara (mainly at Agnews State Hospital), 141; Sonoma (mainly in Santa Rosa city), 72; Alameda, 12; and scattering, 22.

Geographic Divisions.—Analysis of causes of death in different localities reveals marked contrasts between the several geographic divisions in the relative prevalence of various diseases.

In the coast counties of both Northern and Central California, as well as in Southern California outside Los Angeles, relatively high proportions of all deaths are due to diseases of the nervous system, the explanation being the presence of State hospitals in these three geographic divisions.

The interior counties of Northern California show high proportions for miscellaneous deaths from violence, as drowning, railroad injuries, other accidents, etc.

In the interior counties of both Northern and Central California the proportions are high for typhoid fever and for diphtheria and croup. Typhoid fever was also quite prevalent in San Francisco in 1906, and in the other bay counties in 1907.

Each year large proportions of all deaths in San Francisco and the other bay counties were from diseases of the circulatory system (heart disease, etc.) and also from pneumonia. The metropolitan area leads in deaths from diarrhea among children under 2 years of age, and San Francisco leads especially in the proportion of suicides among all decedents.

The proportion of deaths from tuberculosis was very high indeed each year in Los Angeles, as well as in the other counties of Southern California, on account of the many deaths occurring among newcomers from the East.

Contrast between mortality in the metropolitan area and in the rural counties north of Tehachapi shows that the urban territory excels in deaths from heart disease, Bright's disease, pneumonia, cancer, infancy and infantile diarrhea, suicide, typhoid fever, and diphtheria and croup, while the country districts excel in deaths from tuberculosis, other general diseases, diseases of the nervous system, miscellaneous violence, "old age," and malarial fever.

Tuberculosis.—The "great white plague" caused altogether 4,607 deaths, or 14.8 per cent of all, in 1907 and 4,437, or 15.1 per cent, in 1906.

The per cent of total deaths from tuberculosis was no less than 20.1 in 1907 and 21.6 in 1906 for Southern California, against only 12.6 and 12.7, respectively, for the counties north of Tehachapi.

However, deaths from tuberculosis in Southern California occur largely among newly arrived consumptives. Thus, the per cents of tuberculosis victims who had lived in the State less than ten years were as great as 56.4 and 58.9 in 1907 and 1906 for the counties south of Tehachapi, as compared with only 16.4 and 16.6 for those to the north and 32.3 and 33.2 for the entire State. Moreover, the length of residence in California was less than a year for 18.4 per cent of the victims in Southern California in 1907 and for 25.4 per cent in 1906, the corresponding figures for the State as a whole being 9.9 and 12.5. In fact of all who died of tuberculosis in Southern California in 1907 and 1906, those who had been in the State less than a month were respectively 2.4 and 3.4 per cent, those less than three months 7.7 and 9.1 per cent, and those less than half a year altogether 12.7 and 16.0 per cent.

In Northern and Central California, on the other hand, the deaths from tuberculosis include many native Californians and old-time residents. The per cents of native Californians among tuberculous victims in 1907 and 1906 were 37.7 and 38.0 for the counties north of Tehachapi, against only 14.8 and 14.9 for those to the south, being 28.6 and 28.9 for the entire State. Similarly, the per cents who had lived here at least 10 years were 30.5 and 31.1 for Northern and Central California in 1907 and 1906, as compared with 18.4 and 19.7 for Southern California, being 25.7 and 26.6 for the State as a whole.

In short, the death-rate of California is evidently swollen considerably by deaths occurring here from disease contracted elsewhere. For where tuberculosis is most prevalent a large proportion of the victims are residents of very short standing. Moreover, infection from these newly arrived consumptives accounts for some of the deaths among native Californians and old-time residents.

Sex.—Of 31,095 decedents in 1907, the males were 19,666, or 63.2 per cent, and the females 11,429, or 36.8 per cent, while among the 29,303 in 1906, 18,166, or 62.0 per cent, were male and 11,137, or 38.0 per cent, female. Each year the per cent male was highest for Northern California and next for Central California.

The per cents male were above the general averages for deaths from miscellaneous violence, suicide, earthquake and fire (1906), plague (1907), typhoid fever, pneumonia, heart disease, etc., Bright's disease, and pulmonary tuberculosis. The female decedents outnumbered the males only for cancer, whooping-cough, and scarlet fever.

Race.—In 1907 the white decedents numbered 29,339, or 94.3 per cent of all; the Chinese, 670; the Japanese, 517; the negroes, 449; and the Indians, 120. The figures for 1906 were: white, 27,704, or 94.5 per cent; Chinese, 670; negro, 428; Japanese, 384; and Indian, 117. The per cent white was highest each year for Southern California.

The per cents white were very high for deaths from scarlet fever, measles, diphtheria and croup, whooping-cough, cancer, diseases of the nervous and circulatory systems, diarrhea and enteritis (under 2 years), Bright's disease, diseases of early infancy, and suicide.

The proportion of Caucasians among all decedents was low each year for typhoid fever, which causes many deaths of Japanese, and for tuberculosis, which kills many Chinese and negroes.

Nativity.—Of the white decedents in 1907, 10,482, or 35.7 per cent, were born in other states; 9,396, or 32.0 per cent, in foreign countries; 8,332, or 28.4 per cent, in California; and 1,129, or 3.9 per cent, were of unknown nativity. In 1906 those born in other states were 9,679, or 34.9 per cent; the foreign born were 8,840, or 31.9 per cent; those born in California were 7,866, or 28.4 per cent; and the unknown were 1,319, or 4.8 per cent.

The proportion born elsewhere in the United States is very high for Southern California, especially Los Angeles. The proportion foreign born is notably great only for Central California, especially for San Francisco and the other bay counties. The proportion of native Californians among decedents was greatest each year in Central California, and next in Northern California.

The proportion of native Californians is especially great for deaths from early infancy, infantile diarrhea, whooping-cough, measles, scarlet fever, diphtheria and croup, meningitis, tuberculosis other than pulmonary, childbirth, typhoid fever, pneumonia, and plague (in 1907).

The per cents born in other states were above the general averages each year for deaths from diseases of the nervous system other than meningitis, Bright's disease, diseases of the circulatory system, cancer, tuberculosis of the lungs, and diseases of the digestive system other than diarrhea.

The proportions foreign born were above the general averages for deaths from plague (in 1907), cancer, heart disease, etc., pneumonia and other diseases of the respiratory system, Bright's disease, and diseases of the nervous and digestive systems other than meningitis and diarrhea, respectively.

Age Periods.—In 1907 there were 16,761 deaths at the productive ages, 15 to 64 years; 8,175 at the period of old age, 65 years and over; 3,422 in infancy, or the first year of life; 1,484 in childhood, 1 to 4 years; 1,060 in youth, 5 to 14 years; and 193 of unknown age. For 1906 the figures were: 15 to 64 years, 15,324; 65 years and over, 7,833; under 1 year, 3,347; 1 to 4 years, 1,320; 5 to 14 years, 988; and unknown (including 302 deaths from earthquake and fire), 491. The per cent distribution of deaths for 1907 and 1906, respectively, was: productive ages, 53.9 and 52.3; period of old age, 26.3 and 26.7; infancy, 11.0 and 11.4; childhood, 4.8 and 4.5; youth, 3.4 each year; and age unknown, 0.6 and 1.7.

The per cent of deaths occurring at the productive ages was especially high each year for Los Angeles and the rest of Southern California, as well as for San Francisco. The proportion of deaths at the period of old age is particularly large only for the rural counties north of Tehachapi. On the other hand, the proportion of deaths in both infancy and childhood is notably great for the metropolitan area, comprising San Francisco and the other bay counties.

At the years from 15 to 64, large proportions of deaths occur from childbirth, tuberculosis of the lungs, suicide, typhoid fever, miscellaneous violence, plague (in 1907), diseases of the digestive system other than diarrhea, cancer, and Bright's disease.

At 65 years and over, the per cents were high in 1907 and 1906 for deaths from influenza, miscellaneous causes (including "old age" or senility), diseases of the circulatory system (heart disease, etc.), diseases of the nervous system other than meningitis, diseases of the respiratory system other than pneumonia, Bright's disease, and diarrhea of elderly people.

Under 1 year occur large proportions of deaths from early infancy and infantile diarrhea, whooping-cough, measles, meningitis, pneumonia and other diseases of the respiratory system, and tuberculosis other than pulmonary.

At 1 to 4 years the diseases especially fatal are diphtheria and croup, measles, scarlet fever, whooping-cough, diarrhea and enteritis, meningitis, tuberculosis of other organs than the lungs, pneumonia, and plague (in 1907).

At 5 to 14 years the diseases causing exceptionally large proportions of deaths are scarlet fever, diphtheria and croup, meningitis, measles, tuberculosis other than pulmonary, plague (in 1907), typhoid fever, whooping-cough, diarrhea and other diseases of the digestive system, and miscellaneous violence (accidental injuries, etc.).

INCREASE OF DEATHS: 1906 TO 1907.

Sources of Information.—The death registration law of 1905 was enforced throughout California quite faithfully in 1906 and 1907. This law forbids the interment or other disposition of a body except by authority of the permit obtained by filing a satisfactory death certificate with the Local Registrar (or Subregistrar) of the district where the death occurred. The Local Registrars are the Health Officers of cities having freeholders' charters, the Clerks in other cities and incorporated towns, and the County Recorders for the unincorporated portions of counties, the Recorders appointing Subregistrars to receive certificates and issue permits at points remote from county seats.

The original death certificates thus filed with Local Registrars (or Subregistrars) each month are required by law to be forwarded to the State Registrar on or before the fifth day of the following month, the date having been changed from the eighth to the fifth by an amendment enacted in 1907. In the State Bureau of Vital Statistics the statistical data on the death certificates are transferred to tabulation cards such as are used in the Federal Census Bureau by means of a keyboard punching machine. The tabulation cards are punched to show for each death the following particulars: sex, color (or race), month of death, age, conjugal (or marital) condition, birthplace, birthplace of father, birthplace of mother (by countries for the foreign born), occupation, cause of death, and length of residence in California. Occupations and causes of death are necessarily designated by index numbers, the key for occupations being like that used in the Vital Statistics Division of the Federal Census Bureau, and the key for deaths agreeing with the International Classification of Causes of Death. Each tabulation card also shows, by certain holes punched according to a definite system, the registration district (the county and the freeholders' charter city or other city or town), as well as the local registered number of the certificate to which the card corresponds.

Although the tabulation cards are meant to be sorted and counted by electrical tabulating devices such as are used in the Federal Census Bureau and other statistical offices, the cards in the California Bureau of Vital Statistics have so far been sorted and tabulated only by hand. On this account the tabulations have necessarily been limited to causes of death, and, in addition, to only sex, race, nativity (of white decedents), and age periods. Because of the lack of clerical assistance it has also been impossible to make these detailed tabulations for leading cities or individual counties, but only for certain geographic divisions.

Geographic Divisions.—For convenience in tabulation the fifty-seven counties of California have been grouped in three main and eight minor geographic divisions. The three main divisions are Northern, Central, and Southern California. The line between Northern and Central California has been drawn at the southern boundary of Placer, Sutter, Colusa, Napa, and Sonoma counties, or the northern boundary of El Dorado, Sacramento, Yolo, and Marin counties. This dividing line extends irregularly from Lake Tahoe to the Pacific Ocean somewhat north of San Francisco Bay. The line between Central and Southern California has been drawn at the southern boundary of Inyo, Kern, and San Luis Obispo counties, or the northern boundary of San Bernardino, Los Angeles, Ventura, and Santa Barbara counties. This line is familiarly located by Tehachapi pass.

In both Northern and Central California, divisions have been made between the coast and the interior counties. In each case the coast counties include some counties not actually contiguous to the Pacific Ocean but yet on the westward side of the Coast Range. Moreover, in Central California, San Francisco, and the other bay counties (Alameda, Contra Costa, Marin, and San Mateo) have been made minor geographic divisions. Similarly, in Southern California, Los Angeles has been made a minor geographic division in contrast with the other six counties south of Tehachapi.

The three main and eight minor geographic divisions are as follows, the counties in each group being arranged alphabetically for the sake of ready reference:

TABLE 1.—*Main and Minor Geographic Divisions of California, with Counties included in each.*

NORTHERN CALIFORNIA.

Coast Counties.

Del Norte
Humboldt
Lake
Mendocino
Napa
Sonoma
Trinity

Interior Counties.

Butte
Colusa
Glenn
Lassen
Modoc
Nevada
Placer
Plumas
Shasta
Sierra
Siskiyou
Sutter
Tehama
Yuba

CENTRAL CALIFORNIA.

San Francisco
(City and County).

Other Bay Counties.

Alameda
Contra Costa
Marin
San Mateo

Coast Counties.

Monterey
San Benito
San Luis Obispo
Santa Clara
Santa Cruz

Interior Counties.

Alpine
Amador
Calaveras
El Dorado
Fresno
Inyo
Kern
Kings
Madera
Mariposa
Merced
Mono
Sacramento
San Joaquin
Solano
Stanislaus
Tulare
Tuolumne
Yolo

SOUTHERN CALIFORNIA.

Los Angeles.

Other Counties.

Orange
Riverside
San Bernardino
San Diego *
Santa Barbara
Ventura

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* Includes Imperial County, formed August 15, 1907.

Increase, 1906 to 1907.—The following table gives the deaths, exclusive of stillbirths, reported for 1906 and 1907, as well as the number and per cent of increase (or decrease) for each geographic division indicated above, as well as for certain combinations of these divisions:

TABLE 2.—*Increase of Deaths, for Geographic Divisions: 1906 to 1907.*

GEOGRAPHIC DIVISION.	Deaths.		Increase.	
	1907.	1906.	Number.	Per Cent.
THE STATE	31,095	29,303	1,792	6.1
Northern California	3,944	3,528	416	11.8
Coast counties	1,761	1,614	147	9.1
Interior counties	2,183	1,914	269	14.1
Central California	18,063	17,692	371	2.1
San Francisco	6,575	7,151	576*	8.1*
Other bay counties	4,426	3,911	515	13.2
Coast counties	2,121	2,223	102*	4.6*
Interior counties	4,941	4,407	534	12.1
Southern California	9,088	8,083	1,005	12.4
Los Angeles	6,346	5,471	875	16.0
Other counties	2,742	2,612	130	5.0
Northern and Central California	22,007	21,220	787	3.7
Coast counties	14,883	14,899	16*	0.1*
Interior counties	7,124	6,321	803	12.7
Metropolitan area	11,001	11,062	61*	0.6*
Rural counties	11,006	10,158	848	8.3

*Decrease.

Exclusive of stillbirths, altogether 31,095 deaths were reported for 1907, as compared with 29,303 for 1906. The increase of deaths for 1907 over 1906 was only 1,792, or 6.1 per cent, the mortality for 1906 having been swollen unduly by the 750 deaths ascribed to earthquake and fire.

The effect of abnormal conditions in April, 1906, also appears in the fact that fewer deaths were reported for 1907 than for 1906 in San Francisco, as well as in the coast counties of Central California, the division in which Agnews State Hospital is situated. The decrease of deaths in the coast counties is less than the number of deaths from earthquake at Agnews State Hospital but the decrease of deaths in San Francisco is somewhat greater than the number of deaths there from earthquake and fire, 576 against 503. There were slight decreases of deaths for 1907 as compared with 1906 in the whole metropolitan area, comprising San Francisco and the other bay counties, as well as in the coast counties of Northern and Central California, these decreases being due to the unusual number of deaths in April, 1906, in the city and county of San Francisco and in the counties of Santa Clara (Agnews State Hospital) and Sonoma (Santa Rosa city).

In the counties north of Tehachapi the deaths for 1907 numbered 22,007, against 21,220 for 1906, the increase being 787, or only 3.7

per cent. The per cent of increase was 11.8 for Northern California and only 2.1 for Central California. For Southern California the totals were 9,088 in 1907 and 8,083 in 1906, a gain of 1,005, or 12.4 per cent.

The per cents of increase in deaths for minor geographic divisions were as follows: Los Angeles, 16.0; interior counties of Northern California, 14.1; bay counties other than San Francisco, 13.2; interior counties of Central California, 12.1; coast counties of Northern California, 9.1; and counties of Southern California other than Los Angeles, 5.0. The rate of gain was 12.1 for the interior counties of Northern and Central California, and 8.3 for all the rural counties north of Tehachapi.

DEATH-RATES: 1907 AND 1906.

Geographic Divisions.—In order to calculate death-rates the population of California has been estimated conservatively according to the Census Bureau method by adding to the population in 1900 six tenths of the increase between 1890 and 1900 for 1906, and seven tenths for 1907, except that for the few counties showing decreases between the last two Federal censuses the population in 1900 has been taken for both 1906 and 1907, and for the three principal cities arbitrary estimates have been made because of their exceptional conditions of growth. The estimate for San Francisco in 1906 was 450,000, for Los Angeles 200,000, and for Oakland 200,000, while for 1907 the estimates were, respectively, 450,000, 250,000, and 200,000, the estimates for San Francisco and Oakland remaining unchanged for 1907 because of possible overestimates for 1906.

The following table shows the population as thus estimated, the deaths, exclusive of stillbirths, and the death-rate per 1,000 population, for the several geographic divisions in both 1907 and 1906:

TABLE 3.—*Estimated Population, Deaths, and Death-rate per 1,000 Population, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Estimated Population.		Deaths.		Death-rate per 1,000 Population.	
	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	2,001,193	1,882,846	31,095	29,303	15.5	15.6
Northern California	274,686	272,095	3,944	3,528	14.4	13.0
Coast counties	124,373	123,078	1,761	1,614	14.2	13.1
Interior counties	150,313	149,017	2,183	1,914	14.5	12.8
Central California	1,235,303	1,175,186	18,063	17,692	14.6	15.1
San Francisco	450,000	450,000	6,575	7,151	14.6	15.9
Other bay counties	332,936	279,528	4,426	3,911	13.3	14.0
Coast counties	135,566	133,967	2,121	2,223	15.6	16.6
Interior counties	316,801	311,691	4,941	4,407	15.6	14.1
Southern California	491,204	435,565	9,088	8,083	18.5	18.6
Los Angeles	333,481	281,243	6,346	5,471	19.0	19.5
Other counties	157,723	154,322	2,742	2,612	17.4	16.9
Northern and Central California	1,509,989	1,447,281	22,007	21,220	14.6	14.7
Coast counties	1,042,875	986,573	14,883	14,899	14.3	15.1
Interior counties	467,114	460,708	7,124	6,321	15.3	13.7
Metropolitan area	782,936	729,528	11,001	11,062	14.1	15.2
Rural counties	727,053	717,753	11,006	10,158	15.1	14.2

For an estimated State population of 2,001,193 in 1907, the 31,095 deaths give a rate of 15.5, while for an estimated population of 1,882,846 in 1906, the 29,303 deaths represent a rate of 15.6 per 1,000 inhabitants.

The death-rates each year were highest for Southern California, 18.5

and 18.6 in 1907 and 1906, respectively; next for Central California, 14.6 and 15.1; and lowest for Northern California, 14.4 and 13.0.

The death-rate for Northern and Central California together was 14.6 in 1907 and 14.7 in 1906. The rate was less for the coast counties than for the interior counties in 1907, but contrariwise in 1906, and was similarly less for the metropolitan area than for the rural counties in 1907, but not in 1906, when the April earthquake disturbed things in the metropolis and in adjoining coast counties.

The death-rates in minor geographic divisions were highest each year for Los Angeles, 19.0 in 1907 and 19.5 in 1906; next for the other counties south of Tehachapi, 17.4 and 16.9; and next for the coast counties of Central California, 15.6 and 16.6. These are the only divisions with death-rates above the State averages both years, though the rate was also above the State average for the interior counties of Central California in 1907 and for San Francisco in 1906. Each year the death-rate was below the State average, 15.5 and 15.6, for both the coast and interior counties of Northern California, as well as for the bay counties other than San Francisco.

CAUSES OF DEATH: 1907 AND 1906.

The State.—The following table gives the number of deaths in California from certain principal causes, as well as the proportion per 1,000 total deaths and also the death-rate per 100,000 estimated population (2,001,193 in 1907 and 1,882,846 in 1906):

TABLE 4.—*Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths and Death-rate per 100,000 Population, for California: 1907 and 1906.*

CAUSE OF DEATH.	Deaths.		Proportion per 1,000 Total Deaths.		Death-rate per 100,000 Population.	
	1907.	1906.	1907.	1906.	1907.	1906.
ALL CAUSES	31,095	29,303	1,000.0	1,000.0	1,553.8	1,556.3
Typhoid fever	558	657	17.9	22.4	27.9	34.9
Malarial fever	70	111	2.2	3.8	3.5	5.9
Smallpox	6	36	0.2	1.2	0.3	1.9
Measles	189	169	6.1	5.8	9.4	9.0
Scarlet fever	72	52	2.3	1.8	3.6	2.8
Whooping-cough	173	122	5.6	4.2	8.6	6.5
Diphtheria and croup	380	244	12.2	8.3	19.0	13.0
Influenza	114	196	3.7	6.7	5.7	10.4
Plague	82	----------	2.6	----------	4.1	----------
Other epidemic diseases	121	174	3.9	5.9	6.1	9.2
Tuberculosis of lungs	4,040	3,861	129.9	131.7	201.9	205.1
Tuberculosis of other organs	567	576	18.2	19.7	28.3	30.6
Cancer	1,590	1,502	51.1	51.3	79.4	79.8
Other general diseases	1,095	1,016	35.2	34.7	54.7	54.0
Meningitis	657	466	21.1	15.9	32.8	24.7
Other diseases of nervous system	2,403	2,297	77.3	78.4	120.1	122.0
Diseases of circulatory system	4,362	3,766	140.3	128.5	218.0	200.0
Pneumonia and broncho-pneumonia	2,678	2,431	86.1	83.0	133.8	129.1
Other diseases of respiratory system	910	756	29.3	25.8	45.6	40.1
Diarrhea and enteritis, under 2 years	899	930	28.9	31.7	44.9	49.4
Diarrhea and enteritis, 2 years and over	288	338	9.3	11.5	14.4	17.9
Other diseases of digestive system	1,588	1,410	51.1	48.1	79.3	74.9
Bright's disease and nephritis	1,787	1,622	57.5	55.4	89.3	86.2
Childbirth	265	266	8.5	9.1	13.2	14.1
Diseases of early infancy	1,031	946	33.2	32.3	51.5	50.2
Suicide	608	501	19.6	17.1	30.4	26.6
Earthquake and fire	----------	750	----------	25.6	----------	39.8
Other violence	2,711	2,152	87.2	73.4	135.5	114.3
All other causes	1,851	1,956	59.5	66.7	92.5	103.9

Tuberculosis is the principal cause of death in California. Each year over one seventh of all deaths in the State were due to this disease, the per cent being 14.8 for 1907 and 15.1 for 1906. In 1907, 13.0 per cent of all deaths were from tuberculosis of the lungs and 1.8 per cent from tuberculosis of other organs. the corresponding figures for 1906 being 13.2 and 1.9, respectively. The death-rate per 100,000 population was 230.2 in 1907 and 235.7 in 1906 for all forms of tuberculosis.

Next to tuberculosis come diseases of the circulatory system, heart disease, etc. These diseases caused over one eighth of all deaths, 14.0 and 12.9 per cent in 1907 and 1906, and have rates of 218.0 and 200.0, respectively, per 100,000 population.

Next come diseases of the respiratory system, which caused about one ninth of all deaths in the State, 11.5 per cent in 1907 and 10.9

per cent in 1906. In 1907, pneumonia and broncho-pneumonia caused 8.6 per cent of the deaths and other diseases of the respiratory system caused 2.9 per cent, the per cents for 1906 being 8.3 for pneumonia and 2.6 for other diseases. The death-rate per 100,000 inhabitants for all diseases of the respiratory system was 179.4 in 1907 and 169.2 in 1906.

Following pneumonia and other diseases of the respiratory system come meningitis and other diseases of the nervous system. These diseases caused nearly one tenth of all deaths, 9.8 per cent in 1907 and 9.4 per cent in 1906, and have death-rates of 152.9 and 146.7 each year, respectively.

The proportions were next highest in the following cases: diseases of the digestive system (diarrhea and enteritis, etc.), 8.9 per cent in 1907 and 9.1 per cent in 1906; violence other than suicide (or earthquake and fire), 8.7 and 7.3 per cent in 1907 and 1906; cancer, 5.1 per cent each year; and Bright's disease and nephritis, 5.1 per cent in 1907 and 4.8 per cent in 1906.

Of the epidemic diseases, typhoid fever was by far the most fatal each year, causing 558 deaths, or 1.8 per cent of all, in 1907 and 657, or 2.2 per cent, in 1906. Diphtheria and croup caused 380 deaths, or 1.2 per cent, in 1907 and 244, or 0.8 per cent, in 1906. Deaths from other important epidemic diseases occurred as follows: measles, 189 and 169 in 1907 and 1906, respectively; whooping-cough, 173 and 122; influenza, 114 and 196; plague, 82 in 1907 but none in 1906; scarlet fever, 72 in 1907 and 52 in 1906; malarial fever, 70 and 111; and smallpox, 6 and 36.

Including cases first reported in the latter half of 1906, or even in 1907, altogether 750* deaths, or 2.6 per cent of all for the calendar year 1906 are charged against the earthquake and fire of April, 1906. The number given includes only the deaths known to have resulted from this public calamity, and may perhaps understate the loss of life resulting from this seismic disturbance. However, the total does include several deaths resulting only indirectly from earthquake and fire, as deaths of aged persons from fright or heart disease and deaths of infants from exposure.

The 750 deaths resulting directly or indirectly from earthquake and fire occurred in the following counties: San Francisco, 503; Santa Clara, 141; Sonoma, 72; Alameda, 12; Santa Cruz, 7; San Benito and Sacramento, 3 each; Mendocino, Napa, and Solano, 2 each; and Glenn, Nevada, and Los Angeles, 1 each. The bulk of the deaths in Santa Clara County were at the State Hospital at Agnews, and nearly all in Sonoma County were in Santa Rosa city. Most of the deaths in the other counties named occurred among refugees from San Francisco suffering from fright or exposure.

Main Geographic Divisions.—The table which follows gives for the three main geographic divisions in 1907 and 1906 the number of deaths from certain principal causes, as well as the proportion from each cause per 1,000 total deaths. The death-rates per 100,000 population are not shown for geographic divisions, because of the difficulty of estimating population for different localities with sufficiently equal accuracy to justify the comparison of detailed death-rates for individual causes of death.

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* This total differs from that of 709 given for the fiscal year 1905-1906 in the Nineteenth Biennial Report, page 90, because of 40 additional cases in San Francisco and 1 in Santa Cruz County not recorded in the State Bureau when the former report was printed.

TABLE 5.—*Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths, for Main Geographic Divisions: 1907 and 1906.*

CAUSE OF DEATH.	The State.		Northern California.		Central California.		Southern California.	
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
DEATHS.								
ALL CAUSES	31,095	29,303	3,944	3,528	18,063	17,692	9,088	8,083
Typhoid fever	558	657	61	71	373	460	124	126
Malarial fever	70	111	29	54	35	49	6	8
Smallpox	6	36	------	4	6	32	------	------
Measles	189	169	44	14	124	102	21	53
Scarlet fever	72	52	16	6	44	38	12	8
Whooping cough	173	122	28	28	98	67	47	27
Diphtheria and croup	380	244	51	32	233	134	96	78
Influenza	114	196	22	52	57	88	35	56
Plague	82	------	------	------	82	------	------	------
Other epidemic diseases	121	174	25	29	63	98	33	47
Tuberculosis of lungs	4,040	3,861	371	374	2,024	1,912	1,645	1,575
Tuberculosis of other organs	567	576	63	52	319	357	185	167
Cancer	1,590	1,502	134	155	991	911	465	436
Other general diseases	1,095	1,016	175	135	617	593	303	288
Meningitis	657	466	60	42	411	283	186	141
Other diseases of nervous system	2,403	2,297	419	400	1,268	1,232	716	665
Diseases of circulatory system	4,362	3,766	494	433	2,703	2,442	1,165	891
Pneumonia and broncho-pneumonia	2,678	2,431	395	266	1,686	1,616	597	549
Other diseases of respiratory system	910	756	111	93	542	458	257	205
Diarrhea and enteritis, under 2 years	899	930	80	73	558	637	261	220
Diarrhea and enteritis, 2 years and over	288	338	39	27	163	225	86	86
Other diseases of digestive system	1,588	1,410	183	173	946	851	459	386
Bright's disease and nephritis	1,787	1,622	188	147	1,025	977	574	498
Childbirth	265	266	30	37	169	162	66	67
Diseases of early infancy	1,031	946	81	62	614	571	336	313
Suicide	608	501	81	66	367	297	160	138
Earthquake and fire	------	750	------	78	------	671	------	1
Other violence	2,711	2,152	447	299	1,523	1,281	741	572
All other causes	1,851	1,956	317	326	1,022	1,148	512	462
PROPORTION PER 1,000 TOTAL DEATHS.								
ALL CAUSES	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Typhoid fever	17.9	22.4	15.5	20.1	20.6	26.0	13 6	15.6
Malarial fever	2.2	3.8	7.3	15.3	1.9	2.8	0.7	1.0
Smallpox	0.2	1.2	------	1.1	0.3	1.8	------	------
Measles	6.1	5.8	11.1	4.0	6.9	5.8	2.3	6.6
Scarlet fever	2.3	1.8	4.1	1.7	2.4	2.1	1.3	1.0
Whooping-cough	5.6	4.2	7.1	7.9	5.4	3.8	5.2	3.3
Diphtheria and croup	12.2	8.3	12.9	9.1	12.9	7.6	10.5	9.7
Influenza	3.7	6.7	5.6	14.7	3.2	5.0	3.8	6.9
Plague	2.6	------	------	------	4.5	------	------	------
Other epidemic diseases	3.9	5.9	6.3	8.2	3.5	5.5	3.6	5.8
Tuberculosis of lungs	129.9	131.7	94.1	106.0	112.1	108.1	181.0	194.9
Tuberculosis of other organs	18.2	19.7	16.0	14.7	17.7	20.2	20.4	20.7
Cancer	51.1	51.3	34.0	43.9	54.9	51.5	51.2	53.9
Other general diseases	35.2	34.7	44.4	38.3	34.2	33.5	33.3	35.6
Meningitis	21.1	15.9	15.2	11.9	22.8	16.0	20.5	17.4
Other diseases of nervous system	77.3	78.4	106.2	113.4	70.2	69.6	78.8	82.3
Diseases of circulatory system	140.3	128.5	125.2	122.7	149.6	138.0	128.2	110.2
Pneumonia and broncho-pneumonia	86.1	83.0	100.3	75.4	93.3	91.3	65.7	67.9
Other diseases of respiratory system	29.3	25.8	28.1	26.4	30.0	25.9	28.3	25.4
Diarrhea and enteritis, under 2 years	28.9	31.7	20.3	20.7	30.9	36.0	28.7	27.2
Diarrhea and enteritis, 2 years and over	9.3	11.5	9.9	7.7	9.0	12.7	9.5	10.6
Other diseases of digestive system	51.1	48.1	46.4	49.0	52.4	48.1	50.5	47.8
Bright's disease and nephritis	57.5	55.4	47.7	41.7	56.7	55.2	63.2	61.6
Childbirth	8.5	9.1	7.6	10.5	9.4	9.2	7.3	8.3
Diseases of early infancy	33.2	32.3	20.5	17.6	34.0	32.3	37.0	38.7
Suicide	19.6	17.1	20.5	18.7	20.3	16.8	17.6	17.1
Earthquake and fire	------	25.6	------	22.1	------	37.9	------	0.1
Other violence	87.2	73.4	113.3	84.8	84.3	72.4	81.5	70.8
All other causes	59.5	66.7	80.4	92.4	56.6	64.9	56.3	59.6

This table shows that the proportions for typhoid fever were particularly high for Central California, 20.6 and 26.0 in 1907 and 1906, against State averages of 17.9 and 22.4 per 1,000. The proportions for diphtheria and croup were above the State average of 12.2 per 1,000 for 1907 in Northern and Central California, 12.9 in each case, and were above the State average of 8.3 for 1906 in Southern and Northern California, 9.7 for the former and 9.1 for the latter, but not in Central California (7.6).

The proportions for Northern California are particularly high for diseases of the nervous system other than meningitis, being 106.2 and 113.4 for this main division, against 77.3 and 78.4 for the whole State, and for violence other than suicide (or earthquake and fire), being 113.3 and 84.8 for this division, against 87.2 and 73.4 for the State.

Central California excels especially in the proportions for diseases of the circulatory system (heart disease, etc.), 149.6 and 138.0, against State averages of 140.3 and 128.5, and for pneumonia and bronchopneumonia, 93.3 and 91.3, against general averages of 86.1 and 83.0 in 1907 and 1906, respectively.

Southern California leads decidedly in the proportions for tuberculosis. The proportions per 1,000 total deaths for tuberculosis of the lungs were no less than 181.0 and 194.9 for this main division, against only 129.9 and 131.7 for the entire State and for tuberculosis of other organs were 20.4 and 20.7 for this division against 18.2 and 19.7 for the State.

Minor Geographic Divisions.—The table on the following pages presents similar figures for the eight minor geographic divisions:

TABLE 6.—*Deaths from Certain Principal Causes, with Proportion*

CAUSE OF DEATH.	Deaths.						
	The State	Northern California.		Central California.			
		Coast Counties.	Interior Counties.	San Francisco	Other Bay Counties.	Coast Counties.	Interior Counties.
1907.							
ALL CAUSES	31,095	1,761	2,183	6,575	4,426	2,121	4,941
Typhoid fever	558	13	48	123	101	39	110
Malarial fever	70	1	28	6	7	------	22
Smallpox	6	------	------	4	1	------	1
Measles	189	30	14	53	26	9	36
Scarlet fever	72	4	12	8	9	3	24
Whooping-cough	173	20	8	43	26	8	21
Diphtheria and croup	380	17	34	72	81	16	64
Influenza	114	5	17	8	13	12	24
Plague	82	------	------	74	8	------	------
Other epidemic diseases	121	9	16	16	13	12	22
Tuberculosis of lungs	4,040	176	195	684	489	241	610
Tuberculosis of other organs	567	43	20	118	88	36	77
Cancer	1,590	65	69	434	216	119	222
Other general diseases	1,095	76	99	230	144	63	180
Meningitis	657	28	32	146	104	44	117
Other diseases of nervous system	2,403	272	147	342	311	195	420
Diseases of circulatory system	4.632	236	258	1,065	706	349	583
Pneumonia and broncho-pneumonia	2,678	141	254	708	409	139	430
Other diseases of respiratory system	910	48	63	194	122	78	148
Diarrhea and enteritis, under 2 years	899	38	42	217	146	63	132
Diarrhea and enteritis, 2 years and over	288	23	16	45	38	29	51
Other diseases of digestive system	1,588	89	94	357	214	117	258
Bright's disease and nephritis	1.787	89	99	391	263	136	235
Childbirth	265	11	19	50	47	31	41
Diseases of early infancy	1.031	42	39	244	144	74	152
Suicide	608	33	48	148	84	38	97
Other violence	2.711	134	313	483	404	159	477
All other causes	1,851	118	199	312	212	111	387
1906.							
ALL CAUSES	29,303	1,614	1,914	7,151	3.911	2,223	4,407
Typhoid fever	657	22	49	220	76	35	129
Malarial fever	111	5	49	6	5	------	38
Smallpox	36	1	3	20	5	------	7
Measles	169	11	3	57	27	4	14
Scarlet fever	52	2	4	16	12	2	8
Whooping-cough	122	11	17	32	22	7	6
Diphtheria and croup	244	12	20	45	52	9	28
Influenza	196	17	35	23	15	21	29
Other epidemic diseases	174	8	21	39	19	10	30
Tuberculosis of lungs	3.861	175	199	682	406	271	553
Tuberculosis of other organs	576	35	17	127	82	51	97
Cancer	1,502	74	81	356	235	116	204
Other general diseases	1,016	62	73	226	128	78	161
Meningitis	466	17	25	99	70	30	84
Other diseases of nervous system	2,297	242	158	401	259	203	369
Diseases of circulatory system	3.766	201	232	1,069	544	307	522
Pneumonia and broncho-pneumonia	2,431	111	155	727	395	137	357
Other diseases of respiratory system	756	36	57	199	117	52	90
Diarrhea and enteritis, under 2 years	930	36	37	277	153	73	134
Diarrhea and enteritis, 2 years and over	338	13	14	64	47	37	77
Other diseases of the digestive system	1,410	77	96	322	189	106	234
Bright's disease and nephritis	1,622	74	73	430	254	122	171
Childbirth	266	10	27	61	36	27	38
Diseases of early infancy	946	26	36	228	141	53	149
Suicide	501	31	35	140	65	32	60
Earthquake and fire	750	76	2	503	12	151	5
Other violence	2,152	110	189	438	275	159	409
All other causes	1,956	119	207	344	270	130	404

per 1,000 Total Deaths, for Minor Geographic Divisions: 1907 and 1906.

Deaths.		Proportion per 1,000 Total Deaths.								
Southern California.		The State	Northern California.		Central California.				Southern California.	
Los Angeles	Other Counties.		Coast Counties.	Interior Counties.	San Francisco	Other Bay Counties.	Coast Counties.	Interior Counties.	Los Angeles	Other Counties.
6,346	2,742	1,000.0	1.000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
87	37	17.9	7.4	22.0	18.7	22.8	18.4	22.3	13.7	13.5
4	2	2.2	0.6	12.8	0.9	1.6	--------	4.5	0.6	0.7
--------	--------	0.2	--------	--------	0.6	0.2	--------	0.2	--------	--------
16	5	6.1	17.0	6.4	8.1	5.9	4.2	7.3	2.5	1.8
9	3	2.3	2.3	5.5	1.2	2.0	1.4	4.9	1.4	1.1
31	16	5.6	11.4	3.7	6.5	5.9	3.8	4.2	4.9	5.8
75	21	12.2	9.7	15.6	11.0	18.3	7.5	12.9	11.8	7.7
25	10	3.7	2.8	7.8	1.2	2.9	5.7	4.9	3.9	3.6
--------	--------	2.6	--------	--------	11.3	1.8	--------	--------	--------	--------
26	7	3.9	5.1	7.3	2.4	2.9	5.7	4.5	4.1	2.6
1,150	495	129.9	99.9	89.3	104.0	110.5	113.6	123.4	181.2	180.5
136	49	18.2	24.4	9.2	17.9	19.9	17.0	15.6	21.4	17.9
345	120	51.1	36.9	31.6	66.0	48.8	56.1	44.9	54.4	43.8
218	85	35.2	43.2	45.3	35.0	32.5	29.7	36.4	34.4	31.0
145	41	21.1	15.9	14.7	22.2	23.5	20.8	23.7	22.9	14.9
447	269	77.3	154.4	67.3	52.0	70.3	91.9	85.0	70.4	98.1
830	335	140.3	134.0	118.2	162.0	159.5	164.5	118.0	130.8	122.2
439	158	86.1	80.1	116.3	107.7	92.4	65.5	87.0	69.2	57.6
170	87	29.3	27.3	28.9	29.5	27.6	36.8	30.0	26.8	31.7
184	77	28.9	21.6	19.2	33.0	33.0	29.7	26.7	29.0	28.1
61	25	9.3	13.1	7.3	6.8	8.6	13.7	10.3	9.6	9.1
340	119	51.1	50.5	43.1	54.3	48.4	55.2	52.2	53.6	43.4
409	165	57.5	50.5	45.3	59.5	59.4	64.1	47.6	64.5	60.2
51	15	8.5	6.2	8.7	7.6	10.6	14.6	8.3	8.0	5.5
249	87	33.2	23.9	17.9	37.1	32.5	34.9	30.8	39.2	31.7
111	49	19.6	18.7	22.0	22.5	19.0	17.9	19.6	17.5	17.9
468	273	87.2	76.1	143.4	73.5	91.3	75.0	96.5	73.8	99.6
320	192	59.5	67.0	91.2	47.5	47.9	52.3	78.3	50.4	70.0
5,471	2,612	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
84	42	22.4	13.6	25.6	30.8	19.4	15.8	29.3	15.4	16.1
5	3	3.8	3.1	25.6	0.8	1.3	--------	8.6	0.9	1.1
--------	--------	1.2	0.6	1.6	2.8	1.3	--------	1.6	--------	--------
42	11	5.8	6.8	1.6	8.0	6.9	1.8	3.2	7.7	4.2
6	2	1.8	1.2	2.1	2.2	3.1	0.9	1.8	1.1	0.8
13	14	4.2	6.8	8.9	4.5	5.6	3.2	1.4	2.4	5.4
59	19	8.3	7.4	10.4	6.3	13.3	4.1	6.4	10.8	7.3
28	28	6.7	10.5	18.3	3.2	3.8	9.5	6.6	5.1	10.7
34	13	5.9	5.0	11.0	5.5	4.9	4.5	6.8	6.2	5.0
1,049	526	131.7	108.4	104.0	95.4	103.8	121.9	125.5	191.7	201.4
112	55	19.7	21.7	8.9	17.8	21.0	22.9	22.0	20.5	21.1
304	132	51.3	45.9	42.3	49.8	60.1	52.2	46.3	55.6	50.5
212	76	34.7	38.4	38.1	31.6	32.7	35.1	36.5	38.8	29.1
98	43	15.9	10.5	13.1	13.8	17.9	13.5	19.1	17.9	16.5
394	271	78.4	149.9	82.6	56.1	66.2	91.3	83.7	72.0	103.7
640	251	128.5	124.5	121.2	149.5	139.1	138.1	118.4	117.0	96.1
387	162	83.0	68.8	81.0	101.7	101.0	61.6	81.0	70.7	62.0
143	62	25.8	22.3	29.8	27.8	29.9	23.4	20.4	26.1	23.7
147	73	31.7	22.3	19.3	38.7	39.1	32.8	30.4	26.9	28.0
57	29	11.5	8.1	7.3	8.9	12.0	16.6	17.5	10.4	11.1
288	98	48.1	47.7	50.1	45.0	48.3	47.7	53.1	52.6	37.5
336	162	55.4	45.9	38.1	60.1	65.0	54.9	38.8	61.4	62.0
48	19	9.1	6.2	14.1	8.5	9.2	12.1	8.6	8.8	7.3
232	81	32.3	16.1	18.8	31.9	36.1	23.8	33.8	42.4	31.0
102	36	17.1	19.2	18.3	19.6	16.6	14.4	13.6	18.6	13.8
1	--------	25.6	47.1	1.0	70.3	3.1	67.9	1.1	0.2	--------
365	207	73.4	68.2	98.7	61.3	70.3	71.5	92.8	66.7	79.2
285	197	66.7	73.8	108.2	48.1	69.0	58.5	91.7	52.1	75.4

From the proportions per 1,000 total deaths shown for minor geographic divisions it appears that the high proportions for typhoid fever noted for Central California were confined to San Francisco (30.8), and to the interior counties (29.3) in 1906, but that in 1907 the proportions were above the State average for all four divisions of Central California, especially the bay counties other than San Francisco (22.8), and the interior counties extending form Yolo, Sacramento, and El Dorado on the north to and including Kern in the south (22.3). The proportions for typhoid fever were also high each year for the interior counties of Northern California, 22.0 in 1907 and 25.6 in 1906.

The proportions for diphtheria and croup were above the State average of 12.2 for 1907 in the bay counties other than San Francisco (18.3), the interior counties of Northern California (15.6), and the interior counties of Central California (12.9), and were above the State average of 8.3 for 1906 for the bay counties other than San Francisco (13.3), for Los Angeles (10.8), and for the interior counties of Northern California (10.4).

The coast counties of Northern California have very high proportions for diseases of the nervous system other than meningitis, 154.4 and 149.9 in 1907 and 1906, against State averages of 77.3 and 78.4. This is accounted for by the fact that many of the deaths reported for this geographic division occurred at the Mendocino and Napa State Hospitals. The proportions for diseases of the nervous system are also high for the counties south of Tehachapi except Los Angeles (98.1 and 103.7), and for the coast counties of Central California (91.9 and 91.3), the former division including the Southern California State Hospital and the latter the Agnews State Hospital.

The interior counties of Northern California show proportions that are very high, 143.4 and 98.7, against State averages of 87.2 and 73.4, for miscellaneous deaths from violence, as drowning, railroad injuries, other accidents, etc.

The proportions for diseases of the circulatory system (140.3 and 128.5 for the State in 1907 and 1906) are particularly high for San Francisco (162.0 and 149.5), for the other bay counties (159.5 and 139.1), and for the adjoining coast counties (164.5 and 138.1).

The proportions for pneumonia and broncho-pneumonia (86.1 for the State in 1907 and 83.0 in 1906) are especially high for San Francisco (107.7 and 101.7), and for the other bay counties (92.4 and 101.0). The proportions for pneumonia were also high in 1907 for the interior counties of Northern California (116.3), as well as for the interior counties of Central California (87.0).

It is worth noting, incidentally, that the proportions of all deaths from diarrhea and enteritis among children under 2 years of age were no less than 33.0 and 38.7 for San Francisco, and 33.0 and 39.1 for the other bay counties, as compared with only 28.9 and 31.7 for the entire State. Moreover, the proportions for suicide were as great as 22.5 and 19.6 for San Francisco, against 19.6 and 17.1 for the State in 1907 and 1906, respectively.

The proportions for tuberculosis of the lungs, 129.9 in 1907 and 131.7 in 1906 for the State, were as great as 181.2 and 191.7 for Los

Angeles and 180.5 and 201.4 for the other counties of Southern California. Similarly, as compared with State averages of 18.2 and 19.7 for tuberculosis of other organs, the proportions per 1,000 total deaths were 21.4 and 20.5 for Los Angeles and 17.9 and 21.1 for the remaining counties south of Tehachapi.

Urban and Rural Districts.—The table which follows has been prepared to bring out the contrast between mortality conditions in urban and rural districts, figures like those in preceding tables being given here for the metropolitan area, comprising San Francisco and the other boy counties (Alameda, Contra Costa, Marin, and San Mateo), as compared with the rural counties of Northern and Central California:

TABLE 7.—*Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths, for Metropolitan Area and Rural Counties of Northern and Central California: 1907 and 1906.*

CAUSE OF DEATH.	Northern and Central California.		Metropolitan Area.		Rural Counties.	
	1907.	1906.	1907.	1906.	1907.	1906.
DEATHS.						
ALL CAUSES	22,007	21,220	11,001	11,062	11,006	10,158
Typhoid fever	434	531	224	296	210	235
Malarial fever	64	103	13	11	51	92
Smallpox	6	36	5	25	1	11
Measles	168	116	79	84	89	32
Scarlet fever	60	44	17	28	43	16
Whooping-cough	126	95	69	54	57	41
Diphtheria and croup	284	166	153	97	131	69
Influenza	79	140	21	38	58	102
Plague	82	--------	82	--------	--------	--------
Other epidemic diseases	88	127	29	58	59	69
Tuberculosis of lungs	2,395	2,286	1,173	1,088	1,222	1,198
Tuberculosis of other organs	382	409	206	209	176	200
Cancer	1,125	1,066	650	591	475	475
Other general diseases	792	728	374	354	418	374
Meningitis	471	325	250	169	221	156
Other diseases of nervous system	1,687	1,632	653	660	1,034	972
Diseases of circulatory system	3,197	2,875	1,771	1,613	1,426	1,262
Pneumonia and broncho-pneumonia	2,081	1,882	1,117	1,122	964	760
Other diseases of respiratory system	653	551	316	316	337	235
Diarrhea and enteritis, under 2 years	638	710	363	430	275	280
Diarrhea and enteritis, 2 years and over	202	252	83	111	119	141
Other diseases of digestive system	1,129	1,024	571	511	558	513
Bright's disease and nephritis	1,213	1,124	654	684	559	440
Childbirth	199	199	97	97	102	102
Diseases of early infancy	695	633	388	369	307	264
Suicide	448	363	232	205	216	158
Earthquake and fire	--------	749	--------	515	--------	234
Other violence	1,970	1,580	887	713	1,083	867
All other causes	1,339	1,474	524	614	815	860

TABLE 7.—*Deaths from Certain Principal Causes, with Proportion per 1,000 Total Deaths, for Metropolitan Area and Rural Counties of Northern and Central California: 1907 and 1906—Continued.*

CAUSE OF DEATH.	Northern and Central California.		Metropolitan Area.		Rural Counties.	
	1907.	1906.	1907.	1906.	1907.	1906.
PROPORTION PER 1,000 TOTAL DEATHS.						
ALL CAUSES	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Typhoid fever	19.7	25.0	20.4	26.8	19.1	23.1
Malarial fever	2.9	4.8	1.2	1.0	4.6	9.1
Smallpox	0.3	1.7	0.5	2.3	0.1	1.1
Measles	7.6	5.5	7.2	7.6	8.1	3.2
Scarlet fever	2.7	2.1	1.5	2.5	3.9	1.6
Whooping-cough	5.7	4.5	6.3	4.9	5.2	4.0
Diphtheria and croup	12.9	7.8	13.9	8.8	11.9	6.8
Influenza	3.6	6.6	1.9	3.4	5.3	10.0
Plague	3.7	--------	7.5	--------	--------	--------
Other epidemic diseases	4.0	6.0	2.6	5.2	5.4	6.8
Tuberculosis of lungs	108.8	107.7	106.6	98.4	111.0	117.9
Tuberculosis of other organs	17.4	19.3	18.7	18.9	16.0	19.7
Cancer	51.1	50.2	59.1	53.4	43.1	46.8
Other general diseases	36.0	34.3	34.0	32.0	38.0	36.8
Meningitis	21.4	15.3	22.7	15.3	20.1	15.4
Other diseases of nervous system	76.7	76.9	59.4	59.7	93.9	95.7
Diseases of circulatory system	145.3	135.5	161.0	145.8	129.6	124.2
Pneumonia and broncho-pneumonia	94.6	88.7	101.5	101.4	87.6	74.8
Other diseases of respiratory system	29.7	26.0	28.7	28.6	30.6	23.1
Diarrhea and enteritis, under 2 years	29.0	33.4	33.0	38.9	25.0	27.6
Diarrhea and enteritis, 2 years and over	9.2	11.9	7.5	10.0	10.8	13.9
Other diseases of digestive system	51.3	48.2	51.9	46.2	50.7	50.5
Bright's disease and nephritis	55.1	53.0	59.5	61.8	50.8	43.3
Childbirth	9.0	9.4	8.8	8.8	9.3	10.0
Diseases of early infancy	31.6	29.8	35.3	33.4	27.9	26.0
Suicide	20.4	17.1	21.1	18.5	19.6	15.6
Earthquake and fire	--------	35.3	--------	46.5	--------	23.0
Other violence	89.5	74.5	80.6	64.4	98.4	85.3
All other causes	60.8	69.5	47.6	55.5	74.0	84.7

There were substantially the same number of deaths each year in the metropolitan area as in all the other counties north of Tehachapi, the totals being respectively 11,001 and 11,006 in 1907 and 11,062 and 10,158 in 1906. However, there are marked differences between the whole urban area and the rural districts in the distribution of deaths by main causes.

The proportion per 1,000 total deaths for typhoid fever was 20.4 in 1907 and 26.8 in 1906 for the metropolitan area, as compared with only 19.1 and 23.1 for the rural counties. Similarly, the proportions for diphtheria and croup were 13.9 and 8.8 for the urban territory, against only 11.9 and 6.8 for the country districts. On the other hand, the proportions for malarial fever were 4.6 and 9.1 for the rural counties in 1907 and 1906, respectively, against merely 1.2 and 1.0 for the metropolitan area.

The proportion of deaths from diseases of the circulatory system (heart disease, etc.) is very much higher for the urban territory than for the country districts, the proportions for the former in 1907 and 1906 being as great as 161.0 and 145.8, against only 129.6 and 124.2 for the latter. The proportions for Bright's disease and nephritis, which often occur with heart disease, were also higher each year for the metropolitan area (59.5 and 61.8) than for the rural counties (50.8 and 43.3).

. Other important cases in which the proportions per 1,000 total deaths were higher in both 1907 and 1906 for the urban territory than for the country districts are, as follows: pneumonia and broncho-pneumonia, 101.5 and 101.4, against 87.6 and 74.8; cancer, 59.1 and 53.4, against 43.1 and 46.8; diarrhea and enteritis, under 2 years, 33.0 and 38.9, against 25.0 and 27.6; diseases of early infancy (under 3 months), 35.3 and 33.4, against 27.9 and 26.0; and suicide, 21.1 and 18.5, against 19.6 and 15.6.

On the other hand, the proportions were higher in both 1907 and 1906 for the rural counties than for the metropolitan area in the following notable instances: tuberculosis of the lungs, 111.0 and 117.9, as compared with 106.6 and 98.4; general diseases other than tuberculosis and cancer, 38.0 and 36.8, as compared with 34.0 and 32.0; diseases of the nervous system other than meningitis, 93.9 and 95.7, as compared with 59.4 and 59.7; violence other than suicide (or earthquake and fire) 98.4 and 85.3, as compared with 80.6 and 64.4; and miscellaneous causes (including ''old age''), 74.0 and 84.7, as compared with 47.6 and 55.5.

In short, there are relatively more deaths in urban than in rural districts from heart disease, Bright's disease, pneumonia, cancer, infancy and infantile diarrhea, and suicide, as well as from typhoid fever and from diphtheria and croup. However, there is a relatively greater mortality in country districts than in the urban area from tuberculosis, other general diseases, diseases of the nervous system, violence, and ''old age,'' as well as from malarial fever.

TUBERCULOSIS IN CALIFORNIA.

The State.—Tuberculosis is the principal cause of death in California, being the cause of about one seventh of all deaths. Of 31,095 deaths reported to the State Bureau of Vital Statistics for 1907, 4,607, or 14.8 per cent, were from tuberculosis, and of 29,303 deaths reported for 1906, 4,437, or 15.1 per cent, were also from the "great white plague." The totals for diseases of the circulatory system were only 4,362 and 3,766 for 1907 and 1906, respectively; for diseases of the respiratory system, 3,588 and 3,187; for diseases of the nervous system, 3,060 and 2,763; and for diseases of the digestive system, 2,775 and 2,678.

From tuberculosis of the lungs there were 4,040 deaths in 1907, as compared with 3,861 in 1906, while from tuberculosis of other organs there were 567 deaths in 1907 against 576 in 1906.* Of each 1,000 deaths in California in 1907, 129.9 were from tuberculosis of the lungs and 18.2 from tuberculosis of other organs, or 148.1 from tuberculosis of all forms. In 1906 the proportions were 131.7 for tuberculosis of the lungs and 19.7 for tuberculosis of other organs, or 151.4 for all forms.

For an estimated State population of 2,001,193 in 1907 the death-rate per 100,000 inhabitants is 201.9 for tuberculosis of the lungs and 28.3 for tuberculosis of other organs, or altogether 230.2 for all forms of tuberculosis. Similarly, for an estimated population of 1,882,846 in 1906 the death-rate per 100,000 is 205.1 for pulmonary tuberculosis and 30.6 for other forms, or 235.7 for all kinds. In short, the tuberculosis death-rate per 100,000 was no less than 230.2 for 1907 and 235.7 for 1906.

The general death-rate per 1,000 population was 15.5 for California in 1907 and 15.6 in 1906, the rates being swollen greatly by deaths from tuberculosis. It will be shown that many deaths from tuberculosis in California occur among persons of short residence in the State, who evidently came here when too far gone with the disease to be cured. It is also quite likely that many other cases arising here are directly due to this imported infection.

Geographic Divisions.—Southern California is an especially popular resort for consumptives, and here over one fifth of all deaths are due to tuberculosis. The table on the opposite page shows the number and per cent of deaths from tuberculosis for the several geographic divisions of the State in both 1907 and 1906:

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*The distribution of deaths from tuberculosis other than pulmonary was as follows:

	1907.	1906.
Tuberculosis of larynx	29	23
Tuberculous meningitis	230	246
Abdominal tuberculosis	161	166
Pott's disease	26	30
Tuberculous abscess	1	4
White swelling	10	15
Tuberculosis of other organs	28	28
General tuberculosis	82	64
Total	567	576

TABLE 8.—*Number and Per Cent of Deaths from Tuberculosis, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Deaths.		Tuberculosis.			
			Number		Per Cent.	
	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	31,095	29,303	4,607	4,437	14.8	15.1
Northern California	3,944	3,528	434	426	11.0	12.1
Coast counties	1,761	1,614	219	210	12.4	13.0
Interior counties	2,183	1,914	215	216	9.8	11.3
Central California	18,063	17,692	2,343	2,269	13.0	12.8
San Francisco	6,575	7,151	802	809	12.2	11.3
Other bay counties	4,426	3,911	577	488	13.0	12.5
Coast counties	2,121	2,223	277	322	13.1	14.5
Interior counties	4,941	4,407	687	650	13.9	14.7
Southern California	9,088	8,083	1,830	1,742	20.1	21.6
Los Angeles	6,346	5,471	1,286	1,161	20.3	21.2
Other counties	2,742	2,612	544	581	19.8	22.2
Northern and Central California	22,007	21,220	2,777	2,695	12.6	12.7
Coast counties	14,883	14,899	1,875	1,829	12.6	12.3
Interior counties	7,124	6,321	902	866	12.7	13.7
Metropolitan area	11,001	11,062	1,379	1,297	12.5	11.7
Rural counties	11,006	10,158	1,398	1,398	12.7	13.8

This table shows that in Southern California in 1907, 20.1 per cent of all deaths were from tuberculosis, and in 1906 no less than 21.6 per cent. For Los Angeles County the per cents were 20.3 for 1907 and 21.2 for 1906, while for the other counties south of Tehachapi the per cents were respectively 19.8 and 22.2.

North of Tehachapi only one eighth of the deaths are due to tuberculosis, the per cents for Northern and Central California together being 12.6 for 1907 and 12.7 for 1906. The per cents for 1907 and 1906, respectively, were 13.0 and 12.8 for Central California and 11.0 and 12.1 for Northern California, the prevalence of tuberculosis decreasing more and more toward the north. The per cent was below the State average each year for every main and minor geographic division north of Tehachapi, being lowest of all for the interior counties of Northern California, 9.8 in 1907 and 11.3 in 1906.

The per cents are somewhat less for the metropolitan area comprising San Francisco and the other bay counties, 12.5 in 1907 and 11.7 in 1906, than for the rural counties north of Tehachapi, 12.7 and 13.8, respectively. In the city and county of San Francisco the per cent of deaths from tuberculosis was only 12.2 for 1907 and 11.3 for 1906.

Length of Residence.—The heavy mortality from tuberculosis in California is due largely to the immigration of people so badly afflicted with this disease that they can not recover, even under the most favorable climatic conditions, though they may lengthen their lives somewhat by coming to this land of sunshine. For it appears that many who died of tuberculosis in California had been residents of the Golden State for only a short time. This is shown for the several geographic divisions in 1907 and 1906 in the following table, giving numbers and per cents by length of residence:

TABLE 9.—*Deaths from Tuberculosis classified by Length of Residence in California, with Per Cents, for Geographic Divisions: 1907 and 1906.*

Geographic Division.	Total	Length of Residence.					Per Cent.				
		Under 1 Year	1 to 9 Years	10 Years and Over	Life	Unknown	Under 1 Year	1 to 9 Years	10 Years and Over	Life	Unknown
1907.											
THE STATE	4,607	457	1,030	1,184	1,319	617	9.9	22.4	25.7	28.6	13.4
Northern California	434	16	35	148	156	79	3.7	8.1	34.1	35.9	18.2
Coast counties	219	5	12	76	89	37	2.3	5.5	34.7	40.6	16.9
Interior counties	215	11	23	72	67	42	5.1	10.7	33.5	31.2	19.5
Central California	2,343	104	300	700	892	347	4.4	12.8	29.9	38.1	14.8
San Francisco	802	35	87	209	326	145	4.4	10.8	26.1	40.6	18.1
Other bay counties	577	18	70	207	217	65	3.1	12.1	35.9	37.6	11.3
Coast counties	277	12	29	85	135	16	4.3	10.5	30.7	48.7	5.8
Interior counties	687	39	114	199	214	121	5.7	16.6	29.0	31.1	17.6
Southern California	1,830	337	695	336	271	191	18.4	38.0	18.4	14.8	10.4
Los Angeles	1,286	227	508	238	165	148	17.7	39.5	18.5	12.8	11.5
Other counties	544	110	187	98	106	43	20.2	34.4	18.0	19.5	7.9
Northern and Central California	2,777	120	335	848	1,048	426	4.3	12.1	30.5	37.7	15.4
Coast counties	1,875	70	198	577	767	263	3.7	10.6	30.8	40.9	14.0
Interior counties	902	50	137	271	281	163	5.5	15.2	30.0	31.2	18.1
Metropolitan area	1,379	53	157	416	543	210	3.8	11.4	30.2	39.4	15.2
Rural counties	1,398	67	178	432	505	216	4.8	12.7	30.9	36.1	15.5
1906.											
THE STATE	4,437	555	917	1,182	1,284	499	12.5	20.7	26.6	28.9	11.3
Northern California	426	16	47	142	160	61	3.8	11.0	33.3	37.6	14.3
Coast counties	210	4	27	69	83	27	1.9	12.9	32.8	39.5	12.9
Interior counties	216	12	20	73	77	34	5.6	9.3	33.8	35.6	15.7
Central California	2,269	97	287	696	864	325	4.3	12.6	30.7	38.1	14.3
San Francisco	809	21	75	224	341	148	2.6	9.3	27.7	42.1	18.3
Other bay counties	488	17	72	178	169	52	3.5	14.7	36.5	34.6	10.7
Coast counties	322	23	46	85	147	21	7.1	14.3	26.4	45.7	6.5
Interior counties	650	36	94	209	207	104	5.5	14.5	32.2	31.8	16.0
Southern California	1,742	442	583	344	260	113	25.4	33.5	19.7	14.9	6.5
Los Angeles	1,161	286	425	227	149	74	24.6	36.6	19.6	12.8	6.4
Other counties	581	156	158	117	111	39	26.9	27.2	20.1	19.1	6.7
Northern and Central California	2,695	113	334	838	1,024	386	4.2	12.4	31.1	38.0	14.3
Coast counties	1,829	65	220	556	740	248	3.5	12.0	30.4	40.5	13.6
Interior counties	866	48	114	282	284	138	5.5	13.2	32.6	32.8	15.9
Metropolitan area	1,297	38	147	402	510	200	2.9	11.4	31.0	39.3	15.4
Rural counties	1,398	75	187	436	514	186	5.3	13.4	31.2	36.8	13.3

It appears from the table that the per cent of tuberculosis victims in California who were natives of the State, having been here for life, was only 28.6 for 1907 and 28.9 for 1906. The per cent born elsewhere, but who were residents of 10 years' standing, was 25.7 for 1907 and 26.6 for 1906, while the per cents for those who had lived in California only from 1 to 9 years were 22.4 and 20.7 for 1907 and 1906, respectively. In 1907 9.9 per cent, and in 1906 no less than 12.5 per cent, of all the deaths from tuberculosis were of persons who had been in the State less than a year. The length of residence was unknown for 13.4 per cent of the tuberculosis victims in 1907 and for 11.3 per cent in 1906.

The per cent for natives of the State was 38.1 for Central California each year, and for Northern California 35.9 in 1907 and 37.6 in 1906. The per cents were respectively 37.7 and 38.0 for the counties north of Tehachapi against only 14.8 and 14.9 for those to the south. The per cent of tuberculosis victims born in the State was 39.4 for the metropolitan area in 1907 and 39.3 in 1906, as compared with, respectively, 36.1 and 36.8 for the rural counties north of Tehachapi.

The deaths from tuberculosis among residents of 10 years' standing were 34.1 and 33.3 per cent for Northern California and 29.9 and 30.7 for Central California in 1907 and 1906, respectively. For Northern and Central California together the per cents were 30.5 and 31.1 against only 18.4 and 19.7 for Southern California. North of Tehachapi the per cents were respectively 30.2 and 31.0 for the metropolitan area. as compared with 30.9 and 31.2 for the rural counties.

In 1907 altogether 32.3 per cent of the deaths occurred among residents of less than 10 years' standing, 22.4 per cent having lived here from 1 to 9 years and 9.9 per cent under 1 year. Similarly, in 1906 20.7 per cent had been here from 1 to 9 years and 12.5 per cent under 1 year, or altogether 33.2 per cent had resided in California less than 10 years. The per cents for residents of less than 10 years' standing are above the State averages only for Southern California, 56.4 in 1907 and 58.9 in 1906. The per cents were 57.2 and 61.2 for Los Angeles and 54.6 and 54.1 for the other counties south of Tehachapi in 1907 and 1906, respectively. On the other hand, the corresponding per cents were only 16.4 and 16.6 for the counties north of Tehachapi, being 17.2 and 16.9 for Central California, and 11.8 and 14.8 for Northern California. The per cent of deaths among persons who had lived in California less than 10 years was 15.2 for the metropolitan area in 1907 and 14.3 in 1906. as compared with, respectively, 17.5 and 18.7 for the rural counties north of Tehachapi.

It seems, therefore, that in Southern California, where over one fifth of all deaths are from tuberculosis, that nearly three fifths of these deaths occur among persons who had been in the State less than 10 years. In fact, about one fifth of all the tuberculosis victims south of Tehachapi had resided in California less than a year, the per cent being 18.4 for 1907 and 25.4 for 1906. The per cents were 17.7 and 24.6 for Los Angeles and 20.2 and 26.9 for the other counties in 1907 and 1906, respectively.

Southern California.—Moreover, many who died of tuberculosis in Southern California had lived in the State only a few months. This is shown clearly in the following table giving numbers and per cents by length of residence in months for Southern California in 1907 and 1906:

TABLE 10.—*Deaths from Tuberculosis classified by Length of Residence (in Months), with Per Cents, for Southern California: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Length of Residence.									
	Total Under 1 Year.		Under 1 Month.		1 to 2 Months.		3 to 5 Months.		6 to 11 Months.	
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
NUMBERS.										
Southern California	337	442	43	59	97	100	92	120	105	163
Los Angeles	227	286	29	37	72	60	55	79	71	110
Other counties	110	156	14	22	25	40	37	41	34	53
PER CENTS.										
Southern California	18.4	25.4	2.4	3.4	5.3	5.7	5.0	6.9	5.7	9.4
Los Angeles	17.7	24.6	2.3	3.2	5.6	5.1	4.3	6.8	5.5	9.5
Other counties	20.2	26.9	2.6	3.8	4.6	6.9	6.8	7.1	6.2	9.1

The table shows that of all who died of tuberculosis in Southern California in 1907, 2.4 per cent had been in the State less than a month, altogether 7.7 per cent less than three months, and altogether 12.7 per cent less than six months. In 1906 3.4 per cent had lived here under a month, altogether 9.1 per cent under three months, and altogether 16.0 per cent under six months. Of all the tuberculosis victims in Los Angeles in 1907 12.2 per cent, and in 1906 15.1 per cent, had resided in California less than half a year. The corresponding per cents for the other counties south of Tehachapi are 14.0 for 1907 and 17.8 for 1906.

Conclusion.—These figures give only a minimum statement of the extent to which the general death-rate of California is swollen by the deaths of persons who were stricken with tuberculosis elsewhere, and who simply came here in the hope of recovering, or with the expectation of at least lengthening their lives in the glorious climate of the Golden State. The statistics cover only the deaths that occur among these recent residents, in many cases quite soon after their arrival in this land of sunshine. No data are available to tell what proportion of deaths from tuberculosis among native Californians and old-time residents are directly due to imported infection by the presence here of sick people from other places. It is quite evident, however, that the death-rate of California is swollen somewhat by the unhealthfulness, not of this State, but of other states, being increased, in fact, by the wide fame of California as a curative health resort. For the principal cause of death the State is one which finds most of its victims among newcomers seeking restored health and finding longer, happier life in the balmy atmosphere of California.

DEATHS BY SEX, RACE, NATIVITY, AND AGE PERIODS: 1907 AND 1906.

Sex.—The proportion of the sexes among decedents is given in the following table for the several geographic divisions in 1907 and 1906, both numbers and per cents being shown:

TABLE 11.—*Deaths classified by Sex, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Deaths.						Per Cent Male.		Per Cent Female.	
	Total.		Male.		Female.					
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	31,095	29,303	19,666	18,166	11,429	11,137	63.2	62.0	36.8	38.0
Northern California	3,944	3,528	2,729	2,349	1,215	1,179	69.2	66.6	30.8	33.4
Coast counties	1,761	1,614	1,159	1,047	602	567	65.8	64.9	34.2	35.1
Interior counties	2,183	1,914	1,570	1,302	613	612	71.9	68.0	28.1	32.0
Central California	18,063	17,692	11,447	11,035	6,616	6,657	63.4	62.4	36.6	37.6
San Francisco	6,575	7,151	4,166	4,496	2,409	2,655	63.4	62.9	36.6	37.1
Other bay counties	4,426	3,911	2,676	2,309	1,750	1,602	60.5	59.0	39.5	41.0
Coast counties	2,121	2,223	1,282	1,347	839	876	60.4	60.6	39.6	39.4
Interior counties	4,941	4,407	3,323	2,883	1,618	1,524	67.3	65.4	32.7	34 6
Southern California	9,088	8,083	5,490	4,782	3,598	3,301	60.4	59.2	39.6	40.8
Los Angeles	6,346	5,471	3,785	3,162	2,561	2,309	59.6	57.8	40.4	42.2
Other counties	2,742	2,612	1,705	1,620	1,037	992	62.2	62.0	37.8	38.0
Northern and Central California	22,007	21,220	14,176	13,384	7,831	7,836	64.4	63.1	35.6	36.9
Coast counties	14,883	14,899	9,283	9,199	5,600	5,700	62.4	61.7	37.6	38.3
Interior counties	7,124	6,321	4,893	4,185	2,231	2,136	68.7	66.2	31.3	33.8
Metropolitan area	11,001	11,062	6,842	6.805	4,159	4,257	62.2	61.5	37.8	38.5
Rural counties	11,006	10,158	7,334	6,579	3,672	3,579	66.6	64.	33.4	35.2

It appears from this table that of the 31,095 persons who died in California in 1907, 19,666, or 63.2 per cent, were male, and 11,429, or 36.8 per cent, were female, and that among the 29,303 decedents in 1906, the males were 18,166, or 62.0 per cent, and the females 11,137, or 38.0 per cent. There was an increase of 1.2 in the per cent male among decedents in the State as a whole, and there were increases in the per cent male for all main and minor geographic divisions except only the coast counties of Central California.

Each year the per cent male was highest for Northern California, 69.2 in 1907 and 66.6 in 1906, and next in Central California, 63.4 and 62.4, the per cents being 64.4 and 63.1 for Northern and Central California together, against only 60.4 and 59.2 for Southern California.

The per cents male were highest among minor geographic divisions for the interior counties of Northern California, 71.9 and 68.0; next for the interior counties of Central California, 67.3 and 65.4; next for the coast counties of Northern California, 65.8 and 64.9; and next for San Francisco, 63.4 and 62.9. The per cents were below the State averages of 63.2 and 62.0 for the remaining minor geographic divisions, being lowest of all for Los Angeles, 59.6 in 1907 and 57.8 in 1906.

The per cents male were less each year for the metropolitan area, comprising San Francisco and the other bay counties (62.2 and 61.5) than for the rural counties north of Tehachapi (66.6 and 64.8).

Sex and Cause of Death.—The following table shows for California as a whole in both 1907 and 1906, the deaths from certain principal causes classified by sex, with the per cents male and female:

TABLE 12.—*Deaths from Certain Principal Causes classified by Sex, with Per Cents, for California: 1907 and 1906.*

CAUSE OF DEATH.	Deaths.						Per Cent Male.		Per Cent Female.	
	Total.		Male.		Female.					
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
ALL CAUSES	31,095	29,303	19,666	18,166	11,429	11,137	63.2	62.0	36.8	38.0
Typhoid fever	558	657	394	450	164	207	70.6	68.5	29.4	31.5
Malarial fever	70	111	42	64	28	47	60.0	57.7	40.0	42.3
Smallpox	6	36	5	28	1	8	83.3	77.8	16.7	22.2
Measles	189	169	108	93	81	76	57.1	55.0	42.9	45.0
Scarlet fever	72	52	29	25	43	27	40.3	48.1	59.7	51.9
Whooping-cough	173	122	71	55	102	67	41.0	45.1	59.0	54.9
Diphtheria and croup	380	244	212	134	168	110	55.8	54.9	44.2	45.1
Influenza	114	196	62	104	52	92	54.4	53.1	45.6	46.9
Plague	82	-----	57	-----	25	-----	69.5	-----	30.5	-----
Other epidemic diseases	121	174	78	101	43	73	64.5	58.0	35.5	42.0
Tuberculosis of lungs	4,040	3,861	2,561	2,461	1,479	1,400	63.4	63.7	36.6	36.3
Tuberculosis of other organs	567	576	332	325	235	251	58.6	56.4	41.4	43.6
Cancer	1,590	1,502	781	673	809	829	49.1	44.8	50.9	55.2
Other general diseases	1,095	1,016	713	632	382	384	65.1	62.2	34.9	37.8
Meningitis	657	466	402	263	255	203	61.2	56.4	38.8	43.6
Other diseases of nervous system	2,403	2,297	1,489	1,384	914	913	62.0	60.3	38.0	39.7
Diseases of circulatory system	4,362	3,766	2,795	2,424	1,567	1,342	64.1	64.4	35.9	35.6
Pneumonia and broncho-pneumonia	2,678	2,431	1,777	1,523	901	908	66.4	62.6	33.6	37.4
Other diseases of respiratory system	910	756	545	441	365	315	59.9	58.3	40.1	41.7
Diarrhea and enteritis, under 2 years	899	930	519	501	380	429	57.7	53.9	42.3	46.1
Diarrhea and enteritis, 2 years and over	288	338	155	181	133	157	53.8	53.5	46.2	46.5
Other diseases of digestive system	1,588	1,410	956	841	632	569	60.2	59.6	39.8	40.4
Bright's disease and nephritis	1,787	1,622	1,162	1,019	625	603	65.0	62.8	35.0	37.2
Childbirth	265	266	-----	-----	265	266	-----	100.0	-----	100.0
Diseases of early infancy	1,031	946	579	553	452	393	56.2	58.5	43.8	41.5
Suicide	608	501	491	412	117	89	80.8	82.2	19.2	17.8
Earthquake and fire	-----	750	-----	529	-----	221	-----	70.5	-----	29.5
Other violence	2,711	2,152	2,291	1,806	420	346	84.5	83.9	15.5	16.1
All other causes	1,851	1,956	1,060	1,144	791	812	57.3	58.5	42.7	41.5

This table shows that in both 1907 and 1906 the per cents male were highest for deaths from the following important causes: miscellaneous violence, 84.5 and 83.9; suicide, 80.8 and 82.2; earthquake and fire, 70.5 in 1906 alone; plague, 69.5 in 1907 alone; typhoid fever, 70.6 in 1907 and 68.5 in 1906; pneumonia and broncho-pneumonia, 66.4 and 62.6; diseases of the circulatory system, 64.1 and 64.4; Bright's disease and nephritis, 65.0 and 62.8; and tuberculosis of the lungs, 63.4 and 63.7.

On the other hand, the per cent female, except of course for deaths from childbirth, was notably high only in the following cases: cancer, 50.9 and 55.2; whooping-cough, 59.0 and 54.9; and scarlet fever, 59.7 and 51.9 in 1907 and 1906, respectively. For all other diseases the male decedents outnumbered the female, in some cases greatly.

Race.—The race distribution of persons dying in the several geographic divisions in 1907 and 1906 is given in the following table, together with the per cent white among decedents:

TABLE 13.—*Deaths classified by Race, with Per Cent White, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Deaths.						Per Cent White.
	Total.	White.	Negro.	Indian.	Chinese.	Japanese.	
1907.							
THE STATE	31,095	29,339	449	120	670	517	94.3
Northern California	3,944	3,717	30	63	102	32	94.2
Coast counties	1,761	1,695	6	30	22	8	96.3
Interior counties	2,183	2,022	24	33	80	24	92.6
Central California	18,063	16,944	220	36	511	352	93.8
San Francisco	6,575	6,375	49	--------	88	63	97.0
Other bay counties	4,426	4,056	90	6	214	60	91.6
Coast counties	2,121	2,000	13	5	39	64	94.3
Interior counties	4,941	4,513	68	25	170	165	91.3
Southern California	9,088	8,678	199	21	57	133	95.5
Los Angeles	6,346	6,025	170	5	42	104	94.9
Other counties	2,742	2,653	29	16	15	29	96.8
Northern and Central California	22,007	20,661	250	99	613	384	93.9
Coast counties	14,883	14,126	158	41	363	195	94.9
Interior counties	7,124	6,535	92	58	250	189	91.7
Metropolitan area	11,001	10,431	139	6	302	123	94.8
Rural counties	11,006	10,230	111	93	311	261	92.9
1906.							
THE STATE	29,303	27,704	428	117	670	384	94.5
Northern California	3,528	3,305	30	70	95	28	93.7
Coast counties	1,614	1,527	9	43	21	14	94.6
Interior counties	1,914	1,778	21	27	74	14	92.9
Central California	17,692	16,676	203	22	506	285	94.3
San Francisco	7,151	6,864	54	2	156	75	96.0
Other bay counties	3,911	3,681	70	5	128	27	94.1
Coast counties	2,223	2,111	14	4	48	46	95.0
Interior counties	4,407	4,020	65	11	174	137	91.2
Southern California	8,083	7,723	195	25	69	71	95.5
Los Angeles	5,471	5,203	168	--------	43	57	95.1
Other counties	2,612	2,520	27	25	26	14	96.5
Northern and Central California	21,220	19,981	233	92	601	313	94.2
Coast counties	14,899	14,183	147	54	353	162	95.2
Interior counties	6,321	5,798	86	38	248	151	91.7
Metropolitan area	11,062	10,545	124	7	284	102	95.3
Rural counties	10,158	9,436	109	85	317	211	92.9

This table shows that in 1907 the white decedents numbered 29,339, or 94.3 per cent of all; the Chinese, 670; the Japanese, 517; the negroes, 449; and the Indians, 120. In 1906 the figures were: white, 27,704, or 94.5 per cent of all; Chinese, 670; negro, 428; Japanese, 384; and Indian, 117. The negro decedents outnumbered the Japanese in 1906, but in 1907 the Japanese outnumbered the negroes.

The per cent white was substantially the same in 1907 as in 1906, 94.3 against 94.5, for the State as a whole. The per cent white was 95.5 each year for Southern California, as compared with 93.9 for Northern and Central California in 1907, and 94.2 in 1906, the per cents for Central California being respectively 93.8 and 94.3 and for Northern California, 94.2 and 93.7.

Among minor geographic divisions, the per cents white were above or equal to the State averages (94.3 in 1907 and 94.5 in 1906) in the following cases: San Francisco, 97.0 and 96.0; Southern California, except Los Angeles, 96.8 and 96.5; Los Angeles alone, 94.9 and 95.1; coast counties of Northern California, 96.3 and 94.6; and coast counties of Central California, 94.3 and 95.0.

The per cent white was greater each year for the metropolitan area than for the rural counties north of Tehachapi, the per cents being 94.8 in 1907 and 95.3 in 1906 for the urban territory, against 92.9 for the country districts both years.

The number of Chinese decedents was notably great in 1907 for the bay counties other than San Francisco and for the interior counties of Central California, and in 1906 for these same groups and for San Francisco as well. The number of negroes was particularly great only for Los Angeles each year. The Japanese decedents were quite numerous in the interior counties of Central California both years, and in Los Angeles also in 1907. Over half the Indian deaths each year were in Northern California.

Race and Cause of Death.—The following table shows for California in 1907 and 1906 the deaths from certain principal causes classified by race, as well as the per cent white in each case:

TABLE 14.—*Deaths from Certain Principal Causes classified by Race, with Per Cent White, for California: 1907 and 1906.*

CAUSE OF DEATH.	Deaths.						Per Cent White.
	Total.	White.	Negro.	Indian.	Chinese.	Japanese.	
1907.							
ALL CAUSES	31,095	29,339	449	120	670	517	94.3
Typhoid fever	558	488	7	2	3	58	87.5
Malarial fever	70	66	------	1	1	2	94.3
Smallpox	6	5	1	------	------	------	83.3
Measles	189	186	1	2	------	------	98.4
Scarlet fever	72	72	------	------	------	------	100.0
Whooping-cough	173	167	3	3	------	------	96.5
Diphtheria and croup	380	370	------	------	5	5	97.4
Influenza	114	112	1	------	1	------	98.2
Plague	82	70	1	------	7	4	85.4
Other epidemic diseases	121	96	2	1	9	13	79.3
Tuberculosis of lungs	4,040	3,674	89	27	197	53	90.9
Tuberculosis of other organs	567	515	14	3	15	20	90.8
Cancer	1,590	1,546	12	1	19	12	97.2
Other general diseases	1,095	1,039	15	4	29	8	94.9
Meningitis	657	602	10	3	3	39	91.6
Other diseases of nervous system	2,403	2,319	37	2	33	12	96.5
Diseases of circulatory system	4,362	4,187	57	7	87	24	96.0
Pneumonia and broncho-pneumonia	2,678	2,515	44	11	67	41	93.9
Other diseases of respiratory system	910	869	10	1	16	14	95.5
Diarrhea and enteritis, under 2 years	899	854	7	6	7	25	95.0
Diarrhea and enteritis, 2 years and over	288	268	2	2	10	6	93.1
Other diseases of digestive system	1,588	1,495	22	4	34	33	94.1
Bright's disease and nephritis	1,787	1,728	24	3	12	20	96.7
Childbirth	265	255	2	------	3	5	96.2
Diseases of early infancy	1,031	986	10	3	7	25	95.6
Suicide	608	578	5	1	15	9	95.1
Other violence	2,711	2,505	49	22	54	81	92.4
All other causes	1,851	1,772	24	11	36	8	95.7

TABLE 14.—*Deaths from Certain Principal Causes classified by Race, with Per Cent White, for California: 1907 and 1906—Continued.*

CAUSE OF DEATH.	Deaths.						Per Cent White.
	Total.	White.	Negro.	Indian.	Chinese.	Japanese	
1906.							
ALL CAUSES	29,303	27,704	428	117	670	384	94.5
Typhoid fever	657	594	7	1	11	44	90.4
Malarial fever	111	100		2	5	4	90.1
Smallpox	36	36					100.0
Measles	169	163	1	5			96.5
Scarlet fever	52	52					100.0
Whooping-cough	122	116	2	3		1	95.1
Diphtheria and croup	244	235	2		6	1	96.3
Influenza	196	186	3	1	2	4	94.9
Other epidemic diseases	174	154	6		10	4	88.5
Tuberculosis of lungs	3,861	3,503	93	28	179	58	90.7
Tuberculosis of other organs	576	513	12	5	16	30	89.1
Cancer	1,502	1,462	13	2	18	7	97.3
Other general diseases	1,016	963	12	3	29	9	94.8
Meningitis	466	440	3		7	16	94.4
Other diseases of nervous system	2,297	2,231	31	5	24	6	97.1
Diseases of circulatory system	3,766	3,612	51	4	81	18	95.9
Pneumonia and broncho-pneumonia	2,431	2,307	37	7	57	23	94.9
Other diseases of respiratory system	756	727	8	2	13	6	96.2
Diarrhea and enteritis, under 2 years	930	899	8	4	5	14	96.7
Diarrhea and enteritis, 2 years and over	338	308	9	1	14	6	91.1
Other diseases of digestive system	1,410	1,324	16	5	37	28	93.9
Bright's disease and nephritis	1,622	1,549	32		34	7	95.5
Childbirth	266	248	3	4	3	8	93.2
Diseases of early infancy	946	911	14	1	12	8	96.3
Suicide	501	474	4		13	10	94.6
Earthquake and fire	750	711			31	8	94.8
Other violence	2,152	2,025	30	23	21	53	94.1
All other causes	1,956	1,861	31	11	42	11	95.1

The per cents white were above the general averages of 94.3 and 94.5 for 1907 and 1906 for deaths from the following important causes: Scarlet fever, 100.0 per cent each year; measles, 98.4 in 1907 and 96.5 in 1906; diphtheria and croup, 97.4 and 96.3; whooping-cough, 96.5 and 95.1; cancer, 97.2 and 97.3; diseases of the nervous system other than meningitis, 96.5 and 97.1; diseases of the circulatory system, 96.0 and 95.9; diarrhea and enteritis, under 2 years, 95.0 and 96.7; Bright's disease and nephritis, 96.7 and 95.5; diseases of early infancy, 95.6 and 96.3; and suicide, 95.1 and 94.6.

The table shows, however, that the per cents white are very low indeed for typhoid fever, 87.5 in 1907 and 90.4 in 1906, as well as for tuberculosis of the lungs, 90.9 and 90.7, and tuberculosis of other organs, 90.8 and 89.1. From further analysis of the figures in the table it appears that the proportion of Caucasians among all dying from typhoid fever is relatively small, because many deaths from this disease occur among the Japanese, and that the proportion of Caucasians among tuberculous victims is relatively small, because the "great white plague" is especially fatal among Chinese and negroes.

Thus, the per cents Japanese among all dying from typhoid fever were no less than 10.4 in 1907 (58 in 558) and 6.7 in 1906 (44 in 657), while the per cents Japanese among all decedents in the State were only 1.7 and 1.3, respectively. Likewise, the Chinese and negroes are strongly represented among the victims of tuberculosis in California, the Chinese who died from tuberculosis of the lungs numbering 197 in 1907 and 179 in 1906, and the negroes numbering 89 and 93, respectively. While the per cents Chinese were only 2.2 and 2.3 among all decedents in California in 1907 and 1906, the per cents Chinese were no less than 4.9 and 4.7 for deaths from tuberculosis of the lungs, and 2.7 and 2.8 for tuberculosis of other organs. Similarly, while the per cents negro were only 1.4 and 1.5 among all decedents in 1907 and 1906, the per cents negro were 2.2 and 2.4 for pulmonary tuberculosis, and 2.5 and 2.1 for other forms of this disease.

Nativity of White Decedents.—In further analysis of deaths by race, the nativity of white decedents is worth considering. Accordingly, Table 15, on the opposite page, has been prepared classifying white decedents as born in California, born in other states, foreign born, or nativity unknown. The 1,319 of unknown nativity in 1906 include 355 victims of earthquake and fire in San Francisco and vicinity in April, 1906.

It appears from this table that of the 29,339 white decedents in 1907, 10,482, or 35.7 per cent, were born elsewhere in the United States than California; 9,396, or 32.0 per cent, were foreign born; 8,332, or 28.4 per cent, were born in California; and 1,129, or 3.9 per cent, were of unknown nativity. Of the 27,704 white decedents in 1906, those born in other states than California were 9,679, or 34.9 per cent; the foreign born were 8,840, or 31.9 per cent; those born in California were 7,866, or 28.4 per cent; and those of unknown nativity were 1,319, or 4.8 per cent. The per cent born in other states than California was 35.7 in 1907 and 34.9 in 1906, a rise of 0.8 in the per cent. The per cent of white decedents who were born in California was exactly the same each year, 28.4, and the per cent foreign born was substantially the same, 32.0 for 1907 and 31.9 for 1906, the per cent of unknown nativity being only 3.9 for 1907, as compared with 4.8 for 1906.

The proportion of California decedents born in other states is very high for the counties south of Tehachapi, especially Los Angeles, the per cents being 50.8 and 51.5 for Southern California in 1907 and 1906, respectively, and no less than 52.1 and 52.7 for Los Angeles alone. On the other hand, the per cents born in other states were only 29.4 and 28.5 for the counties north of Tehachapi, being 37.5 and 38.4 for Northern California, and merely 27.6 and 26.6 for Central California. The per cents born elsewhere in the United States than California were much less for the metropolitan area, 22.4 and 22.0, than for the rural counties of Northern and Central California, 36.6 in 1907 and 35.8 in 1906.

The proportion of foreign born decedents is particularly great only in Central California, where the per cent foreign born was 36.6 in 1907 and 36.5 in 1906, the per cents being only 29.5 each year for Northern California, and 24.2 in 1907 and 23.1 in 1906 for Southern California. For Northern and Central California together, the per cent foreign born was 35.3 each year, the per cents foreign born being no less than 41.1 in 1907 and 39.7 in 1906 for the urban territory, as compared with 29.4 and 30.4 for the country districts. The per cent of foreign born decedents in San Francisco was as great as 44.0 in 1907 and 41.3 in 1906.

TABLE 15.—*White Decedents classified by Nativity, with Per Cents, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	White Decedents.					Per Cent.			
	Total.	Born in California.	Born in Other States.	Foreign Born.	Unknown.	Born in California.	Born in Other States.	Foreign Born.	Unknown.
1907.									
THE STATE	29,339	8,332	10,482	9,396	1,129	28.4	35.7	32.0	3.9
Northern California	3,717	1,005	1,393	1,096	223	27.0	37.5	29.5	6.0
Coast counties	1,695	497	592	544	62	29.3	34.9	32.1	3.7
Interior counties	2,022	508	801	552	161	25.1	39.6	27.3	8.0
Central California	16,944	5,488	4,684	6,196	576	32.4	27.6	36.6	3.4
San Francisco	6,375	2,114	1,222	2,806	233	33.2	19.2	44.0	3 6
Other bay counties	4,056	1,366	1,114	1,478	98	33.7	27.5	36.4	2.4
Coast counties	2,000	655	715	601	29	32.8	35.8	30.0	1.4
Interior counties	4,513	1,353	1,633	1,311	216	30.0	36.2	29.0	4.8
Southern California	8,678	1,839	4,405	2,104	330	21.2	50.8	24.2	3.8
Los Angeles	6,025	1,230	3,141	1,434	220	20.4	52.1	23.8	3.7
Other counties	2,653	609	1,264	670	110	23.0	47.6	25.3	4.1
Northern and Central California	20,661	6,493	6,077	7,292	799	31.4	29.4	35.3	3.9
Coast counties	14,126	4,632	3,643	5,429	422	32.8	25.8	38.4	3.0
Interior counties	6,535	1,861	2,434	1,863	377	28.5	37.2	28.5	5.8
Metropolitan area	10,431	3,480	2,336	4,284	331	33.3	22.4	41.1	3.2
Rural counties	10,230	3,013	3,741	3,008	468	29.4	36.6	29.4	4.6
1906.									
THE STATE	27,704	7,866	9,679	8,840	1,319	28.4	34.9	31.9	4.8
Northern California	3,305	851	1,270	975	209	25.8	38.4	29.5	6.3
Coast counties	1,527	398	568	478	83	26.1	37.2	31.3	5.4
Interior counties	1,778	453	702	497	126	25.5	39.5	27.9	7.1
Central California	16,676	5,335	4,431	6,083	827	32.0	26.6	36.5	4.9
San Francisco	6,864	2,264	1,236	2,838	526	33.0	18.0	41.3	7.7
Other bay counties	3,681	1,169	1,088	1,347	77	31.8	29.5	36.6	2.1
Coast counties	2,111	668	701	683	59	31.6	33.2	32.4	2.8
Interior counties	4,020	1,234	1,406	1,215	165	30.7	35.0	30.2	4.1
Southern California	7,723	1,680	3,978	1,782	283	21.7	51.5	23.1	3.7
Los Angeles	5,203	1,087	2,745	1,175	196	20.9	52.7	22.6	3.8
Other counties	2,520	593	1,233	607	87	23.5	48.9	24.1	3.5
Northern and Central California	19,981	6,186	5,701	7,058	1,036	31.0	28.5	35.3	5.2
Coast counties	14,183	4,499	3,593	5,346	745	31.7	25.3	37.7	5.3
Interior counties	5,793	1,687	2,108	1,712	291	29.1	36.4	29.5	5.0
Metropolitan area	10,545	3,433	2,324	4,185	603	32.6	22.0	39.7	5.7
Rural counties	9,436	2,753	3,377	2,873	433	29.2	35.8	30.4	4.6

The per cent of native Californians among white decedents was greatest each year for Central California, 32.4 in 1907 and 32.0 in 1906, and next in Northern California, 27.0 and 25.8, the per cents being 31.4 and 31.0 for both these divisions together, in contrast with only 21.2 and 21.7 for Southern California. The per cents born in California were somewhat greater for the metropolitan area, 33.3 and 32.6, than for the rural counties north of Tehachapi, 29.4 and 29.2 in 1907 and 1906, respectively.

Nativity and Cause of Death.—The following table gives numbers and per cents showing the nativity of Caucasians dying from certain principal causes in California in 1907 and 1906:

TABLE 16.—*White Decedents Dying from Principal Causes classified by Nativity, with Per Cents, for California: 1907 and 1906.*

CAUSE OF DEATH.	White Decedents.					Per Cent.			
	Total	Born in California	Born in Other States	Foreign Born	Unknown ..	Born in California ...	Born in Other States	Foreign Born	Unknown ..
1907.									
ALL CAUSES	29,339	8,332	10,482	9,396	1,129	28.4	35.7	32.0	3.9
Typhoid fever	488	164	172	145	7	33.6	35.3	29.7	1.4
Malarial fever	66	18	27	16	5	27.3	40.9	24.2	7.6
Smallpox	5	2	-----	3	-----	40.0	-----	60.0	-----
Measles	186	143	27	16	-----	76.9	14.5	8.6	-----
Scarlet fever	72	55	10	7	-----	76.4	13.9	9.7	-----
Whooping-cough	167	151	11	4	1	90.4	6.6	2.4	0.6
Diphtheria and croup	370	279	71	17	3	75.4	19.2	4.6	0.8
Influenza	112	9	53	50	-----	8.0	47.3	44.7	-----
Plague	70	22	9	37	2	31.4	12.9	52.9	2.8
Other epidemic diseases	96	23	39	32	2	24.0	40.6	33.3	2.1
Tuberculosis of lungs	3,674	994	1,450	1,145	85	27.0	39.5	31.2	2.3
Tuberculosis of other organs	515	265	133	111	6	51.5	25.8	21.5	1.2
Cancer	1,546	145	677	703	21	9.4	43.8	45.5	1.3
Other general diseases	1,039	229	386	367	57	22.0	37.2	35.3	5.5
Meningitis	602	369	140	86	7	61.3	23.2	14.3	1.2
Other diseases of nervous system	2,319	319	1,138	790	72	13.7	49.1	34.1	3.1
Diseases of circulatory system	4,187	337	1,891	1,814	145	8.0	45.2	43.3	3.5
Pneumonia and broncho-pneumonia	2,515	787	810	810	108	31.3	32.2	32.2	4.3
Other diseases of respiratory system	869	206	303	333	27	23.7	34.9	38.3	3.1
Diarrhea and enteritis, under 2 years	854	803	29	22	-----	94.0	3.4	2.6	-----
Diarrhea and enteritis, 2 years and over	268	90	100	72	6	33.6	37.3	26.9	2.2
Other diseases of digestive system	1,495	368	566	514	47	24.6	37.9	34.4	3.1
Bright's disease and nephritis	1,728	254	802	636	36	14.7	46.4	36.8	2.1
Childbirth	255	106	88	60	1	41.6	34.5	23.5	0.4
Diseases of early infancy	986	986	-----	-----	-----	100.0	-----	-----	-----
Suicide	578	106	201	176	95	18.3	34.8	30.5	16.4
Other violence	2,505	627	696	845	337	25.0	27.8	33.7	13.5
All other causes	1,772	475	653	585	59	26.8	36.9	33.0	3.3
1906.									
ALL CAUSES	27,704	7,866	9,679	8,840	1,319	28.4	34.9	31.9	4.8
Typhoid fever	594	244	166	171	13	41.1	27.9	28.8	2.2
Malarial fever	100	31	42	27	-----	31.0	42.0	27.0	-----
Smallpox	36	10	6	14	6	27.8	16.7	38.9	16.6
Measles	163	129	22	11	1	79.1	13.5	6.8	0.6
Scarlet fever	52	36	10	3	3	69.2	19.2	5.8	5.8
Whooping-cough	116	104	12	-----	-----	89.7	10.3	---	-----
Diphtheria and croup	235	159	63	13	-----	67.7	26.8	5.5	-----
Influenza	186	22	97	64	3	11.8	52.2	34.4	1.6
Other epidemic diseases	154	51	48	51	4	33.1	31.2	33.1	2.6
Tuberculosis of lungs	3,503	930	1,468	1,031	74	26.6	41.9	29.4	2.1
Tuberculosis of other organs	513	280	144	81	8	54.6	28.1	15.8	1.5
Cancer	1,462	119	672	649	22	8.1	46.0	44.4	1.5
Other general diseases	963	209	409	298	47	21.7	42.5	30.9	4.9
Meningitis	440	309	88	37	6	70.2	20.0	8.4	1.4
Other diseases of nervous system	2,231	325	1,003	836	67	14.6	44.9	37.5	3.0
Diseases of circulatory system	3,612	294	1,570	1,620	128	8.1	43.5	44.9	3.5
Pneumonia and broncho-pneumonia	2,307	743	697	779	88	32.2	30.2	33.8	3.8
Other diseases of respiratory system	727	192	238	280	17	26.4	32.8	38.5	2.3
Diarrhea and enteritis, under 2 years	899	866	27	6	-----	96.3	3.0	0.7	-----
Diarrhea and enteritis, 2 years and over	308	95	105	103	5	30.9	34.1	33.4	1.6
Other diseases of digestive system	1,324	322	511	471	20	24.3	38.6	35.6	1.5
Bright's disease and nephritis	1,549	187	703	612	47	12.1	45.4	39.5	3.0
Childbirth	248	96	80	72	-----	38.7	32.3	29.0	-----
Diseases of early infancy	911	909	2	-----	-----	99.8	0.2	-----	-----
Suicide	474	65	136	188	85	13.7	28.7	39.7	17.9
Earthquake and fire	711	122	89	145	355	17.2	12.5	20.4	49.9
Other violence	2,025	572	588	613	252	28.3	29.0	30.3	12.4
All other causes	1,861	445	683	665	68	23.9	36.7	35.7	3.7

The per cents born in California were above the general average of 28.4 each year for deaths from the following important causes: early infancy, 100.0 in 1907 and 99.8 in 1906; diarrhea and enteritis, under 2 years, 94.0 and 96.3; whooping-cough, 90.4 and 89.7; measles, 76.9 and 79.1; scarlet fever, 76.4 and 69.2; diphtheria and croup, 75.4 and 67.7; meningitis, 61.3 and 70.2; tuberculosis other than pulmonary, 51.5 and 54.6; childbirth, 41.6 and 38.7; typhoid fever, 33.6 and 41.1; diarrhea and enteritis, 2 years and over, 33.6 and 30.9; pneumonia and broncho-pneumonia, 31.3 and 32.2; and plague, 31.4 in 1907 alone.

The per cents born in other states were above the general averages of 35.7 and 34.9 for 1907 and 1906 for deaths from the following notable causes: diseases of the nervous system other than meningitis, 49.1 and 44.9; Bright's disease and nephritis, 46.4 and 45.4; diseases of the circulatory system, 45.2 and 43.5; cancer, 43.8 and 46.0; tuberculosis of the lungs, 39.5 and 41.6; and diseases of the digestive system other than diarrhea, 37.9 and 38.6.

The per cents foreign born were above the general averages of 32.0 and 31.9 in 1907 and 1906 for deaths from the following causes: plague, 52.9 in 1907 alone; cancer, 45.5 in 1907 and 44.4 in 1906; diseases of the circulatory system, 43.3 and 44.9; diseases of the respiratory system other than pneumonia, 38.3 and 38.5; Bright's disease and nephritis, 36.8 and 39.5; diseases of the nervous system other than meningitis, 34.1 and 37.5; diseases of the digestive system other than diarrhea, 34.4 and 35.6; and pneumonia and broncho-pneumonia, 32.2 and 33.8.

The nativity was unknown for 355, or 49.9 per cent of the 711 Caucasians killed by earthquake and fire in April, 1906. The per cents of unknown nativity are also very high for suicides, 16.4 in 1907 and 17.9 in 1906, as well as for deaths from other violence (drowning, accidental injuries, etc.), 13.5 and 12.4, respectively.

Age Periods.—The following table gives for the several geographic divisions in 1907 and 1906 the classification of decedents by selected age periods, representing in a rough way, infancy, childhood, youth, productive ages, and old age:

TABLE 17.—*Deaths classified by Age Periods, for Geographic Divisions: 1907 and 1906.*

GEOGRAPHIC DIVISION.	Deaths.	Under 1 Year.	1 to 4 Years.	5 to 14 Years.	15 to 64 Years.	65 Yrs. and Over.	Age Unknown.
1907.							
THE STATE	31,095	3,422	1,484	1,060	16,761	8,175	193
Northern California	3,944	289	162	136	2,020	1,284	53
Coast counties	1,761	149	81	70	864	581	16
Interior counties	2,183	140	81	66	1,156	703	37
Central California	18,063	2,138	895	622	9,684	4,627	97
San Francisco	6,575	848	329	197	3,760	1,421	20
Other bay counties	4,426	542	254	182	2,295	1,135	18
Coast counties	2,121	234	72	84	1,004	718	9
Interior counties	4,941	514	240	159	2,625	1,353	50
Southern California	9,088	995	427	302	5,057	2,264	43
Los Angeles	6,346	685	324	221	3,597	1,513	6
Other counties	2,742	310	103	81	1,460	751	37
Northern and Central California	22,007	2,427	1,057	758	11,704	5,911	150
Coast counties	14,883	1,773	736	533	7,923	3,855	63
Interior counties	7,124	654	321	225	3,781	2,056	87
Metropolitan area	11,001	1,390	583	379	6,055	2,556	38
Rural counties	11,006	1,037	474	379	5,649	3,355	112
1906.							
THE STATE	29,303	3,347	1,320	988	15,324	7,833	491
Northern California	3,528	262	125	125	1,708	1,240	68
Coast counties	1,614	105	62	62	802	549	34
Interior counties	1,924	157	63	63	906	691	34
Central California	17,692	2,173	823	575	9,058	4,681	382
San Francisco	7,151	934	344	200	3,750	1,627	296
Other bay counties	3,911	522	201	156	1,924	1,095	13
Coast counties	2,223	217	84	76	1,103	702	41
Interior counties	4,407	500	194	143	2,281	1,257	32
Southern California	8,083	912	372	288	4,558	1,912	41
Los Angeles	5,471	635	250	192	3,166	1,201	27
Other counties	2,612	277	122	96	1,392	711	14
Northern and Central California	21,220	2,435	948	700	10,766	5,921	450
Coast counties	14,899	1,778	691	494	7,579	3,973	384
Interior counties	6,321	657	257	206	3,187	1,948	66
Metropolitan area	11,062	1,456	545	356	5,674	2,722	309
Rural counties	10,158	979	403	344	5,092	3,199	141

This table shows that of the 31,095 deaths in 1907, 16,761 occurred at the productive ages from 15 to 64 years; 8,175 at the period of old age, 65 years and over; 3,422 in infancy, or the first year of life; 1,484 in childhood, 1 to 4 years; 1,060 in youth, 5 to 14 years; and 193 were of unknown age. Similarly, of the 29,303 deaths in 1906, 15,324 were at the productive ages; 7,833 in old age; 3,347 in infancy;

1,320 in childhood; 988 in youth; and 491 were unknown, this number including 302 victims of earthquake and fire in April, 1906.

To facilitate comparisons between geographic divisions, the absolute numbers in the preceding table have been reduced to per cents, as follows:

TABLE 18.—*Per Cent Distribution of Deaths, by Age Periods, for Geographic Divisions: 1907 and 1906.*

Geographic Division.	Per Cent of Deaths.											
	Under 1 Year.		1 to 4 Years.		5 to 14 Years.		15 to 64 Years.		65 Years and Over.		Age Unknown.	
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
THE STATE	11.0	11.4	4.8	4.5	3.4	3.4	53.9	52.3	26.3	26.7	0.6	1.7
Northern California	7.3	7.4	4.1	3.5	3.5	3.5	51.2	48.5	32.6	35.2	1.3	1.9
Coast counties	8.5	6.5	4.6	3.9	4.0	3.8	49.0	49.7	33.0	34.0	0.9	2.1
Interior counties	6.4	8.2	3.7	3.3	3.0	3.3	53.0	47.3	32.2	36.1	1.7	1.8
Central California	11.8	12.3	5.0	4.6	3.5	3.2	53.6	51.2	25.6	26.5	0.5	2.2
San Francisco	12.9	13.1	5.0	4.8	3.0	2.8	57.2	52.4	21.6	22.8	0.3	4.1
Other bay counties	12.3	13.4	5.7	5.1	4.1	4.0	51.9	49.2	25.6	28.0	0.4	0.3
Coast counties	11.0	9.8	3.4	3.8	4.0	3.4	47.3	49.6	33.9	31.6	0.4	1.8
Interior counties	10.4	11.4	4.9	4.4	3.2	3.2	53.1	51.8	27.4	28.5	1.0	0.7
Southern California	11.0	11.3	4.7	4.6	3.3	3.6	55.6	56.4	24.9	23.6	0.5	0.5
Los Angeles	10.8	11.6	5.1	4.6	3.5	3.5	56.7	57.9	23.8	21.9	0.1	0.5
Other counties	11.3	10.6	3.8	4.7	3.0	3.7	53.2	53.3	27.4	27.2	1.3	0.5
Northern and Central California	11.0	11.5	4.8	4.5	3.4	3.3	53.2	50.7	26.9	27.9	0.7	2.1
Coast counties	11.9	11.9	5.0	4.6	3.6	3.3	53.2	50.9	25.9	26.7	0.4	2.6
Interior counties	9.2	10.4	4.5	4.1	3.1	3.3	53.1	50.4	28.9	30.8	1.2	1.0
Metropolitan area	12.6	13.2	5.3	4.9	3.5	3.2	55.0	51.3	23.2	24.6	0.4	2.8
Rural counties	9.4	9.6	4.3	4.0	3.5	3.4	51.3	50.1	30.5	31.5	1.0	1.4

The per cent distribution shows that the deaths at the productive ages from 15 to 64 were 53.9 per cent of all in 1907 and 52.3 per cent in 1906; the deaths at the period of old age, 65 years and over, were 26.3 and 26.7 per cent, respectively; the deaths in infancy, or the first year of life, 11.0 and 11.4 per cent; the deaths in childhood, 1 to 4 years, 4.8 and 4.5 per cent; the deaths in youth, 5 to 14 years, 3.4 per cent each year; and the deaths of unknown age, 0.6 per cent in 1907 and 1.7 per cent in 1906.

The per cents of deaths occurring at the productive ages, from 15 to 64, were above the State averages of 53.9 for 1907 and 52.3 for 1906, only for Los Angeles, 56.7 and 57.9, for the other counties of Southern California, 53.2 and 53.3, and for San Francisco, 57.2 and 52.4. The per cents of deaths at the productive ages were 55.6 and 56.4 for the counties south of Tehachapi, as compared with only 53.2 and 50.7 for those to the north. The per cents were 55.0 and 51.3 for the metropolitan area, but only 51.3 and 50.1 for the rural counties north of Tehachapi.

The proportion of deaths at the period of old age, 65 years and over, was above the general average each year for the coast and interior counties of both Northern and Central California, being below the

State averages for San Francisco and the other bay counties as well as for Los Angeles and the other counties of Southern California. The per cents of deaths occurring at 65 years and over (26.3 and 26.7 for the State) were no less than 32.6 and 35.2 for Northern California, but only 25.6 and 26.5 for Central California and 24.9 and 23.6 for Southern California. The per cents for Northern and Central California together were 26.9 in 1907 and 27.9 in 1906, being only 23.2 and 24.6 for the urban territory, against no less than 30.5 and 31.5 for the country districts.

The proportion of deaths in infancy, or the first year of life, was particularly high each year only for Central California, especially for San Francisco and the other bay counties. While the per cents for the State were 11.0 and 11.4 in 1907 and 1906, the per cents for Central California were 11.8 and 12.3, being no less than 12.9 and 13.1 for the metropolis proper and 12.3 and 13.4 for the adjoining suburbs. The per cent of deaths in the first year of life was no less than 12.6 in 1907 and 13.2 in 1906 for the whole urban territory, as compared with only 9.4 and 9.6 for the rural counties north of Tehachapi. The proportion of deaths in infancy was lowest each year for Northern California, 7.3 per cent in 1907 and 7.4 per cent in 1906.

The proportion of deaths in childhood, 1 to 4 years, as in infancy, is notably great for the metropolitan area. While the per cents for the State were 4.8 and 4.5, the per cents for the metropolitan area were no less than 5.3 and 4.9, being 5.0 and 4.8 for San Francisco and 5.7 and 5.1 for the other bay counties. On the other hand, the per cents for the rural counties north of Tehachapi were only 4.3 and 4.0, the per cents being only 4.1 and 3.5 for Northern California alone.

No marked variations appear between the several geographic divisions in the proportion of deaths in youth, 5 to 14 years, at which period occurred only 3.4 per cent of all deaths in the State each year.

Age and Cause of Death.—The tables on the following pages show for California in 1907 and 1906, first, the number of deaths from certain principal causes classified by age periods, and second, the per cent distribution, by age periods, of the deaths from each of these causes.

TABLE 19.—*Deaths from Certain Principal Causes classified by Age Periods, for California: 1907 and 1906.*

CAUSE OF DEATH.	Deaths.	Under 1 Year.	1 to 4 Years.	5 to 14 Years.	15 to 64 Years.	65 Yrs. and Over.	Age Unknown.
1907.							
ALL CAUSES	31,095	3,422	1,484	1,060	16,761	8,175	193
Typhoid fever	558	1	27	45	463	21	1
Malarial fever	70	4	4	6	40	16	
Smallpox	6				6		
Measles	189	57	89	25	17	1	
Scarlet fever	72	5	27	34	6		
Whooping-cough	173	90	64	14	5		
Diphtheria and croup	380	19	187	146	28		
Influenza	114	3	1	1	29	80	
Plague	82	2	7	9	57	6	1
Other epidemic diseases	121	16	3	5	50	46	1
Tuberculosis of lungs	4,040	32	44	78	3,582	293	11
Tuberculosis of other organs	567	63	105	67	301	28	3
Cancer	1,590		2	9	978	597	4
Other general diseases	1,095	48	21	44	758	214	10
Meningitis	657	140	141	111	246	17	2
Other diseases of nervous system	2,403	90	43	35	1,146	1,076	13
Diseases of circulatory system	4,362	3	6	44	2,131	2,159	19
Pneumonia and broncho-pneumonia	2,678	372	233	67	1,330	662	14
Other diseases of respiratory system	910	123	42	12	333	397	3
Diarrhea and enteritis, under 2 years	899	758	141				
Diarrhea and enteritis, 2 years and over	288		82	18	90	98	
Other diseases of digestive system	1,588	73	52	91	1,009	358	5
Bright's disease and nephritis	1,787	22	17	15	991	740	2
Childbirth	265				264		1
Diseases of early infancy	1,031	1,031					
Suicide	608			2	544	56	6
Other violence	2,711	112	100	155	1,996	274	74
All other causes	1,851	358	46	27	361	1,036	23
1906.							
ALL CAUSES	29,303	3,347	1,320	988	15,324	7,833	491
Typhoid fever	657	5	34	78	519	17	4
Malarial fever	111	14	7	5	54	31	
Smallpox	36	2	3		25	5	1
Measles	169	39	95	24	11		
Scarlet fever	52	1	20	21	7		3
Whooping-cough	122	67	45	10			
Diphtheria and croup	244	22	86	113	23		
Influenza	196	8	5	2	62	118	1
Other epidemic diseases	174	29	16	7	65	56	1
Tuberculosis of lungs	3,861	36	46	82	3,414	263	20
Tuberculosis of other organs	576	85	122	61	281	27	
Cancer	1,502	1	5	3	939	546	8
Other general diseases	1,016	37	17	61	682	211	8
Meningitis	466	150	118	62	120	14	2
Other diseases of nervous system	2,297	89	46	37	1,031	1,079	15
Diseases of circulatory system	3,766	4	1	50	1,827	1,869	15
Pneumonia and broncho-pneumonia	2,431	355	191	75	1,115	683	12
Other diseases of respiratory system	756	112	39	22	227	353	3
Diarrhea and enteritis, under 2 years	930	792	138				
Diarrhea and enteritis, 2 years and over	338		74	22	114	126	2
Other diseases of digestive system	1,410	75	43	69	882	335	6
Bright's disease and nephritis	1,622	20	6	24	908	662	2
Childbirth	266				265		1
Diseases of early infancy	946	946					
Suicide	501			2	432	58	9
Earthquake and fire	750	23	11	20	327	67	302
Other violence	2,152	110	110	119	1,513	248	52
All other causes	1,956	325	42	19	481	1,065	24

TABLE 20.—*Per Cent Distribution, by Age Periods, of Deaths from Certain Principal Causes, for California: 1907 and 1906.*

CAUSE OF DEATH.	Per Cent of Deaths.											
	Under 1 Year.		1 to 4 Years.		5 to 14 Years.		15 to 64 Years.		65 Years and Over.		Age Unknown.	
	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.
ALL CAUSES	11.0	11.4	4.8	4.5	3.4	3.4	53.9	52.3	26.3	26.7	0.6	1.7
Typhoid fever	0.2	0.7	4.8	5.2	8.1	11.9	83.0	79.0	3.7	2.6	0.2	0.6
Malarial fever	5.7	12.6	5.7	6.3	8.6	4.5	57.1	48.7	22.9	27.9	------	------
Smallpox	------	5.6	------	8.3	------	------	100.0	69.5	------	13.9	------	2.7
Measles	30.2	23.1	47.1	56.2	13.2	14.2	9.0	6.5	0.5	------	------	------
Scarlet fever	7.0	1.9	37.5	38.5	47.2	40.4	8.3	13.4	------	------	------	5.8
Whooping-cough	52.0	54.9	37.0	36.9	8.1	8.2	2.9	------	------	------	------	------
Diphtheria and croup	5.0	9.0	49.2	35.3	38.4	46.3	7.4	9.4	------	------	------	------
Influenza	2.6	4.1	0.9	2.6	0.9	1.0	25.4	31.6	70.2	60.2	------	0.5
Plague	2.5	------	8.5	------	11.0	------	69.5	------	7.3	------	1.2	------
Other epidemic diseases	13.2	16.7	2.5	9.2	4.2	4.0	41.3	37.3	38.0	32.2	0.8	0.6
Tuberculosis of lungs	0.8	1.0	1.1	1.2	1.9	2.1	88.6	88.4	7.3	6.8	0.3	0.5
Tuberculosis of other organs	11.1	14.7	18.5	21.2	11.8	10.6	53.1	48.8	5.0	4.7	0.5	------
Cancer	------	0.1	0.1	0.3	0.6	0.2	61.5	62.5	37.5	36.4	0.3	0.5
Other general diseases	4.4	3.6	1.9	1.7	4.0	6.0	69.2	67.1	19.6	20.8	0.9	0.8
Meningitis	21.3	32.2	21.5	25.3	16.9	13.3	37.4	25.8	2.6	3.0	0.3	0.4
Other diseases of nervous system	3.7	3.9	1.8	2.0	1.5	1.6	47.7	44.9	44.8	47.0	0.5	0.6
Diseases of circulatory system	0.1	0.1	0.1	0.1	1.0	1.3	48.9	48.5	49.5	49.6	0.4	0.4
Pneumonia and broncho-pneumonia	13.9	14.6	8.7	7.8	2.5	3.1	49.7	45.9	24.7	28.1	0.5	0.5
Other diseases of respiratory system	13.5	14.8	4.6	5.2	1.3	2.9	36.6	30.0	43.7	46.7	0.3	0.4
Diarrhea and enteritis, under 2 years	84.3	85.2	15.7	14.8	------	------	------	------	------	------	------	------
Diarrhea and enteritis, 2 years and over	------	------	28.5	21.9	6.3	6.5	31.2	33.7	34.0	37.3	------	0.6
Other diseases of digestive system	4.6	5.3	3.3	3.0	5.7	4.9	63.5	62.6	22.6	23.8	0.3	0.4
Bright's disease and nephritis	1.2	1.2	1.0	0.4	0.8	1.5	55.5	56.0	41.4	40.8	0.1	0.1
Childbirth	------	------	------	------	------	------	99.6	99.6	------	------	0.4	0.4
Diseases of early infancy	100.0	100.0	------	------	------	------	------	------	------	------	------	------
Suicide	------	------	------	------	0.3	0.4	89.5	86.2	9.2	11.6	1.0	1.8
Earthquake and fire	------	3.1	------	1.5	------	2.6	------	43.6	------	8.9	------	40.3
Other violence	4.2	5.1	3.7	5.1	5.7	5.6	73.6	70.3	10.1	11.5	2.7	2.4
All other causes	19.3	16.6	2.5	2.1	1.5	1.0	19.5	24.6	56.0	54.5	1.2	1.2

From the table giving the per cent distribution it appears that the per cents of deaths at the productive ages, from 15 to 64 years, were above the general averages of 53.9 and 52.3 for deaths from the following important causes: childbirth, 99.6 each year; tuberculosis of the lungs, 88.6 in 1907 and 88.4 in 1906; suicide, 89.5 and 86.2; typhoid fever, 83.0 and 79.0; miscellaneous violence, 73.6 and 70.3; plague, 69.5 in 1907 alone; diseases of the digestive system other than diarrhea, 63.5 and 62.6; cancer, 61.5 and 62.5; and Bright's disease and nephritis, 55.5 and 56.0.

The per cents of deaths at the period of old age, 65 years and over, were above the general averages for 1907 and 1906, 26.3 and 26.7, for deaths from the following notable causes: influenza, 70.2 and 60.2; miscellaneous causes, including "old age" or senility, 56.0 and 54.5; diseases of the circulatory system, 49.5 and 49.6; diseases of the nervous system other than meningitis, 44.8 and 47.0; diseases of the respiratory system other than pneumonia, 43.7 and 46.7; Bright's disease and nephritis, 41.4 and 40.8; cancer, 37.5 and 36.4; and diarrhea and enteritis, 2 years and over, 34.0 and 37.3.

The per cents of deaths in infancy, or the first year of life, were above the general averages of 11.0 and 11.4 for deaths from the following causes: early infancy (premature birth, congenital debility, etc.), 100.0 each year; diarrhea and enteritis, under 2 years, 84.3 and 85.2; whooping-cough, 52.0 and 54.9; measles, 30.2 and 23.1; meningitis, 21.3 and 32.2; pneumonia and broncho-pneumonia, 13.9 and 14.6; other diseases of the respiratory system, 13.5 and 14.8; and tuberculosis other than pulmonary, 11.1 and 14.7.

The per cents of deaths in childhood, 1 to 4 years, were above the general averages of 4.8 in 1907 and 4.5 in 1906, for deaths from the following causes: diphtheria and croup, 49.2 and 35.3; measles, 47.1 and 56.2; scarlet fever, 37.5 and 38.5; whooping-cough, 37.0 and 36.9; diarrhea and enteritis, 2 years and over, 28.5 and 21.9; meningitis, 21.5 and 25.3; tuberculosis of other organs than the lungs, 18.5 and 21.2; diarrhea and enteritis, under 2 years, 15.7 and 14.8; pneumonia and broncho-pneumonia, 8.7 and 7.8; and plague, 8.5 in 1907 alone.

The per cent of deaths in youth, 5 to 14 years, was above the general average of 3.4 each year for deaths from the following causes: scarlet fever, 47.2 in 1907 and 40.4 in 1906; diphtheria and croup, 38.4 and 46.3; meningitis, 16.9 and 13.3; measles, 13.2 and 14.2; tuberculosis other than pulmonary, 11.8 and 10.6; plague, 11.0 in 1907 alone; typhoid fever, 8.1 and 11.9; whooping-cough, 8.1 and 8.2; diarrhea and enteritis, 2 years and over, 6.3 and 6.5; other diseases of the digestive system, 5.7 and 4.9; and miscellaneous violence (accidental injuries, etc.), 5.7 and 5.6.

The age was unknown for altogether 302, or 40.3 per cent, of the 750 victims of earthquake and fire in April, 1906. The per cents of unknown age were also considerable for deaths from miscellaneous violence, 2.7 in 1907 and 2.4 in 1906; for deaths by suicide, 1.0 and 1.8; and for deaths from plague, 1.2 in 1907 alone, as well as for deaths from more or less indefinite causes, 1.2 each year.

TABLE 21.—*Deaths from each Specified Disease and Class of Diseases, classified by Sex, Race, Nativity, and Age Periods, for California: 1907.*

No.	Cause of Death.	Total Deaths	Male	Female	White	Negro	Indian	Chinese	Japanese	White.				Under 1 Year	1 to 4 Years	5 to 14 Years	15 to 64 Years	65 Years and Over	Age Unknown...
										Born in California	Born in Other States	Foreign Born	Unknown						
	ALL CAUSES	31,095	19,666	11,429	29,339	449	120	670	517	8,332	10,482	9,396	1,129	3,422	1,484	1,060	16,761	8,175	193
	I. GENERAL DISEASES	9,057	5,445	3,612	8,406	146	44	286	175	2,499	3,065	2,653	189	340	581	483	6,320	1,302	31
	(A.) Epidemic diseases	1,765	1,058	707	1,632	16	9	26	82	866	419	327	20	197	409	285	701	170	3
1	Typhoid fever	558	394	164	488	7	2	3	58	164	172	145	7	1	27	45	463	21	1
2	Exanthematic typhus																		
3	Relapsing fever	1		1	1					1					1				
4	Malarial fever	70	42	28	66		1	1	2	18	27	16	5	4	4	6	40	16	
5	Smallpox	6	5	1	5	1				2		3					6		
6	Measles	189	108	81	186	1	2			143	27	16		57	89	25	17	1	
7	Scarlet fever	72	29	43	72					55	10	7		5	27	34	6		
8	Whooping cough	173	71	102	167	3	3			151	11	4	1	90	64	14	5		
9	(*a*) Diphtheria	296	164	132	289			5	2	211	61	14	3	9	131	129	27		
	(*b*) Croup	84	48	36	81				3	68	10	3		10	56	17	1		
10	Influenza	114	62	52	112	1		1		9	53	50		3	1	1	29	80	
11	Miliary fever																		
12	Asiatic cholera																		
13	Cholera nostras	1	1					1									1		
14	Dysentery	51	29	22	44	1	1	4	1	5	22	15	2	2	1	1	14	32	1
15	Plague	82	57	25	70	1		7	4	22	9	37	2	2	7	9	57	6	1
16	Yellow fever																		
17	Leprosy	4	2	2	2			2				2					4		
18	Erysipelas	50	34	16	47	1		2		16	16	15		13	1	2	20	14	
19	Other epidemic diseases	14	12	2	2				12	1	1			1		2	11		
	(B.) Other general diseases	7,292	4,387	2,905	6,774	130	35	260	93	1,633	2,646	2,326	169	143	172	198	5,619	1,132	28
*20	Septicemia	108	68	40	102	1		4	1	32	37	30	3	7	5	5	80	11	
21	Glanders and farcy																		
22	Malignant pustule and charbon	1	1		1							1					1		
23	Rabies																		
24	Actinomycosis, trichinosis, etc.																		
25	Pellagra																		
†27	Tuberculosis of lungs	4,040	2,561	1,479	3,674	89	27	197	53	994	1,450	1,145	85	32	44	78	3,582	293	11
†26	Tuberculosis of larnyx	29	20	9	27	1		1		9	13	4	1				25	4	
28	Tuberculous meningitis	230	136	94	213	4		4	9	146	42	25		50	82	82	64	2	
29	Abdominal tuberculosis	161	88	73	144	2	3	5	7	59	38	46	1	10	12	10	115	13	1
30	Pott's disease	26	18	8	24	1		1		6	10	8			2	7	16	1	
*31	Tuberculous abscess	1	1		1					1							1		
32	White swelling	10	7	3	9	1				4	3	2		1	1	5	3		
33	Tuberculosis of other organs	28	18	10	24	1		1	2	8	6	8	2		1	5	16	4	2
34	General tuberculosis	82	44	38	73	4		3	2	32	21	18	2	2	7	8	61	4	
35	Scrofula	4	3	1	4					4				1	2		1		

36	Syphilis	[illegible]	2	2	4					2		2					4		
38	Gonorrheal infections of children	1	1		1					1				1					
39	Cancer of mouth	59	49	10	58			1		2	24	32				3	28	26	1
40	Cancer of stomach and liver	670	414	256	650	6		6	8	43	262	339	6			8	401	264	2
41	Cancer of intestines and peritoneum	139	77	62	134			8	2	14	65	53	2				85	54	
42	Cancer of genital organs	197		197	195	1	1			22	113	56	4				156	41	
43	Cancer of breast	115		115	114	1				18	55	39	2				74	41	
44	Cancer of skin	52	33	19	51			1		2	22	26	1				21	31	
*45	Cancer of other or unspecified organs	358	208	150	344	4		8	2	44	136	158	6		2	4	213	138	1
*46	Tumor (noncancerous)	17	9	8	17					4	6	7					11	6	
47	Acute articular rheumatism	116	67	49	112	3			1	39	43	28	2	1	3	23	79	10	
48	Chronic rheumatism and gout	72	32	40	67	2	1	2		3	37	25	2				35	37	
49	Scurvy	2		2	2					1	1				1			1	
50	Diabetes	235	120	115	230	3		2		31	96	99	4		1	9	145	79	1
51	Exophthalmic goiter	23	2	21	22	1				1	12	9					20	3	
52	Addison's disease	5	3	2	5					1	3	1					4	1	
53	Leukemia	29	20	9	29					12	7	10			3	2	23	1	
*54	Anemia, chlorosis	74	36	38	71			2	1	11	32	25	3		1	8	54	16	
†56	Alcoholism	245	233	12	238	1	3	1	2	32	79	94	33				204	34	7
57	Lead poisoning	7	7		7					1	3	3					6	1	
58	Other professional intoxications	2	2		2							2					2		
59	Other chronic poisonings	34	27	7	23			11		9	8	3	3				29	4	1
†55	Other general diseases	12	6	6	12					2	6	4		1	1	1	6	3	
	II. DISEASES OF THE NERVOUS SYSTEM	3,060	1,891	1,169	2,921	47	5	36	51	688	1,278	876	79	230	184	146	1,392	1,093	15
*60	Encephalitis	16	11	5	16					7	4	4	1	3	1		12		
61	Meningitis	657	402	255	602	10	3	3	39	369	140	86	7	140	141	111	246	17	2
62	Locomotor ataxia	53	48	5	52			1		7	32	12	1				39	13	1
63	Other diseases of spinal cord	86	51	35	85	1				15	39	29	2	2	4	2	46	32	
64	Apoplexy	1,143	687	456	1,108	13	1	15	6	76	582	415	35	5	6	5	491	632	4
65	Softening of brain	115	84	31	112	3				3	66	41	2				39	76	
*66	Paralysis	341	196	145	331	3	1	6		12	193	118	8	1		1	104	232	3
67	General paralysis of insane	120	91	29	115	2		3		11	59	40	5				90	29	1
68	Other forms of mental disease	126	72	54	119	3		3	1	19	45	49	6				119	6	1
74	*a* (pt). Other diseases of brain	94	69	25	87	5		1	1	18	33	27	9	1	4	3	60	23	8
69	Epilepsy	106	64	42	103	2		1		33	48	21	1		1	5	85	15	
*70	Convulsions (nonpuerperal)	10	2	8	9	1				3	4	2				1	8	1	
*71	Convulsions of children	93	51	42	89	1		1	2	84	3	2		74	19				
72	Tetanus	39	33	6	34	3		1	1	15	11	7	1	4	1	14	19	1	
73	Chorea	4	4		4					1	1	2				1	1	2	
74	*b* (pt). Other diseases of nervous system	43	16	27	42			1		7	16	18	1		2		27	14	
75	Diseases of the eye and its adnexa	1	1		1					1					1				
76	Diseases of the ear	13	9	4	12				1	7	2	3			4	3	6		
	III. DISEASES OF THE CIRCULATORY SYSTEM.	4,362	2,795	1,567	4,187	57	7	87	24	337	1,891	1,814	145	3	6	44	2,131	2,159	19
77	Pericarditis	40	26	14	33	3	1	1	2	8	14	7	4			2	27	9	2
78	Endocarditis	47	34	13	42	1		1	3	9	21	11	1			2	38	7	
79	Heart disease	3,664	2,348	1,316	3,513	45	6	81	19	288	1,542	1,553	130		4	37	1,833	1,773	17
80	Angina pectoris	129	77	52	123	5		1		5	72	43	3			1	74	54	
81	Diseases of arteries	355	242	113	351	2		2		7	176	164	4				85	270	
82	Embolism and thrombosis	96	52	44	96					10	56	29	1		1	1	53	41	

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* Indefinite and unsatisfactory title. † Order of titles changed.

TABLE 21.—*Deaths from each Specified Disease and Class of Diseases, classified by Sex, Race, Nativity, and Age Periods, for California: 1907—Continued.*

No.	Cause of Death.	Total Deaths	Male	Female	White	Negro	Indian	Chinese	Japanese	White.				Under 1 Year	1 to 4 Years	5 to 14 Years	15 to 64 Years	65 Years and Over	Age Unknown...
										Born in California	Born in Other States	Foreign Born	Unknown						
	III. DISEASES OF CIRCULA'Y SYSTEM—*Cont.*																		
83	Diseases of veins	6	4	2	6	.....	.....	.....	.....	.....	3	2	1	.....	.....	.....	5	1	.....
84	Diseases of lymphatics	2	1	1	2	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	1	1	.....
*85	Hemorrhages (except of lungs)	23	11	12	21	1	.....	1	.....	10	5	5	1	3	1	1	15	3	.....
86	Other diseases of circulatory system	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	IV. DISEASES OF THE RESPIRATORY SYSTEM	3,588	2,322	1,266	3,384	54	12	83	55	993	1,113	1,143	135	495	275	79	1,663	1,059	17
*87	Diseases of nasal fossæ	2	2	.....	1	1	.....	.....	.....	.....	1	.....	.....	1	.....	.....	1	.....	.....
88	(*a*) Laryngitis	18	13	5	17	.....	.....	1	.....	11	3	2	1	6	4	4	4	.....	.....
	(*b*) Other diseases of larynx	11	6	5	9	1	.....	1	.....	3	4	2	.....	1	1	.....	9	.....	.....
89	Diseases of the thyroid body	1	.....	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....
90	Acute bronchitis	136	72	64	127	2	.....	2	5	107	10	10	.....	95	32	.....	4	5	.....
91	Chronic bronchitis	393	212	181	383	4	.....	4	2	33	157	187	6	.....	.....	5	118	269	1
92	Broncho-pneumonia	506	289	217	482	4	1	6	13	214	113	149	6	139	85	12	126	144	.....
93	Pneumonia	2,172	1,488	684	2,033	40	10	61	28	573	697	661	102	233	148	55	1,204	518	14
94	Pleurisy	65	46	19	58	.....	1	.....	6	8	30	17	3	1	2	1	48	13	.....
*95	Congestion of lungs	105	71	34	101	.....	.....	4	.....	26	30	39	6	18	2	1	41	42	1
96	Gangrene of lungs	10	8	2	9	.....	.....	.....	1	1	5	3	.....	.....	.....	.....	10	.....	.....
97	Asthma	91	56	35	87	1	.....	3	.....	5	31	46	5	.....	.....	.....	40	51	.....
98	Emphysema	15	10	5	15	.....	.....	.....	.....	.....	12	3	.....	.....	.....	.....	7	8	.....
*99	(*a*) Hemorrhage of lungs	32	24	8	30	1	.....	1	.....	5	9	13	3	.....	1	.....	25	5	1
	(*b*) Other diseases of respiratory system	31	25	6	31	.....	.....	.....	.....	7	11	10	3	1	.....	1	25	4	.....
	V. DISEASES OF THE DIGESTIVE SYSTEM	2,775	1,630	1,145	2,617	31	12	51	64	1,261	695	608	53	831	275	109	1,099	456	5
100	Diseases of mouth	10	5	5	9	.....	1	.....	.....	6	2	1	.....	4	1	2	2	1	.....
101	(*a*) Tonsilitis	32	17	15	31	.....	.....	.....	1	18	9	3	1	2	5	14	10	1	.....
	(*b*) Diseases of pharnyx	11	6	5	10	.....	.....	.....	1	5	3	2	.....	2	2	1	6	.....	.....
102	Diseases of esophagus	2	1	1	2	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	1	1	.....
103	Ulcer of stomach	98	67	31	93	1	.....	1	3	10	36	44	3	.....	.....	1	70	27	.....
104	*(*a*) Gastritis	109	69	40	101	4	.....	3	1	14	49	36	2	.....	.....	2	48	59	.....
	(*b*) Other diseases of stomach	48	32	16	45	1	.....	.....	2	8	19	15	3	1	1	1	24	21	.....
*100*l*	Dentition†	23	10	13	22	.....	.....	.....	1	22	.....	.....	.....	19	4	.....	.....	.....	.....
105	Diarrhea and enteritis (under 2 years)	899	519	380	854	7	6	7	25	803	29	22	.....	758	141	.....	.....	.....	.....
106	Diarrhea and enteritis (2 years and over)	288	155	133	268	2	2	10	6	90	100	72	6	.....	82	18	90	98	.....
107	Intestinal parasites	2	2	.....	2	.....	.....	.....	.....	1	1	.....	.....	.....	1	.....	1	.....	.....
108	(*a*) Hernia	75	50	25	67	1	2	4	1	10	16	38	3	7	.....	.....	39	29	.....
	(*b*) Obstruction of intestines	199	93	106	192	3	.....	.....	4	62	65	61	4	22	19	12	97	48	1
109	Other diseases of intestines	43	24	19	39	1	.....	3	.....	14	14	10	1	7	2	1	24	9	.....
110	Acute yellow atrophy of liver	2	1	1	2	.....	.....	.....	.....	1	.....	1	.....	.....	1	.....	1	.....	.....
111	Hydatid tumors of liver	2	1	1	2	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	2	.....	.....
112	Cirrhosis of liver	363	241	122	340	4	.....	16	3	55	131	137	17	1	2	.....	271	87	

113	Biliary calculi	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	1	82	30	......
115	Diseases of spleen	9	6	3	9	......	......	......	......	1	4	4	......	......	1	......	5	1	2
116	Peritonitis (nonpuerperal)	171	85	86	161	4	......	2	4	36	65	54	6	5	3	15	123	25	......
†118	Appendicitis	237	165	72	224	2	......	2	9	88	86	48	2	......	8	41	183	5	......
†117	Other diseases of digestive system	2	......	2	2	......	......	......	......	......	2	......	......	......	......	......	2	......	......
	VI. DISEASES OF GENITO-URINARY SYSTEM	2,126	1,322	804	2,058	29	8	14	22	312	949	756	41	27	17	18	1,190	870	4
119	Acute nephritis	76	45	31	71	1	......	2	2	47	14	10	......	21	12	2	40	1	......
120	Bright's disease	1,711	1,117	594	1,657	23	3	10	18	207	788	626	36	1	5	13	951	789	2
121	Other diseases of kidneys	51	32	19	48	1	......	1	1	11	15	21	1	8	......	2	32	13	1
122	Calculi of urinary tract	2	......	2	2	......	......	......	......	2	......	......	......	......	......	1	1	......	......
123	Diseases of bladder	94	81	13	93	......	......	1	......	2	45	46	......	2	......	......	24	68	......
124	Diseases urethra, urinary abscess, etc.	4	3	1	4	......	......	......	......	......	1	3	......	......	......	......	3	1	......
125	Diseases of prostate	43	43	......	43	......	......	......	......	......	27	15	1	......	......	......	5	88	......
126	Nonvenereal diseases of male genital organs	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
127	Metritis	6	......	6	6	......	......	......	......	3	2	1	......	......	......	......	5	1	......
128	Uterine hemorrhage (nonpuerperal)	2	......	2	2	......	......	......	......	1	1	......	......	......	......	......	1	1	......
129	Uterine tumor (noncancerous)	26	......	26	23	3	......	......	......	6	8	7	2	......	......	......	25	......	1
130	Other diseases of uterus	33	......	33	33	......	......	......	......	10	16	6	1	......	......	......	83	......	......
131	Ovarian tumors	31	......	31	30	1	......	......	......	4	17	9	......	......	......	......	23	8	......
132	(a) Diseases of tubes	41	......	41	40	......	......	......	1	14	14	12	......	......	......	......		......	......
	(b) Other diseases of female genital organs	4	......	4	4	......	......	......	......	3	1	......	......	......	......	......	4	......	......
133	Nonpuerperal diseases of the breast (cancer excepted)	2	1	1	2	......	......	......	......	2	......	......	......	......	......	......	2	......	......
	VII. CHILDBIRTH	265	......	265	255	2	......	3	5	106	88	60	1	......	......	......	264	......	1
134	Accidents of pregnancy	70	......	70	69	...	......	......	1	32	25	12	......	......	......	......	70	......	......
135	Puerperal hemorrhage	22	......	22	22	......	......	......	......	6	8	8	......	......	......	......	22	......	......
136	Other accidents of labor	15	......	15	15	......	......	......	......	6	4	5	......	......	......	......	15	......	......
137	Puerperal septicemia	76	......	76	69	1	......	3	3	30	25	14	......	......	......	......	76	......	......
138	Puerperal convulsions	50	......	50	49	......	......	......	1	20	16	13	......	......	......	......	50	......	......
139	Puerperal phlegmasia alba dolens	1	......	1	1	......	......	......	......	......	1	......	......	......	......	......	1	......	......
140	Other puerperal accidents	31	......	31	30	1	......	......	......	12	9	8	1	......	......	......	30	......	1
141	Puerperal diseases of the breast	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
	VIII. DISEASES OF THE SKIN	120	77	43	115	1	1	3	......	17	50	44	4	9	4	3	36	68	......
142	Gangrene	73	50	23	70	1	1	1	......	4	35	29	2	1	2	......	18	57	......
143	Carbuncle	9	4	5	8	......	......	1	......	1	3	4	......	......	......	......	8	1	......
*144	Abscess	19	14	5	18	......	......	1	......	5	7	5	1	2	......	3	11	3	......
145	Other diseases of the skin	19	9	10	19	......	......	......	......	7	5	6	1	6	2	......	4	7	......
	IX. DISEASES OF THE LOCOMOTOR SYSTEM	29	20	9	27	......	......	2	......	15	5	6	1	8	3	6	10	2	......
146	Diseases of bones	22	14	8	20	......	......	2	......	14	4	2	......	8	3	6	4	1	......
147	Diseases of joints	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
*148	Amputation	7	6	1	7	......	......	......	......	1	1	4	1	......	......	......	6	1	......
149	Other diseases of organs of locomotion	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
	X. MALFORMATIONS	231	141	90	226	1	1	1	2	219	4	3	......	206	16	8	1	......	......
150	(a) Hydrocephalus	24	14	10	22	......	1	......	1	19	2	1	......	16	6	1	1	......	......
	(b) Congenital malformation of heart, cyanosis	164	102	62	161	1	......	1	1	157	2	2	......	150	8	6	......	......	......
	(c) Other congenital malformations	43	25	18	43	......	......	......	......	43	......	......	......	40	2	1	......	......	......

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*Indefinite and unsatisfactory title. †Order of titles changed.

TABLE 21.—*Deaths from each Specified Disease and Class of Diseases, classified by Sex, Race, Nativity, and Age Periods, for California: 1907.—Continued.*

No.	Cause of Death.	Total Deaths	Male	Female	White	Negro	Indian	Chinese	Japanese	White. Born in California	White. Born in Other States	White. Foreign Born	White. Unknown	Under 1 Year	1 to 4 Years	5 to 14 Years	15 to 64 Years	65 Years and Over	Age Unknown
	XI. EARLY INFANCY	1,031	579	452	986	10	3	7	25	986				1,031					
151	(*a*) Premature birth	496	285	211	476	7	1	2	10	476				496					
	*(*b*) Congenital debility	473	264	209	451	3	1	5	13	451				473					
152	Other diseases of early infancy	59	28	31	57		1		1	57				59					
153	Lack of care	3	2	1	2				1	2				3					
	XII. OLD AGE	802	463	339	769	13	6	14		11	377	357	24				21	774	7
*154	Old age	802	463	339	769	13	6	14		11	377	357	24				21	774	7
	XIII. VIOLENCE	3,319	2,782	537	3,083	54	23	69	90	733	897	1,021	432	112	100	157	2,540	330	80
155	Suicide by poison	196	130	66	189	2		3	2	47	65	48	29			2	185	8	1
156	Suicide by asphyxia	38	27	11	37			1		3	18	12	4				33	4	1
157	Suicide by hanging or strangulation	52	46	6	46			5	1	5	13	18	10				42	10	
158	Suicide by drowning	25	18	7	24			1		1	10	10	3				20	4	1
159	Suicide by firearms	231	206	25	221	8	1	2	4	43	80	62	36				211	17	3
160	Suicide by cutting instruments	47	47		44			2	1	5	13	16	10				36	11	
161	Suicide by jumping from high places	6	5	1	6							6					5	1	
162	Suicide by crushing	5	5		5					1	1	1	2				5		
163	Other suicides	8	7	1	6			1	1	1	1	3	1				7	1	
164	Fractures	95	58	37	91	2			2	8	41	38	4			3	35	57	
165	Dislocations	2	1	1	2						1	1						2	
†167	Burns and scalds	125	61	64	114	4		3	4	37	40	32	5	6	22	6	74	16	1
168	Burning by corrosive substances	11	7	4	11					7	3	1		1	4	2	4		
169	Heat and sunstroke	14	13	1	14					4	4	4	2	1	1		10	1	1
170	Cold and freezing	25	25		24		1			2	4	12	6				15	10	
171	Lightning (electricity)	41	40	1	37	2	2			11	19	7			1	4	36		
172	Drowning	377	338	39	346	3	2	5	21	88	69	107	82	3	19	28	291	12	24
173	Starvation, privation, etc.	15	6	9	13			2		7	3	2	1	3		1	10	1	
174	Inhalation of poisonous gases	69	49	20	68				1	21	18	25	4	1	3	4	49	10	2
175	Other accidental poisonings	100	64	36	94	3		2	1	43	31	17	8	7	24	10	50	9	
†166	(*a*) Accidental gunshot wounds	102	94	8	97	1	3	1		44	23	22	8			28	71	3	
	(*b*) Injuries by machinery	31	30	1	30	1				8	12	9	1				30		
	(*c*) Injuries in mines and quarries	35	35		32	1		2		5	5	21	1				32	2	1
	(*d*) Railroad accidents and injuries	679	624	55	634	10	3	9	23	91	170	227	146		4	20	567	58	30
	(*e*) Injuries by horses and vehicles	187	169	18	175	2		3	7	42	56	62	15		8	19	142	18	
	(*f*) Other accidental traumatisms	489	437	52	459	8	3	7	12	85	145	191	38	2	13	24	373	62	15
176	(*a*) Suffocation	15	9	6	15					10	2	2	1	8		2	5		
	(*b*) Injuries at birth	72	43	29	71	1				71				72					
	(*c*) Homicide	216	178	38	168	11	7	20	10	41	46	61	20	6		8	195	12	
	(*d*) Other external violence	11	10	1	10		1			2	4	4		2	1		7	1	

	XIV. ILL-DEFINED DISEASES	330	199	131	305	4	3	14	4	155	70	55	25	130	23	7	94	62	14
*177	"Dropsy"	39	25	14	35	......	......	4	......	3	16	14	2	......	1	1	11	26	....
*178	Sudden death	3	1	2	2	1	......	......	......	......	2	......	......	......	......	......	......	8	....
*179	(a) Heart failure	42	26	16	40	......	......	1	1	3	18	15	4	......	......	......	22	20	....
	(b) Inanition (over 3 months)‡	81	51	30	79	......	......	2	......	69	6	4	......	70	9	......	2	......	....
	(c) Debility (over 3 months)‡	2	1	1	2	......	......	......	......	1	......	1	......	1	......	......	1	......	....
	(d) Marasmus (over 3 months)‡	64	26	38	61	2	......	......	1	53	6	2	......	53	10	......	1	......	....
	(e) Fever	3	2	1	3	......	......	......	......	3	......	......	......	......	......	3	......	......	....
	(f) Other ill-defined diseases	14	5	9	13	......	......	1	......	3	9	1	......	......	1	......	13	......	....
	(g) Unknown	82	62	20	70	1	3	6	2	20	13	18	19	6	2	3	44	13	14

* Indefinite and unsatisfactory title. † Order of titles changed.
‡ Deaths reported from this cause, under 3 months of age, are compiled under "Congenital debility," 151 (*b*).

TABLE 22.—*Deaths from each Specified Disease and Class of Diseases, classified by Sex, Race, Nativity, and Age Periods, for California: 1906.*

No.	CAUSE OF DEATH.	Total Deaths	Male	Female	White	Negro	Indian	Chinese	Japanese	WHITE. Born in California	WHITE. Born in Other States	WHITE. Foreign Born	WHITE. Unknown	Under 1 Year	1 to 4 Years	5 to 14 Years	15 to 64 Years	65 Years and Over	Age Unknown
	ALL CAUSES	29,303	18,166	11,137	27,704	428	117	670	384	7,866	9,679	8,840	1,319	3,347	1,320	988	15,324	7,833	491
	I. GENERAL DISEASES	8,716	5,145	3,571	8,077	151	50	276	162	2,324	3,159	2,413	181	346	501	467	6,082	1,274	46
	(*A.*) *Epidemic diseases*	1,761	1,054	707	1,636	21	12	34	58	786	466	354	30	187	311	260	766	227	10
1	Typhoid fever	657	450	207	594	7	1	11	44	244	166	171	13	5	34	78	519	17	4
2	Exanthematic fever																		
3	Relapsing fever	2		2	1	1						1				1	1		
4	Malarial fever	111	64	47	100		2	5	4	31	42	27		14	7	5	54	31	
5	Smallpox	36	28	8	36					10	6	14	6	2	3		25	5	1
6	Measles	169	93	76	163	1	5			129	22	11	1	39	95	24	11		
7	Scarlet fever	52	25	27	52					36	10	3	3	1	20	21	7		3
8	Whooping cough	122	55	67	116	2	3		1	104	12			67	45	10			
9	{(*a*) Diphtheria	191	103	88	184	2		5		121	52	11		12	59	97	23		
	{(*b*) Croup	53	31	22	51			1	1	38	11	2		10	27	16			
10	Influenza	196	104	92	186	3	1	2	4	22	97	64	3	8	5	2	62	118	1
11	Military fever																		
12	Asiatic cholera																		
13	Cholera nostras	8	5	3	7			1		1	2	4			1		3	4	
14	Dysentry	68	38	30	61	2		5		20	18	22	1	8	11	2	20	27	
15	Plague																		
16	Yellow fever																		
17	Leprosy	1	1					1									1		
18	Erysipelas	87	52	35	81	3		2	1	26	28	24	3	18	3	4	36	25	1
19	Other epidemic diseases	8	5	3	4			1	3	4				3	1		4		
	(*B.*) *Other general diseases*	6,955	4,091	2,864	6,441	130	38	242	104	1,538	2,693	2,059	151	159	190	207	5,316	1,047	36
*20	Septicemia	99	68	31	92	4		1	2	22	38	29	3	4	1	6	70	17	1
21	Glanders and farcy																		
22	Malignant pustule and charbon	6	5	1	6							6					5	1	
23	Rabies																		
24	Actinomycosis, trichinosis, etc.,	2	2		1				1			1					2		
25	Pellagra																		
†27	Tuberculosis of lungs	3,861	2,461	1,400	3,503	93	28	179	58	930	1,468	1,031	74	36	46	82	3,414	263	20
†26	Tuberculosis of larynx	23	19	4	22			1		7	11	3	1			1	20	2	
28	Tuberculous meningitis	246	136	110	226	5	2	4	9	156	53	14	3	66	92	34	53	1	
29	Abdominal tuberculosis	166	83	83	139	3	3	6	15	69	33	34	3	17	21	8	107	13	
30	Pott's disease	30	23	7	25	1		2	2	13	8	4			2	7	21		
*31	Tuberculous abscess	4	2	2	3	1				1	1	1		1			3		
32	White swelling	15	9	6	14	1				7	3	4			2	4	7	2	
33	Tuberculosis of other organs	28	15	13	25			2	1	10	11	4		1	2	4	15	6	
34	General tuberculosis	64	38	26	59	1		1	3	17	24	17	1		3	3	55	3	
35	Scrofula	3	3		3					3				1	2				

36	Syphilis	5	1	2	2			1			2						3		
38	Gonorrheal infections of children	1	1		1					1				1					
39	Cancer of month	51	46	5	51					4	19	27	1	1			24	26	
40	Cancer of stomach and liver	578	335	243	565	1		9	3	32	234	285	14				331	242	5
41	Cancer of intestines and peritoneum	112	58	54	111	1				13	40	55	3				71	41	
42	Cancer of genital organs	240		240	235	4	1			28	117	90					194	45	1
43	Cancer of breast	119		119	118	1				9	61	46	2				87	32	
44	Cancer of skin	61	43	18	61					1	36	24					19	42	
*45	Cancer of other or unspecified organs	341	191	150	321	6	1	9	4	32	165	122	2		5	3	213	118	2
*46	Tumor (noncancerous)	9	4	5	8			1			5	3					4	5	
47	Acute articular rheumatism	120	55	65	118	1		1		40	43	30	5		5	32	63	20	
48	Chronic rheumatism and gout	101	47	54	99			2		6	56	35	2			3	51	47	
49	Scurvy	3	2	1	2				1			2		1			2		
50	Diabetes	227	120	107	221	4		2		33	116	69	3		1	16	137	72	1
51	Exophthalmic goiter	12	2	10	12						8	4					12		
52	Addison's disease	9	7	2	8		1			3	3	2					8	1	
53	Leukemia	31	18	13	30				1	9	12	9		1	3	1	22	4	
*54	Anemia, chlorsis	75	32	43	75					14	43	15	3	3	1	2	52	16	1
†56	Alcoholism	195	168	27	195					32	63	77	23		1	1	173	18	2
57	Lead poisoning	3	3		3					1	2						2	1	
58	Other professional intoxications																		
59	Other chronic poisonings	45	39	6	29	1		14	1	14	9	3	3				43	2	
†55	Other general diseases	5	5		3			2				2	1				2	3	
	II. DISEASES OF THE NERVOUS SYSTEM	2,763	1,647	1,116	2,671	34	5	31	22	634	1,091	873	73	239	164	99	1,151	1,093	17
*60	Encephalitis	18	11	7	17			1		6	4	6	1	2	4		10	1	1
61	Meningitis	466	263	203	440	3		7	16	309	88	37	6	150	118	62	120	14	2
62	Locomotor ataxia	64	51	13	63			1		3	31	28	1			1	40	23	
63	Other diseases of spinal cord	78	54	24	74	1	1	1	1	9	37	27	1	1	2	1	33	40	1
64	Apoplexy	1,097	673	424	1,070	13	1	12	1	65	521	448	36	5	2	8	489	588	5
65	Softening of brain	106	69	37	105	1				7	44	53	1				33	73	
*66	Paralysis	339	182	157	334	2		3		21	164	144	5		1	2	83	252	1
67	General paralysis of insane	103	76	27	98	5				15	50	28	5				65	35	3
68	Other forms of mental disease	132	74	58	125	5		2		18	60	39	8				110	20	2
74	*a* (pt). Other diseases of brain	91	50	41	85	4		2		22	30	30	3	1	3	4	57	25	1
69	Epilepsy	89	50	39	88		1			35	33	18	2	2	4	7	65	11	
*70	Convulsions (nonpuerperal	10	8	2	9			1		4	3	1	1			3	6		1
*71	Convulsions of children	96	51	45	91		2		3	86	5			71	25				
72	Tetanus	33	23	10	32			1		18	5	7	2	6	2	10	13	2	
73	Chorea	7	3	4	6				1	4	2				1	1	5		
74	*b* (pt). Other diseases of nervous system	27	6	21	27					8	12	6	1				19	8	
75	Diseases of the eye and its adnexa	2	1	1	2					2				1			1		
76	Diseases of the ear	5	2	3	5					2	2	1			2		2	1	
	III. DISEASES OF THE CIRCULATORY SYSTEM	3,766	2,424	1,342	3,612	51	4	81	18	294	1,570	1,620	128	4	1	50	1,827	1,869	15
77	Pericarditis	.26	19	7	21	1		3	1	5	6	8	2			2	19	5	
78	Endocarditis	33	15	18	33					10	12	10	1			7	26		
79	Heart disease	3,208	2,048	1,160	3,072	46	2	72	16	248	1,311	1,401	112	2		39	1,589	1,565	13
80	Angina pectoris	89	60	29	88		1			7	48	30	3				41	47	1
81	Diseases of arteries	304	211	93	296	3		5		5	146	139	6				89	215	
82	Embolism and thrombosis	63	39	24	62		1			6	31	22	3			1	33	28	1

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* Indefinite and unsatisfactory title. † Order of titles changed.

TABLE 22.—*Deaths from each specified Disease and Class of Diseases, classified by Sex, Race, Nativity, and Age Periods, for California: 1906—Continued.*

No.	Cause of Death.	Total Deaths	Male	Female	White	Negro	Indian	Chinese	Japanese	White.				Under 1 Year	1 to 4 Years	5 to 14 Years	15 to 64 Years	65 Years and Over	Age Unknown
										Born in California	Born in Other States	Foreign Born	Unknown						
	III. DISEASES OF CIRCULA'Y SYSTEM—*Cont.*																		
83	Diseases of veins	6	5	1	5	....	....	1	....	....	5	....	....	....	....	....	3	3	....
84	Diseases of lymphatics	4	3	1	4	....	....	....	....	1	1	2	....	....	....	1	3	....	....
*85	Hemorrhages (except of lungs)	33	24	9	31	1	....	....	1	12	10	8	1	2	1	....	24	6	....
86	Other diseases of circulatory system	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	IV. DISEASES OF THE RESPIRATORY SYSTEM	3,187	1,964	1,223	3,034	45	9	70	29	935	935	1,059	105	467	230	97	1,342	1,036	15
*87	Diseases of the nasal fossæ	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
88	(*a*) Laryngitis	17	9	8	17	....	....	....	....	10	1	6	....	1	6	2	5	3	....
	(*b*) Other diseases of larynx	5	4	1	4	....	....	1	....	2	1	....	1	....	1	....	3	....	1
89	Diseases of the thyroid body	1	....	1	1	....	....	....	....	....	1	....	....	....	....	....	1	....	....
90	Acute bronchitis	141	77	64	134	3	1	2	1	98	14	22	....	80	23	5	10	23	....
91	Chronic bronchitis	293	148	145	288	3	....	2	....	29	119	137	3	1	3	3	84	202	....
92	Broncho-pneumonia	452	241	211	435	6	....	7	4	206	98	121	10	136	59	15	93	146	3
93	Pneumonia	1,979	1,282	697	1,872	31	7	50	19	537	599	658	78	219	132	60	1,022	537	9
94	Pleurisy	52	36	16	50	....	....	1	1	7	20	21	2	3	1	2	27	18	1
*95	Congestion of lungs	118	74	44	113	....	....	2	3	34	33	43	3	25	4	6	21	61	1
96	Gangrene of lungs	3	2	1	3	....	....	....	....	1	....	2	....	....	....	1	2	....	....
97	Asthma	65	44	21	62	1	....	1	1	3	28	28	3	....	1	....	33	31	....
98	Emphysema	8	6	2	8	....	....	....	....	1	3	4	....	1	....	....	3	4	....
*99	(*a*) Hemorrhage of lungs	38	29	9	35	1	1	1	....	5	14	12	4	1	....	1	29	7	....
	(*b*) Other diseases of respiratory system	15	12	3	12	....	....	3	....	2	4	5	1	....	....	2	9	4	....
	V. DISEASES OF THE DIGESTIVE SYSTEM	2,678	1,523	1,155	2,531	33	10	56	48	1,283	643	580	25	867	255	91	996	461	8
100	Diseases of mouth	7	4	3	7	....	....	....	....	5	1	1	....	5	....	....	1	1	....
101	(*a*) Tonsilitis	25	17	8	24	1	....	....	....	15	7	2	....	4	6	5	9	1	....
	(*b*) Diseases of pharynx	9	5	4	9	....	....	....	....	4	1	4	....	3	1	....	4	1	....
102	Diseases of esophagus	9	4	5	9	....	....	....	....	1	4	4	....	....	....	....	7	2	....
103	Ulcer of stomach	78	49	29	78	....	....	....	....	15	41	22	....	....	....	2	59	17	....
104	*(*a*) Gastritis	134	75	59	128	3	1	2	....	15	50	61	2	5	3	2	50	74	....
	(*b*) Other diseases of stomach	39	28	11	35	2	....	1	1	8	16	11	....	4	2	2	13	18	....
*100*l*	Dentition†	9	4	5	8	....	1	....	....	7	1	....	....	6	3	....	....	....	....
105	Diarrhea and enteritis (under 2 years)	930	501	429	899	8	4	5	14	866	27	6	....	792	138	....	....	....	....
106	Diarrhea and enteritis (2 years and over)	338	181	157	308	9	1	14	6	95	105	103	5	....	74	22	114	126	2
107	Intestinal parasites	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
108	(*a*) Hernia	81	40	41	78	....	....	3	....	6	23	45	4	5	....	....	41	33	2
	(*b*) Obstruction of intestines	159	94	65	151	1	....	2	5	58	48	45	....	28	19	7	65	40	....
109	Other diseases of intestines	36	18	18	34	....	....	1	1	10	16	8	....	4	1	3	23	5	....
110	Acute yellow atrophy of liver	1	1	....	1	....	....	....	....	....	1	....	....	....	....	....	1	....	....
111	Hydatid tumors of liver	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
112	Cirrhosis of liver	295	211	84	266	2	1	20	6	32	96	131	7	1	....	1	225	66	2

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
115	Diseases of spleen	2	1	1		1			1								2		
116	Peritonitis (nonpuerperal)	160	66	94	150	2	1	5	2	49	58	41	2	7	4	10	125	13	1
†118	Appendicitis	207	129	78	197	2		2	6	75	75	45	2	1	4	32	161	9	
†117	Other diseases of the digestive system	4	2	2	4						2	2				1	8		
	VI. DISEASES OF GENITO-URINARY SYSTEM	1,955	1,180	775	1,859	43	2	41	10	232	848	730	54	22	6	25	1,110	788	4
119	Acute nephritis	44	27	17	41	1			2	24	9	8		14	4	5	20	1	
120	Bright's disease	1,578	992	586	1,508	31		34	5	168	694	604	47	6	2	19	888	661	2
121	Other diseases of kidneys	46	35	11	39	2	1	3	1	2	17	18	2	1			29	16	
122	Calculi of urinary tract	2	1	1	2						1	1					1	1	
123	Diseases of bladder	95	84	11	92		1	2		7	42	42	1	1			30	63	1
124	Diseases urethra, urinary abscess, etc.	3	2	1	3					1	1	1				1	2		
125	Diseases of prostate	38	38		37			1			17	20					5	33	
126	Nonvenereal diseases of (male) genital organs	1	1			1												1	
127	Metritis	1		1	1							1					1		
128	Uterine hemorrhage (nonpuerperal)	3		3	3						1	2					3		
129	Uterine tumor (noncancerous)	31		31	28	3				9	13	5	1				28	3	
130	Other diseases of uterus	49		49	46	3				14	20	10	2				44	4	1
131	Ovarian tumors	27		27	25	2				3	15	7					22	5	
132	(a) Diseases of tubes	35		35	32			1	2	9	11	11	1				35		
	(b) Other diseases of female genital organs	2		2	2						2						2		
133	Nonpuerperal diseases of the breast (cancer excepted)																		
	VII. CHILDBIRTH	266		266	248	3	4	3	8	96	80	72					265		1
134	Accidents of pregnancy	87		87	80	1		2	4	39	27	14					87		
135	Puerperal hemorrhage	11		11	11					3	3	5					11		
136	Other accidents of labor	18		18	15	1	2			5	1	9					17		1
137	Puerperal septicemia	67		67	62	1		1	3	20	22	20					67		
138	Puerperal convulsions	45		45	44		1			19	16	9					45		
139	Puerperal phlegmasia alba dolens																		
140	Other puerperal accidents	38		38	36		1		1	10	11	15					38		
141	Puerperal diseases of the breast																		
	VIII. DISEASES OF THE SKIN	90	57	33	89				1	15	38	34	2	5		4	34	47	
142	Gangrene	52	33	19	52					6	23	21	2	3		1	11	37	
143	Carbuncle	3	2	1	3					1	1	1					3		
*144	Abscess	27	14	13	27					7	10	10		1		3	16	7	
145	Other diseases of the skin	8	8		7				1	1	4	2		1			4	3	
	IX. DISEASES OF THE LOCOMOTOR SYSTEM	36	24	12	36					14	15	7		8	2	4	19	3	
146	Diseases of bones	28	17	11	28					12	12	4		8	2	3	12	3	
147	Diseases of joints	1	1		1					1							1		
*148	Amputation	7	6	1	7					1	3	3				1	6		
149	Other diseases of organs of locomotion																		
	X. MALFORMATIONS	183	107	76	178	2		2	1	173	8	2		168	10	4	1		
150	(a) Hydrocephalus	17	10	7	17					16	1			11	4	1	1		
	(b) Congenital malformation of heart, cyanosis	134	80	54	129	2		2	1	127	1	1		128	4	2			
	(c) Other congenital malformations	32	17	15	32					30	1	1		29	2	1			

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* Indefinite and unsatisfactory title. † Order of titles changed.

TABLE 22.—*Deaths from each Specified Disease and Class of Diseases, classified by Sex, Race, Nativity, and Age Periods, for California: 1906—Continued.*

No.	CAUSE OF DEATH.	Total Deaths	Male	Female	White	Negro	Indian	Chinese	Japanese	WHITE.				Under 1 Year	1 to 4 Years	5 to 14 Years	15 to 64 Years	65 Years and Over	Age Unknown...
										Born in California	Born in Other States	Foreign Born	Unknown						
	XI. EARLY INFANCY	946	553	393	911	14	1	12	8	909	2			946					
151	(a) Premature birth	479	274	205	468	4		5	2	468				479					
	*(b) Congenital debility	426	251	175	404	8	1	7	6	402	2			426					
152	Other diseases of early infancy	37	24	13	36	1				36				37					
153	Lack of care	4	4		3	1				3				4					
	XII. OLD AGE	787	431	356	764	8	4	11		7	364	378	15				34	746	7
*154	Old age	787	431	356	764	8	4	11		7	364	378	15				34	746	7
	XIII. VIOLENCE	3,403	2,747	656	3,210	34	23	65	71	759	813	946	692	133	121	141	2,272	373	363
155	Suicide by poison	150	100	50	143	2		4	1	17	40	62	24			1	131	16	2
156	Suicide by asphyxia	38	32	6	38					9	11	10	8			1	35	1	1
157	Suicide by hanging or strangulation	55	46	9	48			6	1	2	9	27	10				43	10	2
158	Suicide by drowning	9	6	3	9					3	1	5					8	1	
159	Suicide by firearms	180	168	12	172	2		1	5	24	62	57	29				160	17	3
160	Suicide by cutting instruments	42	37	5	39			1	2	7	8	20	4				32	10	
161	Suicide by jumping from high places	4	3	1	4					1		1	2				4		
162	Suicide by crushing	7	7		7						1	1	5				7		
163	Other suicides	16	13	3	14			1	1	2	4	5	3				12	3	1
164	Fractures	156	121	35	149	2		1	4	28	51	59	11		4	5	99	46	2
165	Dislocations	2	2		2						1	1						2	
†167	Burns and scalds	136	66	70	129	2	1	3	1	52	43	30	4	7	30	16	64	19	
168	Burns by corrosive substances	2	1	1	2						2						2		
169	Heat and sunstroke	23	17	6	23					5	5	11	2	4			12	7	
170	Cold and freezing	17	16	1	17					1	5	4	7		1		10	4	2
171	Lightning (electricity)	38	38		38					10	20	2	6			3	35		
172	Drowning	253	236	17	239	2	3		9	74	47	69	49	6	15	26	179	16	11
173	Starvation, privation, etc.	1	1		1								1						1
174	Inhalation of poisonous gases	69	52	17	65	1		2	1	15	15	29	6		3	2	52	12	
175	Other accidental poisonings	115	61	54	118	1		1		48	45	16	4	7	29	9	62	7	1
†166	(a) Accidental gunshot wounds	100	94	6	95		3	1	1	35	30	24	6		1	14	78	7	
	(b) Injuries by machinery	20	20		19				1	2	10	7					19	1	
	(c) Injuries in mines and quarries	52	52		50		1		1	6	12	20	12				46		6
	(d) Railroad accidents and injuries	410	388	27	386	4	1	5	14	66	121	122	77		8	16	343	35	8
	(e) Injuries by horses and vehicles	114	103	11	108	2	1		3	42	30	32	4		8	17	70	18	1
	(f) Other accidental traumatisms	379	344	35	364	1	3	2	7	69	117	138	40	5	10	6	285	64	9
176	(a) Suffocation	30	17	13	27	8			2	20	4	8		17	1	8	8	1	
	(b) Injuries at birth	64	47	17	62		2			62				64					
	(c) Homicide	164	128	36	131	11	8	6	8	33	30	45	28			2	142	9	11
	(d) Other external violence	7	7		5	1			1	4		1					7		
	(e) Earthquake and fire	750	529	221	711			81	8	122	89	145	355	23	11	20	327	67	302

	XIV. ILL-DEFINED DISEASES	527	364	163	484	10	5	22	6	191	123	126	44	142	30	6	191	143	15
*177	"Dropsy"	24	13	11	23	......	......	......	1	1	12	10	......	......	......	......	14	10	......
*178	Sudden Death	6	5	1	6	......	......	......	......	1	2	1	2	......	......	......	1	4	1
	(*a*) Heart failure	85	65	20	83	1	......	......	1	7	42	27	7	......	......	......	43	40	2
	(*b*) Inanition (over 3 months)‡	87	48	39	82	2	......	2	1	70	6	6	......	66	14	......	3	4	......
	(*c*) Debility (over 3 months)‡	19	11	8	17	1	......	1	......	11	1	4	1	11	2	......	4	1	1
*179	(*d*) Marasmus (over 3 months)†	71	35	36	69	2	......	......	......	59	6	4	......	53	11	......	1	6	......
	(*e*) Fever	6	4	2	5	......	......	1	......	1	2	1	1	1	......	1	1	2	1
	(*f*) Other ill-defined diseases	17	10	7	16	1	......	......	......	......	10	6	......	......	......	......	9	7	1
	(*g*) Unknown	212	173	39	183	3	5	18	3	41	42	67	33	11	3	5	115	69	9

* Indefinite and unsatisfactory title. † Order of titles changed.

‡ Deaths reported from this cause, under 3 months of age, are compiled under "Congenital debility," 151(*b*).

TABLE 23.—*Deaths Reported for Registration Districts (Cities, Towns, and Rural Parts of Counties): 1907.*

[Cities or incorporated towns not reporting deaths omitted from table.]

REGISTRATION DISTRICT.	Deaths: 1907.
CALIFORNIA	31,095
Alameda County	3,609
Rural	772
Alameda	368
Berkeley	393
Hayward	35
Livermore	25
Oakland	1,950
Pleasanton	18
San Leandro	48
Alpine County	4
Amador County	70
Butte County	526
Rural	337
Biggs	6
Chico	95
Gridley	13
Oroville	75
Calaveras County	131
Colusa County	77
Rural	65
Colusa	12
Contra Costa County	347
Rural	158
Antioch	31
Concord	12
Martinez	67
Richmond	79
Del Norte County	17
El Dorado County	168
Fresno County	839
Rural	497
Fresno	333
Selma	9
Glenn County	52
Rural	46
Willows	6
Humboldt County	234
Rural	142
Eureka	90
Ferndale	2
Imperial County*	13
Rural	8
Imperial	5
Inyo County	11
Rural	10
Bishop	1
Kern County	299
Rural	105
Bakersfield	148
Kern	46
Kings County	143
Rural	44
Hanford	81
Lemoore	18
Lake County	74
Rural	62
Lakeport	12
Lassen County	27
Los Angeles County	6,346
Rural	891
Alhambra	21
Azusa	16
Claremont	1
Compton	1
Covina	32
Glendale	23
Hermosa Beach	6
Hollywood	38
Long Beach	220
Los Angeles	4,145
Monrovia	99
Ocean Park	25
Pasadena	360
Pomona	118
Redondo Beach	34
San Pedro	62
Santa Monica	114
Sawtelle	34
Sierra Madre	8
South Pasadena	25
Whittier	61
Wilmington	12
Madera County	82
Marin County	239
Rural	116
Belvedere	3
Mill Valley	18
San Rafael	67
Sausalito	35
Mariposa County	45
Mendocino County	258
Rural	185
Fort Bragg	39
Potter Valley	11
Ukiah	23
Merced County	138
Rural	92
Los Banos	7
Merced	39
Modoc County	42
Rural	29
Alturas	13
Mono County	3
Monterey County	257
Rural	108
Monterey	40
Pacific Grove	51
Salinas	58
Napa County	476
Rural	351
Calistoga	9
Napa	93
St. Helena	23
Nevada County	280
Rural	142
Grass Valley	87
Nevada City	51

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* Formed August 15, 1907, from part of San Diego County.

TABLE 23.—*Deaths Reported for Registration Districts (Cities, Towns, and Rural Parts of Counties): 1907—Continued.*

[Cities or incorporated towns not reporting deaths omitted from table.]

REGISTRATION DISTRICT.	Deaths: 1907.
Orange County	335
Rural	130
Anaheim	51
Fullerton	25
Orange	19
Santa Ana	110
Placer County	97
Rural	67
Auburn	27
Rocklin	3
Plumas County	100
Riverside County	312
Rural	72
Corona	28
Elsinore	10
Riverside	192
San Jacinto	10
Sacramento County	1,149
Rural	436
Sacramento	713
San Benito County	78
Rural	56
Hollister	14
San Juan	8
San Bernardino County	774
Rural	182
Colton	91
Ontario	43
Redlands	153
San Bernardino	284
Upland	21
San Diego County	759
Rural	50
Coronado	14
Escondido	8
National City	14
Oceanside	7
San Diego	666
San Francisco (city and county)	6,575
San Joaquin County	905
Rural	360
Lodi	43
Stockton	502
San Luis Obispo County	197
Rural	56
Paso de Robles	37
San Luis Obispo	104
San Mateo County	231
Rural	192
Redwood city	39
Santa Barbara County	356
Rural	153
Lompoc	13
Santa Barbara	190
Santa Clara County	1,200
Rural	565
Alviso	1
Gilroy	79
Los Gatos	45
Palo Alto	52
San José	405
Santa Clara	53
Santa Cruz County	389
Rural	116
Boulder Creek	13
Santa Cruz	187
Watsonville	73
Shasta County	323
Rural	237
Redding	86
Sierra County	58
Rural	49
Loyaltown	9
Siskiyou County	204
Rural	146
Etna	10
Fort Jones	1
Yreka	47
Solano County	356
Rural	112
Benicia	35
Dixon	15
Fairfield	12
Rio Vista	8
Suisun	6
Vacaville	25
Vallejo	143
Sonoma County	650
Rural	314
Cloverdale	6
Healdsburg	41
Petaluma	115
Santa Rosa	140
Sebastopol	16
Sonoma	18
Stanislaus County	134
Rural	82
Modesto	47
Oakdale	5
Sutter County	58
Tehama County	155
Rural	93
Red Bluff	62
Trinity County	52
Tulare County	226
Rural	148
Porterville	10
Tulare	40
Visalia	28
Tuolumne County	86
Ventura County	193
Rural	28
Oxnard	48
San Buenaventura	77
Santa Paula	40
Yolo County	152
Rural	87
Winters	5
Woodland	60
Yuba County	184
Rural	27
Marysville	148
Wheatland	9

HYGIENE.

DEPARTMENT OF HYGIENE.

ARCHIBALD R. WARD, DIRECTOR,
Assistant Professor of Bacteriology, University of California.

The work of the hygienic laboratory during the biennial period just completed,* has been characterized particularly by a gradual increase in its opportunities for usefulness. A few more physicians in the State have come to realize the value of having a bacteriological laboratory to call upon, and a few more towns are getting the benefit of the laboratory's aid in fighting contagious diseases. Examinations of one sort and another have been made during the two years for eighty towns in the State and for two hundred and sixty-seven physicians in these towns. A large part of the work has been directed towards the control of diphtheria. Experience has demonstrated that the laboratory methods can be of great assistance in fighting epidemics in the smaller communities. The total number of examinations of all sorts made in the two years is seven thousand two hundred and fifty-four (7,254); of these, five thousand and nine (5,009) were made in connection with diphtheria epidemics. Some diphtheria epidemic work extending slightly beyond the biennial period ending June 30, 1908, but here reported, involved making six thousand three hundred and twenty-five (6,325) more examinations. The total number of examinations since the last report is thirteen thousand five hundred and seventy-nine (13,579).

DIPHTHERIA.

Work on this disease is the most important function of the laboratory, for laboratory reports are indispensable to the physician who handles diphtheria cases in accordance with the best medical practice. In connection with the management of clinical cases, one thousand two hundred and thirty-one (1,231) examinations of throat cultures have been made, through the use of our regular mailing outfits. Despite the great distance that cultures have to be sent and the consequent loss of time, which makes reports of little value in severe urgent cases, our reports are of value for detecting mild cases, for differential diagnosis, for the confirmation of clinical diagnosis in typical cases, and for determining the proper period for quarantine. There are times in the beginning of mild epidemics when the value of the laboratory in determining the true character of the disease is out of all proportion to the number of examinations made. Every health officer derives support in quarantine measures by a confirmatory report from outside sources. An instance has come to light where a physician used the serum in our mailing outfits to make his own determination, but always sent his cultures to the laboratory later for a confirmatory report because of the effect upon the family of the patient.

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*July 1, 1906, to June 30, 1908.

THE PREVENTION OF DIPHTHERIA.

But the largest opportunity of the laboratory lies in the field of preventive medicine. Bacteriology has in no instance better explained the phenomena of the spread of a disease, nor designated more definitely measures for the control of a disease, than in the case of diphtheria. It has been demonstrated not only that patients harbor virulent diphtheria bacilli in the throat and nose, but that the germs remain for a long period after convalescence in those throats and noses, and constitute a real source of danger to susceptible individuals. Likewise healthy persons, themselves highly resistant to diphtheria, may harbor virulent bacilli in their throats or noses, without becoming victims of the disease, but may, at the same time, give the disease to less resistant persons. It has been observed that 2 to 4 per cent of the healthy people in a community, in the absence of a diphtheria epidemic, harbor typical diphtheria bacilli. During epidemics as high as 50 per cent (in rare cases) of the people in close contact with cases have been found to be bacilli carriers. Furthermore, we find diphtheritic infections exhibiting all grades of clinical manifestation from these perfectly healthy carriers up to clinical diphtheria of the most pronounced type. Clinical methods of diagnosis fail entirely to discover these mild cases. Even in the severe cases there is opportunity for confusing diphtheria with the membranous lesions of scarlet fever and tonsilitis. This great variation of clinical manifestations, this persistence of infection after convalescence, these cases so mild as to go unrecognized, and the frequent occurrence of carriers, makes the fight against diphtheria peculiarly dependent upon laboratory methods, for it is only upon examination of a culture that one can arrive at any certainty as to whether or not an individual who has been exposed is a safe member of the community. The fatality from diphtheria is on the decrease, but the morbidity is not decreasing. The recognized clinical cases under treatment and properly quarantined are not contributing to the occurrence of new cases.[1] It has been asserted that they account for not more than 2 per cent of the new cases. Where do the other 98 per cent of the cases originate? The belief at present is that they come from the bacilli carriers and mild, unrecognized cases, unsuspected and at large in the community. The logical remedy is, so far as possible, to search for these carriers and mild cases, separate them from their fellows, and treat them by the means now so thoroughly established in good medical practice. It is simply a broadening of the field of application of well-tried methods. But the difficulties involved in interference with the liberties of adults not associated with clinical cases has made impracticable any serious work in this direction among adults. Not so in the cases of school children. Sufficient work[2] has been done to demonstrate that the benefits outweigh the difficulties. The usual practice when an epidemic occurs or is threatened, is to close the schools, a procedure which turns the children on the streets without checking other means of association than the school. The loss of time is serious; the danger of the spread of the diphtheria is lessened, but not eliminated. A more efficient scheme is to examine all school children, and to exclude from school the bacilli carriers. The disease is directly combated by eliminating the dangerous individuals—the sources of the germs—and the majority of the school children lose no school time. In coöperative efforts with local health authorities along these lines the laboratory can exert a broad influence in the control of diphtheria.

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[1] Hill. Time Limit versus Culture Limit in Diphtheria Release. American Journal of Public Hygiene, Vol. XVII, Nov. 1907, No. 4, page 318.

[2] Graham-Smith. Journal of Hygiene, Vol. III (1903), page 216; Vol. IV (1904), page 258.

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METHODS OF COMBATING DIPHTHERIA IN SCHOOLS.

As a preliminary to any work of this sort, it has been found necessary to have a thorough understanding between health and school boards. Unless the scheme is thoroughly understood by all the authorities concerned and the control of school attendance unreservedly yielded to the health officer, opposition that menaces the success of the work is sure to arise later. The family physician's certificate of freedom from clinical diphtheria, based on a mere physical examination, is one of many evils to be expected.

The method used by this laboratory in fighting a diphtheria epidemic in a school is as follows: By previous appointment, and preferably on Friday, representatives of the laboratory take cultures from the noses and throats of all people in the school, pupils and teachers. The pupils are then dismissed, to reassemble on Monday, when the results of the examination will be available. All persons showing positive cultures are excluded from school, together with all other school children in the same family. A letter somewhat similar to that following is sent home with the children:

BOARD OF HEALTH.

DEAR MADAM:

An examination has been made of the throat of ...., and it has been found that there are diphtheria germs present. This does not necessarily mean that he will have diphtheria, but it does mean that he has been exposed to the disease and may give it to other children. Although the germs may never show in the throat, except to bacteriological examination, yet he is a menace to other children.

Your children are, therefore, temporarily excluded from school. They ought not to associate with other children while absent from school. A permit to attend school will be issued when the throats of your children are free from the germs.

Examinations to determine the condition of the throat should be made about twice a week. Cultures for this purpose will be taken free of charge by the health officer.

Diphtheria is spread by children's using in common such things as cups, spoons, pencils and the like; sucking the same toys; coughing in each other's faces; kissing; or by any of the various ways by which germs in the throat and saliva may be transferred.

Yours truly,

————————————, Health Officer.

In the mean time all physicians in town have been fully informed as to the character and purpose of the work. No pupil excluded on account of his harboring diphtheria germs is permitted to reënter until two negative cultures have been obtained from him, and at least one negative from the other members of the family. No pupil absent from school for more than two days for any cause is allowed to reënter without examination, and likewise, no new pupil is allowed to enter until an examination has been made. Full records of all cases are kept in the laboratory, and when conditions warrant a permit to attend school is prepared for signature by the health officer. Postal card reports of all examinations are sent to parents from the laboratory. Duplicate records of all examinations are kept in the school.

The manner of the examination of the families of excluded children must vary with local conditions. It is best that they be visited at home by a representative of the health officer. They may call at his office, or meet him in the office of the school principal at appointed intervals. The restraint imposed upon the children of excluded families must also vary with local conditions. Strict quarantine is desirable, but may be impossible in the face of a strong public opinion and poor facilities for enforcement. The quarantine card on a house undoubtedly alarms the parents of the neighbor's children and prevents mingling, even if it does not inspire perfect obedience within the house.

DIPHTHERIA IN THE LINCOLN SCHOOL, BERKELEY.

For a year or more, there had been intermittent trouble from diphtheria among the pupils of this school, in very marked contrast to conditions in other districts of the town. Conditions were becoming so bad in the fall of 1906 that the children were being kept from school and popular opinion was demanding that the school be closed. The proximity of the seat of trouble to the State Hygienic Laboratory favored a trial of the control of diphtheria by regulation of school attendance, on the basis of bacteriological examinations. The dual position of Dr. George F. Reinhardt, as Professor of Hygiene in the University and as Town Health Officer, unified the executive and laboratory branches of the work. These conditions permitted a closer supervision of the work and observation of results than has been possible in subsequent work in other towns.

On November 19, 1906, cultures were taken from the throats (only) of four hundred and seventy-five pupils and teachers, with the result that twenty-seven children were found harboring diphtheria bacilli—slightly over 5 per cent. The investigation of the histories of these individuals confirmed the value of this sort of work in locating centers of infection. Of the twenty-seven infected children, four were from families that had had clinical cases within a month; six gave histories confirming suspicion of unrecognized or mild manifestations. The rule requiring submission to bacteriological examination before entering school, after a short absence, brought to light the concealment of diphtheria in two families, and necessitated exclusion of children of nine other families, because of the discovery of bacilli carriers among them.

From November 19th to January 10th, twenty-two cases of diphtheria occurred among the school children; a circumstance that cast doubt upon the value of the method used. The occurrence of two cases shortly after the first examination, in which the clinical manifestations were primarily in the nose indicated that the first examination of the school was faulty, in that no nose cultures had been taken. The children excluded from school, too, were mingling freely on the streets and at children's parties with those at school. Altogether, the conditions suggested the necessity of a second examination with exclusion and quarantine of the carriers.

A second examination on January 10th resulted in the discovery of seventy-seven bacilli carriers—14 per cent of the school. Of these, ten had been previously excluded and then readmitted on two negative throat cultures. Three were from a family that had had diphtheria in October. One was from a family that had had a recent clinical case. One developed clinical diphtheria in a few days after exclusion. The other sixty-two gave no significant histories.

The favorable results following the second examination, as compared with the previous work, are shown in Table 1.

TABLE 1.

PERIOD.	Cases in Families Connected with School.	Cases in Families not Connected with School.
October 1st to 31st	5	1
November 1st to 19th	9	1
November 19th, first school examination.		
November 19th to 30th	4	0
December 1st to 31st	12	2
January 1st to 10th	6	0
January 10th, second school examination.		
January 10th to 31st	0	5
February 1st to 11th	0	5
February 11th to 28th	2	0
March 1st to 31st	0	0

The numerous examinations of the families of the children under quarantine showed any number of examples of the spread of diphtheria bacilli in families from one child (or adult) to another. The observations amply confirmed the wisdom of the policy of excluding all children when one carrier was found. The necessity of requiring at least two negatives before release from quarantine was demonstrated, and it was shown that with even two, a risk is taken.

The period of exclusion is shown in the following table:

TABLE 2.—*Duration of Quarantine.*

Time.	Cases.
10 to 20 days	37
20 to 30 days	43
30 to 40 days	18
40 to 50 days	14
50 to 100 days	12
100 to 150 days	5
Over 150 days	0
Total	129

The average period of quarantine was thirty-three days; the longest case, one hundred and thirty-nine days. These figures include only those cases in which examinations were allowed. Some families refused to have examinations made, and so unnecessarily prolonged the period of this exclusion from school. Two thousand two hundred and sixty-four examinations were made in connection with the work.

From the facts observed, the following conclusions* were drawn:

(1) The epidemic that existed in the school was due to three factors: first, the existence of mild cases of diphtheria that, because of lack of bacteriological examination, went unrecognized as diphtheria; second, the insufficient length of quarantine in clinical cases; and, third, germ cases following exposure and never showing clinical symptoms.

(2) Our attempts to isolate all infected children had no effect on the course of the epidemic, so long as we made throat cultures alone. When we took both nose and throat cultures, and quarantined all the children showing positive cultures, the epidemic stopped.

(3) It is extremely important, in times of danger from diphtheria, that every sore throat, no matter how far it may seem to be from diphtheria, be regarded as suspicious, until a bacteriological examination has proved it to be otherwise.

(4) It is such a frequent occurrence to have a positive follow a negative culture, that at least two negatives should be demanded for release from quarantine. No case should be released on clinical signs alone.

(5) It is possible to stop epidemic diphtheria in a public school by regulation of attendance by bacteriological findings.

DIPHTHERIA IN OROVILLE.

Diphtheria was apparently introduced into the town by a visitor who had recently recovered from the disease elsewhere. One case was reported on November 14th, shortly after the arrival of the visitor in the family. No more cases were reported for six weeks.

From December 25, 1907, until January 25, 1908, cases were reported in fifteen families. Six of these families consumed milk from the R——— dairy. One of these six families was reported on December 25th, and the other five were reported during the five days, January 15th to 20th. Two other families gave a history of probable spread from the families on the milk route in question. Seven infected families in town gave no history of connection with the milk route.

The suspicions of the health officer were directed to the dairy by the number of infected families who were among its patrons and by the fact that few families consuming the milk escaped. A considerable portion of the milk was used by two cheap restaurants, and if any cases were contracted from the milk in these establishments, it was not possible to trace them.

The only people handling the milk were a man, his wife and daughter. Cultures were made from the nose and throat of each one. The mother and daughter gave positive cultures from the throat, while the man gave negative results. Bacilli persisted in the throat of the woman for three weeks in spite of constant effort to clear up the infection. No history of previous clinical diphtheria could be established, nor were clinical manifestations recognizable. The fact that the woman frequently milked the cows and delivered the milk is of interest. Upon the discovery of the carriers at the dairy, the local authorities took measures to prevent any further contamination of the milk.

Almost at the first appearance of diphtheria in the town, the schools had been closed, in spite of the fact that there was no evidence pointing to their being a source of infection. All cases in the town were either adults, children not attending school, or were attributable to the milk route.

The facts seemed to justify the opening of the school for those children who could pass an examination of the nose and throat for diphtheria bacilli. The examination of all children, several hundred, present on the first day that the schools were open, showed only 3.4 per cent to harbor diphtheria bacilli. This small percentage of carriers confirmed the conclusion that the school children were not primarily involved in the epidemic. Throughout the period that the school was under surveillance, many of the children who were refused admission because they showed diphtheria bacilli, were found to come from families that had previously had cases of diphtheria.

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* Archibald R. Ward and Margaret Henderson: The Control of Diphtheria in a Public School. California State Journal of Medicine, August, 1907.

TABLE 3.—*A Statistical Summary of the Work in Oroville.*

Total number of examinations	942
Total number of individuals examined	713
Total number of individuals examined first day	354
Total number of individuals giving positive cultures first day	12 (3.4%)
Total number of individuals giving positive cultures at any time	82

By means of this bacteriological control of attendance, the schools were kept open with perfect safety to the children attending, in the face of conditions that had led the local health authorities to feel it necessary to close them. The experience confirms our feeling that bacteriological examination of children kept in schools is a safe means of preventing an epidemic.

DIPHTHERIA IN HAYWARD.

Work in the Hayward Grammar School was carried on under great difficulties imposed by local conditions. The infection was of long standing and complicated with scarlet fever. The schools had already been closed for some time, and the parents had become impatient. The majority of the families were foreigners, and the explanation of the work difficult, if not impossible. The families were large, a fact which necessitated the exclusion of a larger number of children than usual. The families were widely scattered about the country, and difficulty was experienced in getting the individuals assembled for examination. The distribution by grades of infected individuals is shown in the following table:

TABLE 4.—*Distribution of Infected Pupils in Hayward Grammar School.*

SCHOOL GRADE.	Number Negative.	Number Positive.	Per Cent Positive.
Receiving	56	2	4
Low first	29	4	12
High first	56	11	16
Low second	14	0	0
Second	30	3	10
High second	24	3	11
Third	43	2	4
High third	31	3	0.8
Low fourth	39	11	22
Fourth	19	8	29
Low fifth	26	3	11
High fifth	36	10	21
Sixth	20	5	25
High sixth	37	2	0.5
Seventh	37	7	17
Eighth	25	3	0.1
Totals	522	77	12.8

It will be noted that the percentage in certain grades is high. The exclusion of all these infected individuals, together with the other children in their families, resulted in a crippling of the work in many grades. Quarantine was deemed impossible by the local authorities. There was clinical evidence of cases of diphtheria in the school after the examination. The local conditions and the fact that the school year was nearly spent, rendered it inadvisable to make the reëxamination, the necessity for which was so clearly indicated.

TABLE 5.—*A Statistical Summary of the Work in Hayward.*

Total number of examinations	1,658
Total number of individuals examined	757
Total number of individuals examined first day	599
Total number of individuals giving positive cultures on first day	77 (12.8%)
Total number of individuals giving positive cultures at any time	124
Total number of individuals excluded	197
Total number of families involved	84
Total number of positive cultures obtained after one negative	31
Total number of positive cultures obtained after two negatives	10*

DIPHTHERIA AT COLFAX.

The epidemic in Colfax is an excellent example of what can be accomplished when there is coöperation and harmony between the laboratory and the health and school authorities. The efforts of the very thorough and energetic health officer made it possible to stop the epidemic in a school that had been exposed to infection by clinical cases for months and to stop it with just one examination. On the first examination, 10 per cent of the children were found to be infected. These were excluded from the school and strictly quarantined, and there were no further cases of diphtheria in the school, whereas before the examination, there had been a constant succession of clinical cases.

TABLE 6.—*Statistical Summary of the Work in Colfax.*

Total number of individuals examined	145
Total number of examinations	321
Total number of individuals examined first day	107
Total number of individuals giving positive cultures on first day	10 (10%)

DIPHTHERIA AT PATTON.[1]

In April, 1908, diphtheria broke out among the employés and patients of the Southern California State Hospital at Patton. Antitoxin was administered to every inmate of the institution; the cases were isolated in the tubercular cottages, apart from the main building, and the epidemic was apparently stopped. In June, the disease reappeared. It was decided, this time, to deal with the epidemic by quarantining not only the cases, but all the infected individuals in the institution.

On June 29th, the bacteriologist from the State Hygienic Laboratory went to take charge of the situation. At that time the isolation cottages had a population of about sixty. Cases had been removed to the cottages as soon as they were diagnosed. Their rooms had been fumigated as soon as they were moved. Release from the isolation cottages had been granted when two cultures from the throat had given negative results. Antitoxin had been administered the week before to every one in the institution.

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* Eight of these occurred when there were other members of the family infected.

[1] Acknowledgment for writing the report of the results obtained at Patton is made to Miss Margaret Henderson, who represented the laboratory in the work.

On June 30th, the first examination of the entire household was commenced. Cultures were taken from both noses and throats in every case. Between June 30th and July 6th, every inmate and employé was examined. Of the eleven hundred and fifteen people in the institution, one hundred and twenty-nine, or 11.6 per cent, were found to be carrying diphtheria bacilli. These one hundred and twenty-nine people were added to the population of the isolation cottages, their belongings, their bedding and the side room, or dormitory, in which they slept, were thoroughly fumigated with formaldehyde, and the floors and walls washed with mercuric chloride.

Between July 6th and July 11th, the entire household was examined a second time for the purpose of detecting any infections that had escaped the first examination. In twelve of the fifteen wards the percentage of infected individuals was this time found to be very low, one or none or two to a ward. In three cases, the male and female sick wards and one other female ward, the percentage was still high, but a third examination of these three wards detected but one infected individual to a ward. By July 11th infections in the household had fallen to 1.8 per cent of the entire population. During this time the people at the isolation cottages were examined at rather frequent intervals, and when an individual showed two successive negatives, he was given a mercuric chloride bath, his clothes were fumigated, and he was sent back to the main house. In the interval between June 30th and July 11th, twenty-three men and eight women were released from quarantine in this manner. Cultures taken from two of these individuals a few days after release showed them to be again positive. We took this to be a reinfection, occurring in the interval that elapsed between the taking of the culture for the second negative on one afternoon and the time that the patient left the cottage the next afternoon. To avoid the danger of reinfecting the wards that these people seemed to threaten, a new system of release was established. After two successive negatives, a patient was removed to a halfway ward, apart from the isolation camp and apart from the main building. Patients in this halfway ward were segregated in groups of six or less. Their cultures were taken every day. When any one entire group gave negative cultures, they were sent back to the main building. If one member of the group gave a positive, he was sent back to the isolation camp and the rest were held for the result of yet another culture.

On July 12th, a third examination of the entire household was commenced. This was completed on July 20th, and showed the infection to be 2.8 per cent. Between July 12th and July 20th, fifty people were released from quarantine, making a total of eighty-one releases to July 20th.

After July 20th the percentage of infections rose rapidly. Between July 20th and 29th it was 4.6 per cent. Between July 29th and August 5th it was 11 per cent, as high as it had been at the beginning of the work. This new tide of infections demanded an explanation. Suspicion was directed to the individuals who had returned from the isolation cottage, for in every ward where there were any infections found this time at least one was of these returns. An examination of their records showed that of the eighty-one released before July 20th, thirty-one had at some subsequent time given a positive culture and been returned to the camp. These thirty-one individuals had been released after giving never less than two, and in the majority of cases from three to eight, successive negatives, at least one of them after removal from the infected camp to the halfway ward. In fifteen cases the first culture taken after return to the main house was positive, and in almost all the cases the positive came soon after return.

The explanation for all these facts seemed to be this: These thirty-one persons were true carriers. In the isolation camp the patients lived outdoors at all times, sat out under the trees during the day, ate in open tents, and slept in beds on the lawns. These outdoor conditions were excellent for getting rid of infection. The bacilli retreated to the crypts of the tonsils and the recesses of the nose, and were missed in the culture taking. So a succession of negatives was obtained. When the carriers returned to the less favorable conditions of the house, the infection again spread in the nose and throat, and the cultures were again positive. The percentage of infections in the main building had risen because these carriers had gone back. When this became evident, a new plan was adopted for dealing with carriers. Two wards were chosen for permanent isolation wards and cleared of their patients. These were arranged with separate dining-rooms, so that there need be no communication between them and the rest of the house. When an individual once released from the isolation cottage again gave a positive culture, he was regarded as a carrier and put into this carrier ward. Cultures were taken from every person returned to the house from the isolation cottage every other day for at least two weeks. At the end of that time, if he was still giving negatives, he was regarded as safe, and thereafter examined only with his ward. If he gave a positive, he was put into the carrier ward, to remain there for months, if necessary. Of two hundred and eight individuals released up to August 12th, sixty-three had given positives again and been put on the carrier ward.

With this system of careful supervision of released individuals, and of isolation of carriers, the percentage of infections in the household again fell rapidly. On August 7th, 8th, and 9th, six of the fourteen wards were examined and the percentage of infections found to be 0.7 per cent.

Of approximately twelve hundred inhabitants then, three hundred and sixty-four, or 30 per cent, had at one time or another, between June 30th and August 12th, shown the presence of diphtheria bacilli in either their throats or their noses. On August 12th one hundred and forty-five of these had been released from quarantine; sixty-three were living in the carrier ward, and one hundred and fifty-six were still at the isolation cottage. The infection in the main house was 0.7 per cent. Between June 29th and August 12th there were but three new cases of clinical diphtheria showing membranes. One of these was a new patient, who gave a positive culture on admission and developed a membrane before the next morning; another had been in the institution but two weeks, and had been given antitoxin upon arrival; the third was a patient of long residence.

From June 29th to August 12th six thousand three hundred and twenty-five examinations were made. The entire expense to the State was slightly over five cents for each examination.

TYPHOID FEVER.

One hundred and eighty-five Widal tests have been made. In the winter 1906-7, the prevalence of typhoid in the San Francisco Bay region was regarded as warranting special inspections of the region by voluntary inspectors. The only class of students qualified to do efficient work—those civil engineers specializing in sanitary engineering, and a few students in bacteriology—spent their only available time, the Christmas holidays, at the work. Field work was done and reports rendered to the State Board of Health by the following, whose assistance is gratefully acknowledged:

Name.	Territory.
C. G. Gillespie	San Leandro Canyon, border of Lake Chabot.
Galen A. Wood	Western Pacific Grading Camps in Livermore Valley.
Charles von Geldern	Vallejo.
George W. Lyons	Clayton, Concord, San Anselmo.
E. B. McFarland	Richmond.
Frank S. Robinson	Napa.

TYPHOID FEVER IN BERKELEY.

During the last half of October, 1906, there were twenty cases of typhoid fever reported to the Berkeley Health Office. Dr. Geo. F. Reinhardt, the Health Officer, suggested that the laboratory coöperate in a study of the significance of this distinctly unusual number of cases. A study of the cases with reference to water supply eliminated that source of infection from consideration, and information was secured that many of these cases had very likely been contracted in San Francisco and elsewhere, when typhoid was prevalent, because so many people were living in tents after the fire. Ten of the cases reported from October 15th to 29th were supplied with milk from one dealer. The last case occurring on this milk route was a son of the dairyman, who but a few days before had himself been delivering milk.

A visit to the home where he lay sick revealed dangerous conditions. The privy, a temporary affair, had no vault and no protection from flies. Not ten feet from it the milk cans were washed in a temporary shed. A washtub filled with milky water was found, which had evidently recently been used for milk cans. The family washing on the clothesline, and the washboard in the shed by the tub, indicated that the shed was also utilized for laundry purposes. Some eighteen delivery cans, measures, etc., were on pegs near by. Water for cleansing the cans was heated over a fire in a small tank, supported by a few bricks. The supply of water from this source would be ridiculously inadequate for the proper scalding of utensils. A carpenter, working on a nearby building and using the open privy, was convalescing from typhoid. Flies furnished the connection between the privy and the milk cans.

The milk delivered by this dealer, not great in amount, was not brought to his home before delivery; the cans only were brought there for washing. The dairyman was required to have this can washing done elsewhere, after which no further trouble was traced to the dairy. Neither the Berkeley Board of Health nor the Health Officer then had the power to order this simple precaution, and would have been compelled to wait for action by the Town Trustees, had not the State Board of Health taken prompt action, on request of the local authorities.

The milk sold by this dealer was only a fraction of the output of a large dairy near San Pablo, the product of which was mostly sold in Oakland, and it was not possible to trace it there. A visit to the dairy and inquiry among physicians in San Pablo revealed no trouble.

BUBONIC PLAGUE.

During the plague epidemic in the bay region, thirteen specimens of material from suspected cases, all from Oakland and Berkeley, were examined for plague. In five of these, *B. pestis* was demonstrated by its pathological effect on guinea pigs and its cultural characteristics. About one hundred rats from ships visiting Oriental ports were examined for plague, with negative results.

With the inauguration in February of the bounty system of collecting rats in Berkeley, the laboratory undertook an examination of rats for plague; the expense of these examinations was borne by the town of Berkeley. Over six hundred rats were examined. The staff of the laboratory was inadequate for this work, in addition to the regular routine, and the conditions which crowding in the laboratory necessitated were unsanitary.

In recognition of these facts, the Citizens' Health Committee of Berkeley appropriated funds raised by popular subscription for further assistance in the work. With the assistance of the Esterly Construction Company, a model open-air laboratory, screened from flies, was provided. Arrangement was made with Dr. Allen F. Gillihan in March to undertake responsibility for the pathological examination of the rats, and a summary of his work follows:

Autopsy Work on Rats. (Service of Dr. Ward.)

February 21, 1908, to March 10, 1908:	
Total number received and examined	677
Number showing suspicious lesions	0

Autopsy Work on Rats. (Service of Dr. Gillihan.)

March 16, 1908, to May 9, 1908:	
Total number received	1,285
Number not examined (decomposed)	118
Total number rats examined	1,167
Number showing suspicious lesions and bipolars in smears	12

TABLE 7.—*Statistical Summary of Autopsy Work on Rats.*

February 21, 1908, to May 9, 1908:	
Total number received	1,962
Total number not examined (decomposed)	118
Total number rats examined	1,844
Total number showing suspicious lesions and bipolars in smears	12

In no case did the facts warrant a conclusive diagnosis of plague. The smears showing the bipolar staining bacilli were obtained from the lungs in all of the above twelve rats. In three, the heart blood and spleen also showed the bipolars, but the enlarged lymph nodes invariably gave negative results. Seven of these suspicious rats were very closely studied by making cultures and by inoculations of guinea pigs, negative results being invariably obtained. Two of these suspects that had excited the greatest interest gave cultures of an organism quite different from plague, *e. g.*, luxuriant growth of a typical bipolar staining bacillus upon salt-agar, no involution forms and gas production on glucose bouillon. Cultures were repeatedly replated to insure a pure culture.

In case of doubt in deciding upon the significance of the lesions in a rat, it did not seem safe to let the presence of bipolars alone sway the decision in favor of plague. Neumann[1] has observed a natural disease in a rat, produced by a bipolar organism causing lesions strikingly like plague. Members of the *B. septicaemia hemorrhagica* group, typical bipolars and closely resembling *B. pestis* in cultural characters and lesions produced, are the cause of common diseases among a great number of wild and domesticated animals. This group of organisms causes disease in fowls, rabbits and guinea pigs, but evidence regarding rats is not at hand.

It should be noted that no case of plague in man was regarded as having originated in Berkeley during the period covered by the rat autopsy work here reported.

TUBERCULOSIS.

Two hundred and fifty-five examinations have been made of the sputum for tubercle bacilli.

WATER EXAMINATIONS.

As explained in a previous report, it is deemed inadvisable for the laboratory to pass judgment on the quality of the water, with reference to typhoid, without all the information that would be yielded by a sanitary survey of its source. The difficulties of collection and shipment of water in perfect condition also make it extremely difficult to get reliable results from examination of water from a distance. Fifty-seven samples of water have been examined, most of them having been collected in Berkeley by members of the laboratory staff.

The health officer desiring an examination usually has this question in mind: Is the water responsible for the typhoid fever prevalent? The answer to this is best determined by a study of the history of the cases and attending circumstances. In collecting this data, we have found it useful to employ a 3 by 5-inch card ruled with blanks, for the orderly classification of the information. Something very similar was used in the Palo Alto epidemic:

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[1] Beitrag zür Trage der pestähnlichen rattan pathogenen Bakterien. Zeitschrift für Hygiene und Infectionskrankheiten. Vol. 45 (1903), page 450.

State Hygienic Laboratory—University of California, Berkeley.

Patient's name ---------- Address ----------
Date { of first symptoms ---------- 19
Date { of taking to bed ---------- 19
Date { of physician's first visit ---------- 19
Age ------ sex ------ color ------ nationality ------
Place of work, business, or school ----------
Physician while ill ----------
Health before attack ----------
Out of town (date) ----------
Patient discharged by physician (date) ----------

Symptoms	Chills	Pain in Bowels	Tongue
	Vomiting	Nosebleed	Delirium
	Headache	Diarrhœa or Constipation	Eruption
	Fever		Spleen

(*Reverse of card.*)
Typhoid Fever.

Examination No. ----------
Widal reaction: Made? (*Yes or No*) ---- Date when Positive ---- Date when Suggestive ---- Date when Negative ----
Complications ----------
Drinking Water { Town supply / Private well   Milkman ----------
Milk delivered { A.M. ------ / P.M. ------   Source of cream and extra milk supply ----------
Previous cases in the house ----------
Has patient visited other cases? ----------
Privy or Water closets ---------- Plumbing ----------
What probable sources of infection ----------
What possible sources of infection ----------
Remarks ----------

TESTS OF SOLIDIFIED FORMALDEHYDE.

Tests were made of Dr. George Leininger's Solidified Formaldehyde as a room disinfectant in the strength recommended by the company—"less than one half of one ounce to 1,000 cubic feet." As a matter of fact, it was found that this amount is insufficient. Miss Margaret Henderson, in a report on the work, published in the Bulletin of the State Board of Health for July, 1907, concluded as follows:

> "I would conclude, then, that, so far as our experiments go, Dr. Leininger's Solidified Formaldehyde seems to be an efficient surface disinfectant when used in the proportion of at least two ounces for 1,000 cubic feet, but can not, in that proportion, be depended upon for any penetration. The fire risk in using it is not to be disregarded."

RAT VIRUS.

The measures taken against bubonic plague drew attention to the subject of the various brands of rat virus on the market. A series of tests was carried on to determine the value of the following brands: Danyz Virus, Deutsche Danyz-Virus-Vertriebs-Gessellschaft, Berlin; Ratite, Pasteur Vaccine Co.; Azoa (Rat Virus), Parke, Davis & Co. In no case did rats fed on these viruses die with lesions attributable to the virus, nor did rats fed on virus die in greater numbers than the check animals fed on plain wheat. None of the preparations tested can be recommended. Complete details of the experiments appear in the Bulletin for January, 1908.

CHANGES IN LABORATORY STAFF.

The Director of the laboratory will spend the year, beginning July 1. 1908, on leave, in study and travel. Dr. George F. Reinhardt will be in charge during his absence. Miss Margaret Henderson leaves the position of Assistant, but remains in the Department of Hygiene as an instructor. Miss Elsie Cole on July 1, 1908, was appointed Assistant in the State Hygienic Laboratory.

RECOMMENDATIONS.

The usefulness of the laboratory can be increased in the future in several ways. For one thing, provision should be made for branch stations throughout the State. This is desirable, primarily, to make it possible for physicians to get prompt reports. At present, reports are considerably delayed by the distance which cultures have to be sent to the laboratory, and the early reports, so desirable in dealing with such diseases as diphtheria, typhoid, and tuberculosis, are obtainable by physicians in the bay counties only. A few branches, well-located, would increase the value of the laboratory immeasurably. The present laboratory at the University could serve the nearby portions of the State, become the center from which media and supplies could be distributed to the branches, and continue to carry on research work.

Distinct provision for research ought certainly to be made. The whole subject of milk borne diseases and of pasteurization is demanding attention. The relation of milk to the spread of typhoid fever, diphtheria, and scarlet fever is beginning to be well recognized. Pasteurization of market milk is the most practicable remedy, but the suggestion raises questions concerning methods of pasteurization, the effect upon infant mortality from the use of heated milk and the bacteriological changes in pasterized milk. It is highly desirable that extended studies be made of the infant mortality of a city with reference to these points. California is in such close contact with the Orient and with the South American countries, that her public health problems are not those of the East. Our problems can not be settled for us by research laboratories situated in the Eastern States, where all the conditions are different.

It is imperative that the staff of the laboratory be enlarged. The work of diphtheria alone during the past year has been more than the force of the laboratory, unaided, could possibly have handled. This year the University has built a new building, with ample and excellent room for the laboratory. The space and the equipment for extensive work are thus provided, but the absurdly small staff of the laboratory and the meagre allowance for maintenance make it impossible to attempt much more than a limited routine. The staff of the laboratory should certainly be increased at least enough to make it possible to do the work demanded in the control of diphtheria.

PURE FOODS AND DRUGS.

DEPARTMENT OF PURE FOOD AND DRUGS.

PROF. M. E. JAFFA, DIRECTOR.

The work here reported covering a period of seven months (January 1 to August 1, 1908) was undertaken under the direction of the State Board of Health in accordance with the provisions of the Pure Food and Drug laws* of March 11, 1907. These laws, however, did not go into effect until January 1, 1908; thus ample time to conform to the new laws was afforded all manufacturers, dealers, and agents.

These laws were enacted for the purpose of preventing the manufacture, sale, or transportation of adulterated, mislabeled or misbranded foods, liquors and drugs, regulating the traffic therein, providing penalties for their violation, and of establishing a state laboratory for the analyses of foods, liquors and drugs.

The State Board of Health established its laboratory at the University of California, Berkeley, where the work is now being carried on. The facilities are not nearly as adequate as they should be and can barely be made sufficient for the present fiscal year.

Fourteen hundred samples of different foods and food materials have been received at the laboratory. Of the total number of samples sent in, 989 have been examined and analyzed. A tabular statement for each kind of food material so tested is presented herewith. These tables show the number of samples of each kind of food tested and of the number examined those which are either adulterated, misbranded or mislabeled, or not in violation of the California Pure Foods Act, as the case may be. It was considered that this would be the most concise way of presenting the results of the work without going into any unnecessary elaboration and presentation of a large number of tables which are hardly called for in such a report. In addition to the results of chemical studies herewith submitted, it may be said that considerable time is required for correspondence and personal interviews.

BAKING POWDERS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Baking powder			6	6

The results of the six examinations showed that the baking powders contained only the usual ingredients for such products. The total carbon dioxid varies from a minimum of 10.12 per cent to a maximum of 15.78 per cent, with an average of 13.6 per cent.

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* Copy of these laws may be had upon application to Dr. N. K. Foster, Secretary of the State Board of Health, Sacramento, California, or to the Director of the State Food and Drug Laboratory, University of California, Berkeley, Calif.

Four of the samples contained starch, a small amount of which should not be considered as an adulterant, as it ordinarily protects the other ingredients from acting on each other and thus lowering the value of the powder.

When the standards for baking powder, now in preparation by the Department of Agriculture shall have been received by this laboratory, the more extensive and complete examinations of the different baking powders sold in this State will be taken up. Such complete examinations did not seem to be called for in the absence of the standards of purity for such products.

BEERS.

Material.	No. Containing Preservatives.	No. not Containing Preservatives.	Total.
Beers	3	35	38

The samples of beer were collected mainly in San Francisco and Oakland, and a few were received from Los Angeles. The examination was made chiefly for the purpose of ascertaining the presence or absence of non-permissible preservatives. Twelve samples were more completely analyzed with reference to specific gravity and the content of alcohol, extract, ash and phosphoric acid. The determinations showed for alcohol, a minimum percentage of 4.25 and a maximum of 6.0. The other data indicated that the composition of the respective beers was in accordance with the average for such beverages. Later on it is intended to make a comprehensive series of analyses, taking into consideration the use of substitutes for hops in the manufacture of beer.

BEVERAGES.

Material Labeled.	No. Adulterated.	No. Misbranded or Mislabeled.	No. Adulterated and Mislabeled.	No. not in Violation of California Pure Foods Act	Total.
Cider—apple	6	1		2	9
Cider—orange	3	1			4
Carbonated beverages (soda waters)	1		79	33	113
Totals	10	2	79	35	126

The above table indicates the number of samples of beverages, other than beer and wine, which have been analyzed by the laboratory up to the first of August.

It will be noticed that of the nine samples labeled apple cider, only two were found which would meet the required standards of purity as declared by the Secretary of Agriculture. Adulterations consisted in one case of salicylic acid; and in the remaining five of the addition of sugar and other materials thus making an imitation or compound cider. The results of examination of the four samples labeled orange cider indicate that they were all either adulterated or mislabeled. Salicylic acid was detected in one sample and coal-tar colors were found in two, the use of such colors not being declared on the labels as required by law. The content of ash or mineral matter in all four was far below the quantity of that found in a pure orange juice.

With reference to the 113 samples of carbonated beverages (soda waters) examined, it will be seen that 80 were adulterated and mislabeled, the adulterations consisting in the main of the addition of a coal-tar color, which was used to imitate some natural product and thus conceal inferiority. As is well understood, the use of certain coal-tar colors are allowed, provided such use is properly declared on the label.

It may be said that at the present writing practically all of the soda water now sold complies with the requirements of the California Pure Foods Act with reference to the matter of proper labeling.

BREADS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Bread			3	3

Two samples of bread examined were from the California Home for Feeble-Minded, Eldridge, California, and one from the Southern California Hospital, at Patton. These analyses were made in accordance with the plan of the State Board of Health to utilize as far as possible the State laboratory as a means of examining foods for the different State hospitals with a view of ensuring to these institutions foods and food products of the best quality and complying in all respects with the Pure Food Laws of the State. The analyses of these breads showed them to be fully up to the standard of purity for a well-made bread from white flour. The protein content in two of the samples was 7.84 per cent and in the third, 7.67 per cent, showing a very close agreement in this respect.

BUTTER.

Material.	No. Adulterated.	No. Misbranded or Mislabeled	No. not in Violation of California Pure Foods Act.	Total.
Butter		8		8

Eight samples of butter were sent to the laboratory for examination, and all were either misbranded or mislabeled. The mislabeling in seven out of eight samples was found to be due to misleading statements regarding the place of manufacture of the respective butters. One sample was mislabeled in that the contents of the package weighed thirteen ounces, while the statement on the label was to the effect that there were sixteen ounces in the package. Upon analysis it was found that all the samples contained no other than pure milk fat. The content of water was not excessive in any instance.

BUTTERMILK.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Buttermilk			2	2

Two samples of the buttermilk were examined, both found to be in accordance with requirements for such an article of food. No preservatives or added coloring matter were detected.

CATSUPS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Catsup	1	4	11	16

Sixteen samples of this condiment were examined at the laboratory, with the satisfactory result that only one was found adulterated, the added material being a coal-tar color, such fact not being declared on the label; the color was used to conceal inferiority. Four out of the sixteen, or 25 per cent, were found to contain benzoic acid; the use of such preservative in the catsup was not stated on the label, thus constituting mislabeling. The use of benzoate of soda to the extent of one tenth of 1 per cent is allowed in such materials as catsup, provided a declaration is made on the label of the presence of such a preservative in the catsup; otherwise it use, no matter in what quantities, constitutes mislabeling. About 70 per cent of the number of samples examined were not in violation of the Pure Foods Act.

There are on the market samples of tomato catsup which have all the appearances of having been colored, other than by means of the tomato juice. In some such cases, the coloring matter is due to capsicum added as a spice, and consequently is permissible.

COLORING MATTERS.

Material.	No. Not Allowed in Foods.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Coloring matter	24		13	37

These materials are used chiefly for intensifying the coloring of soda water, syrups, confectionery, extracts, and, to some extent, in macaroni and ice cream. Two classes of coloring matters are met with in the open market, the vegetable colors and coal-tar colors. The proclamation of the Secretary of Agriculture as to the use of coloring matters is contained in Food Inspection Decisions Nos. 76 and 77;

by the terms of these decisions certain coal-tar colors are permitted, but any one using the same must satisfy himself that the dye used is such as comes within the decision. Otherwise the use of the color will be deemed an adulteration. The use of coal-tar color in any food or food product must be declared on the label of such where, without the statement, the food or liquor can be said to be so colored as to conceal damage or inferiority. Again, where through the use of coloring matter, the article is made to represent itself to be something that it is not. A typical example of this would be a beverage labeled or sold as "raspberry soda," the color of the raspberry being given by the use of the coal-tar color and not by the use of fruit juice or extract of the raspberry. In case of a beverage bearing a purely fancy name, which does not purport to be and is not sold as the product of anything which if used in its manufacture would give the color which is actually given by the use of a dye—there is no occasion to state on the label the use of artificial color, unless damage or inferiority is concealed by the use of such color. Again, if candy is colored by one of the permissible coal-tar colors, but not so colored as to imitate any fruit or other material product, and is not so labeled, there is no necessity of stating on the label of such candy that it is artificially colored. If, however, the candy is colored so as to imitate the strawberry, and sold as "strawberry chews," it must be labeled "artificially colored." The table indicates that thirty-seven samples were examined with the result that twenty-four, or about 65 per cent, were found to be not permissible. In other words, only about one third of the number of samples examined were found to meet the requirements of the United States Foods Inspection Decision No. 76.

CONFECTIONERY.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Confectionery	40	4	103	147

In accordance with subdivision 7 of section 4 of the California Pure Foods Act, confectionery is adulterated if it contains terra alba, barytes, talc, chrome yellow, or other mineral substance or poisonous color or flavor, or other ingredient deleterious or detrimental to health, or any vinous, malt, or spirituous liquors or compound or narcotic drug.

For the purpose of ascertaining whether the candies sold in open market were or were not in violation of this section, one hundred and forty-seven samples were collected and examined. About 27 per cent of these were found to contain paraffin. The use of this material is expressly prohibited by the law, and justly so, too.

It is extremely injurious to the human system, in proof of which it may be said that this substance is practically unacted upon by strong sulphuric acid at a temperature of 130 degrees centigrade. Such being the case, it would hardly be possible to expect the digestive juices, weak as they are, to have any appreciable action on such a material, and therefore the body to derive any nutritive value therefrom.

Four samples of candies analyzed were found to be mislabeled, in that they were labeled and colored so as to deceive and mislead the purchaser into the belief that they were colored and flavored by the use of fruit juice or extract, whereas such fruit juice or extract was not used; but the color was imparted to the candy by the use of a coal-tar color, such fact not being declared on the label.

Seventy per cent of the candies examined were found to contain no poisonous or other ingredients in violation of the law. It is true that some were made from cheaper material than others, but the materials were not in any case objectionable, and were allowable under the California Pure Food laws.

FLAVORING EXTRACTS.

Material Labeled.	No. Adulterated.	No. Misbranded or Mislabeled.	No. Adulterated and Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Lemon extract	2		6	1	9
Vanilla extract			5	4	9
Strawberry extract			3		3
Orange extract			2		2
Pineapple extract			2	1	3
Cherry extract			2		2
Banana extract			1		1
Raspberry extract			1	2	3
Totals	2		22	8	32

It may be said that the above tabular statement presents but the beginning of an extended investigation of the flavoring extracts sold in our State. As previously stated, the policy of the laboratory is to investigate each kind of food or food product as fully as possible. In accordance therewith, it is the intention to continue the examination and analysis of as many samples of flavoring extracts as can be officially obtained.

It is to be hoped that a more extended investigation of the extracts sold in the State will result in a more favorable showing than is here presented. As will be seen, only 25 per cent of the number sent to the laboratory were found not to be in violation of the law; practically 75 per cent were found to be adulterated and mislabeled. The adulterations consisted, in the main, of coloring matter added to conceal inferiority and imitation. In some instances the percentages of different ingredients were below the standards of purity for such materials as proclaimed by the Secretary of Agriculture in Circular 19.

WHEAT FLOUR.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Flour			28	28

The object of the examination of samples of flour was to ascertain their comparative richness in nitrogenous ingredients. The analyses were made at the request of the Superintendent of the State Hospital, and the results were used as a basis of purchase of the flour supplied to the respective hospitals.

The collected data indicated a great difference in the percentage of total protein: Of the four samples submitted by one of the institutions, the protein ranged from 6.06 per cent as a minimum to 9.71 per cent as a maximum, thus showing the advantages of having the flour analyzed. When considering the total number (28) examined, it was found that the minimum percentage of protein was 6.06 and the maximum 10.24, a difference of 4.18 per cent. The average for all being 8.95 per cent.

When the facilities of the laboratory shall have been increased as it is hoped they soon will be, it is the intention to fully and completely examine all food supplies submitted or used at the different State hospitals.

UNFERMENTED GRAPE JUICE.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Grape juice			6	6

Six official samples of different kinds of unfermented grape juice were submitted to the laboratory for analysis. None of these were found to be either adulterated or mislabeled, all being fully up to the requirements for such a food product.

ICE CREAMS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Ice cream	18		14	32

The standard for ice cream as proclaimed by the Secretary of Agriculture is as follows:

Ice cream is a frozen product made from cream and sugar, with or without a natural flavoring, and contains not less than fourteen (14) per cent of milk fat.

Fruit ice cream is a frozen product made from cream, sugar, and sound, clean, mature fruits, and contains not less than twelve (12) per cent of milk fat.

Nut ice cream is a frozen product made from cream, sugar, and sound, nonrancid nuts, and contains not less than twelve (12) per cent of milk fat.

It is to be regretted that of the thirty-two samples tested, only fourteen, or about 44 per cent, could be considered as meeting the requirements of the standards of purity just indicated.

The adulteration in most cases was not in the addition of any deleterious or injurious material, but because the fat content was lower than the required standard, 14 per cent, which, in accordance with subdivision 1, section 4 of the California Pure Foods Act, constitutes adulteration.

From a hygienic standpoint there is no objection whatever to the addition of a small amount of gelatine to ice cream; but when such additions are made, the fact must be stated on the label in order to conform to the provisions of the law. Similarly with respect to the addition of allowable coloring matter to ice cream.

MACARONI.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. Adulterated and Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Macaroni		2	4	8	14

Fourteen samples of this manufactured product were collected by the inspectors and forwarded to the laboratory, some from San Francisco and Oakland, and some from Los Angeles. Two of the samples were mislabeled, in that they were so labeled as to mislead the purchaser into the belief that the package contained twenty-five pounds, whereas by actual weight the contents were found to be less than twenty pounds. In four samples adulteration and mislabeling were encountered. This was due to the fact that the macaroni was colored so as to conceal inferiority. The coloring being used to imitate macaroni which has been colored by the use of eggs, whereas in the samples in question no eggs were used at all, but the color present in the macaroni was imparted to it by the use of a coal-tar color, such fact not being declared on the label. Fifty-seven per cent of the samples collected were not in violation of the law. It may be said at the present writing that there is very little macaroni, if any, now sold in the State which is not properly labeled both as to weight and color.

MEATS AND MEAT-FOOD PRODUCTS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Frankfurters	5		4	9
Bologna	5	1	3	9
Sausage, pork	1	1	2	4
Hamburger steak	6			6
Meat for bologna			2	20
Totals	17	2	11	30

It was the aim of Congress, by the passage of the National Pure Food Act of June 30, 1906, to insure to the consumer foods and food products honestly labeled and free from adulteration; and to the honest manufacturer, protection from undesirable competition of those who, in various ways, were sophisticating their products.

In order to best attain these ends, it is absolutely essential that there shall be active and efficient coöperation between the State and the Federal laboratories. The national law deals only with imported foods, or with foods and food products manufactured in one State and sold in another; it can not exercise any supervision with reference to foods and food products manufactured and sold only in the same State, hence the necessity for the State law, and the establishment of the State laboratory.

Naturally, it is not possible, during the first few months of the laboratory's existence, to correct all the evil influences arising from food and drug adulteration. The seemingly most important infringements are first taken up, and it appears to those in charge of the work that one of the most imperative needs is to remedy the evils of the adulteration of meats and meat products. This is not only important for the protection of the consumer, but it is of vital interest to the honest manufacturer, and particularly to those who are interested in meats and meat-food products intended for interstate commerce. These people are under Federal inspection, and without the coöperation of the State would be forced to submit to competition of those within the State who are not under such inspection, because the latter do not send their goods outside of the State.

In accordance with the above statements, a number of samples of meats and meat-food products were collected, and analyzed results of these analyses showed that adulteration is extensively practiced. The materials used for this purpose are chiefly borax and sulphur dioxid, neither of which preservatives is allowed to be used in meats and meat-food products.

The table showing the results of the examinations indicates that nine samples of "frankfurters" were collected and five found to be adulterated, the adulteration in every instance consisting in the addition to the meat of the preservative boric acid or borax. Five samples of bologna sausage out of nine samples submitted contained boric acid.

When the new meat inspection law first went into effect there was a great hue and cry by the butchers as to the impossibility of making these meat-food products without the use of such preservatives. As an illustration, the following excerpt from a lecture* by the Hon. Geo. P. McCabe, Chief Solicitor for the Department of Agriculture, may not be out of place:

> Few people are aware that no preservative or chemical other than common salt, sugar, wood smoke, vinegar, pure spices, and saltpeter, may be used in any meat or meat-food product bearing the legend "U. S. Inspected and Passed." A wonderful revolution in this matter has been accomplished, quietly but effectively, within the last five months. The former practice can best be illustrated by a remark made by a small packer to the Secretary of Agriculture. In discussing the subject of preservatives in sausage, he said: "Mr. Secretary, what is reasonable is reasonable. What I want to use is a little borax, a little salicylic acid, a little anilin dye, and a little preservaline, and I can make sausage all right." He is making sausage now without using any of these substances.
>
> I have been told by the attorney for one of the largest food interests in the United States, that when a certain manufacturer of sausage was informed that the Department had forbidden the use of preservatives he replied: "That does not affect me. I do not use any preservatives." His informant continued that the Department had forbidden the use of borax, at which he exclaimed: "Heavens! My business is ruined."

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* U. S. Department of Agriculture, Bureau of Animal Industry, Circular No. 101, page 9.

Evidently some butchers of this State agree to a certain extent with some of the opinions expressed in the above quotation. At the recent meeting of the State Board of Health it was openly stated by some butchers that it was impossible to take fresh meat, grind it as for "Hamburger steak," place the same in the refrigerator after grinding, and have meat so prepared in an edible condition at the close of the day. It was a further contention of these butchers that it was a better proposition for the general public to add some preservative, and thus prevent decomposition, than to run the risk of the meat's spoiling, and causing digestive disturbances if it were consumed. The Board of Health, however, did not share in these opinions, and in order to settle this question, the following experiment was carried out at the State laboratory.

Twenty pounds of fresh beef (round steak) were purchased on Monday, July 13, 1908, at 9 A. M. This was brought to the laboratory, put through a meat chopper, placed on an eighteen-inch graniteware platter, and set in the refrigerator at 11, the temperature of the refrigerator being 50°F. At 5 P. M. of the same day there was nothing objectionable in any way with reference to this chopped meat, either in odor, color, or taste. The next morning, July 14th, at 11 A. M., about one pound was removed from the platter by one of the assistants, taken to her home, and cooked as Hamburger steak usually is. The statements of the persons who partook of this meat were that it was absolutely unobjectionable in every way. At 6 P. M. of the same day four pounds of the meat were taken from the platter, divided into two portions, and cooked at two different homes, again the verdict being that there was nothing objectionable in any way—that it was just as good chopped meat as any member of the respective households had ever eaten. It is thus seen that the meat was in a perfectly edible condition thirty hours after being placed in the refrigerator. On July 15th, at 1 P. M., the remainder of the meat, fifty hours after it had been placed in the refrigerator, was used at the bacteriological laboratory for making bouillon. This proves that the meat was in good condition, as otherwise it could *not* have been used for bacteriological preparations. In fact, it was stated by those in charge of the bacteriological laboratory that the meat was, even then, in an edible condition.

It is thus seen that there is no foundation for the opinions expressed by the butchers at the meeting above referred to. It is true that the use of certain preservatives will give a more uniform color to meat, not retaining the original meat color, but giving a new, and as above stated, a more uniform, color.

With reference to the change of color in meat on standing, it may be said that after a few hours in the refrigerator the color on the exterior of a mass of chopped meat will be slightly different from that just below the surface of the mass. But this change is not objectionable from a physiological point of view, and does not indicate any deterioration whatever in the food value of the meat. The public should be educated to the fact that an absolutely uniform color in a mass of chopped meat is not an indication of the high quality or freshness of such meat.

It should be emphasized that this whole matter is not a question of opinion, but a question of law, and the law states very definitely that "No preservative or chemical other than common salt, sugar, wood smoke, vinegar, pure spices, and saltpeter, may be used in any meat or meat-food product."

UNSWEETENED CONDENSED MILK.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Milk—condensed	15		3	18

The subject of condensed milk has been one which has provoked a great deal of discussion during the last few months. The standard purity for such a product proclaimed by the Secretary of Agriculture is as follows:

Condensed milk, evaporated milk, is milk from which a considerable portion of water has been evaporated and contains not less than twenty-eight (28) per cent of milk solids, of which not less than twenty-seven and five tenths (27.5) per cent is milk fat.

The contention of most of the manufacturers of this article is that they can not profitably meet the above requirements, and in view of their objections the committee on standards recommended that there be no State prosecutions in cases where the standards of purity were not fully met, provided the fat content was 7.7 per cent. In view of such a recommendation, this laboratory did not take any official action on the samples which were submitted to the laboratory. In accordance, however, with advices from Washington, it would appear that the standards as given in Circular 19 have not been in any way altered, consequently in the very near future official samples of unsweetened condensed milk being sold in this State will be collected and examined in the usual manner. It will be noticed from the table that of the eighteen samples examined, only three could be considered as meeting the requirements, both as to the content of fat and total solids. If the fat content alone were considered, then seven would be classed as not being in violation of the law.

The adulteration in this case does not consist in the addition to the milk of any deleterious or injurious ingredients, but is due to the fact that the milk is inferior to and has a lower nutritive value than has a condensed milk which fully meets with the requirements of the law. The law requires for such a condensed milk, that it shall contain at least 7.7 per cent of butter fat. This figure should be regarded as the minimum fat percentage which condensed milk should contain, and not as the maximum.

PREPARED MUSTARD.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Mustard—prepared	11			11

The examination of eleven samples of prepared mustard, as indicated in the tabular statement, demonstrates that all were below the required standard of purity, thus indicating inferiority and thereby constituting adulteration. The deficiency was particularly noticeable with reference to the content of protein. Some samples, however, contained an excessive amount of starch.

OILS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Oils—olive			6	6
Oils—salad (cotton seed)			2	2
Totals			8	8

As will be seen by the results here presented, there were no cases of adulteration or mislabeling found in connection with the eight samples of oil analyzed. It is to be hoped that the results of the proposed examination of a large number of samples will be as satisfactory. Heretofore, the adulteration of olive oil has consisted of the addition of cheaper vegetable oils, such as cotton seed, peanut, sesame, etc. In such cases as these, for domestic purposes, such as salad dressings, etc., the adulterant is not to be considered as harmful. At the same time it is fraudulent, for the reason that the cost of the product is far less in the case of the adulterants than for olive oil. For medicinal purposes, the addition of such an oil to olive oil might be injurious.

PICKLES.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Pickles—sour		5	9	14
Pickles—sweet		4	1	5
Pickles—miscellaneous		6		6
Totals		15	10	25

An inspection of the table showing the results of examination of pickles indicates that 60 per cent of the samples submitted were either mislabeled or misbranded. Most of the violations consisted of the addition of benzoate of soda or benzoic acid, without such fact being declared on the label as required by law. The use of benzoate of soda, as previously stated, is allowed to the extent of one tenth of 1 per cent, provided a statement of such use appears on the label.

It may be stated that no injurious matters other than the preservatives were found in the pickles, the percentage of alum being minute, and not present in such quantities as to constitute an adulteration.

SAUCES.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Sauces, etc.		6	9	15
Sauces—Worcestershire		10	10	20
Totals		16	19	35

The above table does not present the results of an extended examination of sauces as sold in the State, but presents the results of the thirty-five samples received at the laboratory. Of these it will be seen that nearly 50 per cent were found to be in violation of the law, the violation in every case consisting of mislabeling, in that the fact that benzoate of soda was used as a preservative was not declared on the label of the respective bottles. These data, as in the case of pickles, represent the results of the analyses of samples submitted and not those of an extended investigation which it is hoped will be undertaken in the near future.

SOUP—CANNED.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Soups			6	6

Six samples of canned soups were received at the laboratory for examination and analyses, and the results demonstrate that they were all in accordance with the provisions of the California Pure Foods Act. This was to have been expected, in view of the fact that these canned soups are manufactured in establishments which conduct interstate traffic, and therefore are under the supervision of the Bureau of Animal Industry, United States Department of Agriculture, whose inspection is very rigid and strict.

SPICES.

Material.	No. Adulterated.	No. not in Violation of California Pure Foods Act.	Total.
Pepper—black	14	21	35
Pepper—white	5	18	23
Pepper—cayenne	4	17	21
Mustard	8	19	27
Ginger	3	11	14
Cinnamon	7	13	20
Allspice	5	11	16
Cloves	6	8	14
Nutmeg	1	14	15
Mace	5	6	11
Thyme	2	6	8
Marjoram	6	1	7
Sage	1	7	8
Savory	0	7	7
Celery		1	1
Totals	67	160	227

It will be seen that two hundred and twenty-seven samples of spices have been received at the laboratory, and of these sixty-seven, or about 28 per cent, were found more or less adulterated. The adulterations in the case of pepper consisted chiefly in the addition of cereals to the peppers, and in some few instances charcoal to black pepper. In the other instances noted, the adulterations consisted in the addition to the pure material of refuse, stems, or foreign matters. It may be said that probably 50 per cent of the spices found to be in violation of the law were not intentionally adulterated; that it was due more to carelessness in the manufacturer, or selection of original material, than to an intentional adulteration. The percentage (72) of samples not in violation of the law is not quite satisfactory, and it is confidently expected that the next examination will show a much higher percentage of pure spices.

SYRUPS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. Adulterated and Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Syrups—flavoring	1	7	21	7	36
Syrups—maple			3	1	4
Table syrup				4	4
Totals	1	7	24	12	44

As will be seen by inspection of the above tabulated data, the most of the adulterations of the syrups were found among what are called "flavoring syrups," used for soda waters. The sophistication in most of these cases was due to the coloring of the syrups by coal-tar dyes, such facts not being declared on the label, and similarly with reference to artificial flavors. In seven of the samples, benzoic acid was detected, and the presence of such material was not indicated on the label.

It is the intention of the laboratory in the near future to make an extensive series of analyses of the different syrups sold in the State. The results presented herewith are upon eight samples of the table and maple syrups which were submitted to the laboratory. It will be seen that of the table syrups none were in violation of the law, while in the case of the maple syrups only one was in accordance with the law, and three were mislabeled, in that they contained cane sugar and glucose, such facts not being declared on the label.

VINEGARS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Vinegar—cider		9	17	26
Vinegar—malt		6	2	8
Vinegar—wine		2	2	4
Vinegar—distilled		5	22	27
Vinegar—miscellaneous	1	1	4	6
Totals	1	23	47	71

Seventy-one of the vinegars, chiefly from the Bay regions, were analyzed during the spring of the year, and the results show that twenty-four, or a little over one third, of the samples collected were in violation of the California Pure Foods Act. The analyses uniformly showed that there were no injurious or deleterious additions to the vinegars; that the violations were in every case, with one exception, that of mislabeling. The distilled vinegar would be labeled a "malt vinegar" or a "cider vinegar," etc. As far as the strength of the acid is concerned one is probably as good as the other, depending entirely upon the percentage of acid found; but the mislabeling is certainly a fraud, in that it is much more expensive to manufacture a cider vinegar than a distilled vinegar.

MISCELLANEOUS.

Material.	No. Adulterated.	No. Misbranded or Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Lard			2	2
Parafo			3	3
Pork and beans			1	1
Rusk, Holland		1		1
Salt			2	2
Sugar	1		2	3
Whisky			1	1
Wine			6	6
Totals	1	1	17	19

Nineteen miscellaneous samples have been received, and it was thought best to group them in one tabular statement in place of making a separate one for each different kind of material received. The showing made is very satisfactory, there being only two out of the fourteen which were in violation of the law. One of these was a sample labeled "Sugar Crystals," which consisted of saccharine, there being no sugar in the material. The other instance of the violation was that of the "Holland Rusk," in which case the violation consisted in mislabeling, in that the sample was so mislabeled as to mislead and deceive the purchaser. It will be noticed that only one sample of whisky has been examined. It was deemed best to defer the extended investigation of whisky until a later date in view of the more urgent calls upon the laboratory along other lines.

Parafo is a material consisting mainly of beef stearin, which is used in place of paraffin. The use of this latter material is prohibited in the manufacture of candies, and parafo has been offered as a substitute. The three samples examined indicate that this material is non-injurious and does not contain any unsaponifiable matter.

SUMMARY OF ANALYTICAL WORK.

The following table summarizes the analytical work of the State laboratory for the period of seven months, January 1st to August 1st. The inspection of the data indicates that, of the fourteen hundred samples received, nine hundred and eighty-nine have been examined with the results that 20.9 per cent are adulterated, 9.0 per cent mislabeled or misbranded, 13.0 per cent both adulterated and mislabeled, and 57.1 per cent not in violation of the California Pure Foods Act. This showing is not as satisfactory as it should be, and therefore emphasizes the necessity for thorough and comprehensive inspection of all classes of foods and food materials. It may be observed that there are a number of foods and condiments which have not been even noted in the table. This is not due to any failure to realize the importance or nutritive values of such articles, but because the laboratory force is so limited that the analyses of the official samples submitted did not permit of any further work along other lines.

It will also be seen that no mention is made of drugs. It should not, therefore, be understood that the absence of such a report signifies that the importance of drugs is in any way underestimated; far from it, but there appeared to have been a far more urgent call for the examination of foods. During the coming year, however, it is intended to devote considerable time to the testing of drugs.

TABLE SHOWING SUMMARY OF ANALYTICAL WORK.

January 1 to August 1, 1908.

Material.	No. Adulterated.	No. Mislabeled.	No. Adulterated and Mislabeled.	No. not in Violation of California Pure Foods Act.	Total.
Baking powder				6	6
Beers		3		35	38
Beverages	10	2	79	35	126
Bread				3	3
Butter		8			8
Buttermilk				2	2
Catsup	1	4		11	16
Coloring matter	24			13	37
Confectionery	40	4		103	147
Extracts	2		22	8	32
Flour				28	28
Grape juice				6	6
Ice cream	18			14	32
Lard				2	2
Macaroni		2	4	8	14
Meat and meat-food products	17	2		11	30
Milk—condensed	15			3	18
Mustard—prepared	11				11
Oils—olive				6	6
Oils—salad (cotton seed)				2	2
Parafo				3	3
Pickles		15		10	25
Pork and beans				1	1
Rusk—Holland		1			1
Salt				2	2
Sauces, etc.		6		9	15
Sauces—Worcestershire		10		10	20
Soups				6	6
Spices	67			160	227
Syrups—flavoring	1	7	21	7	36
Syrups—maple			3	1	4
Syrups—table				4	4
Sugar		1		2	3
Vinegar	1	23		47	71
Whisky				1	1
Wine				6	6
Totals	207	88	129	565	989

CONCLUSION.

The foregoing data clearly emphasize the necessity for continued, thorough and comprehensive food and drug inspection and analyses. In order that such examination of foods and drugs be properly maintained, it is very essential that more and extended facilities, both as to room and assistance, should be afforded, than those at present at the command of the Director of the laboratory. The advantages of having such a laboratory situated at the University of California are many, and are fully appreciated by the State Board of Health.

With the enlarged laboratory resources and apparatus, important studies and research work could, with very little additional expense, be most profitably conducted. Prominent among the desirable investigations, is that of chemically analyzing and reporting on the waters of the several mineral springs of the State. As is well known, many of these are exceedingly valuable medicinally, others are valuable as table waters. It would, therefore, appear that a bulletin published by the State Board of Health and containing results of such an investigation would be a valuable scientific contribution to the knowledge of the subject, and at the same time be of great moment to the State of California.

Another line of work which should most certainly be carried on in the laboratory of the State Board of Health is that of nutrition investigations. Studies in infant nutrition seem to be most urgently called for; particularly is this so in view of the fact that such experiments are not being conducted to any extent at any of the institutions in the country. The extreme and vital significance of the carefully planned and scientifically conducted metabolism experiments on infants can not be overestimated. It is to be hoped in the near future that the State laboratory will be so enlarged and equipped that profitable results along the lines indicated may be achieved.

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TWENTY-SECOND AND TWENTY-THIRD ANNUAL REPORTS

OF THE

BOARD OF DENTAL EXAMINERS

OF THE

STATE OF CALIFORNIA

SACRAMENTO:
W. W. SHANNON, : : : SUPERINTENDENT OF STATE PRINTING.
1908.

MEMBERS OF THE BOARD OF DENTAL EXAMINERS OF THE STATE OF CALIFORNIA—1908.

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C. A. HERRICK, D.D.S., *Secretary*,	910 Hayes St., San Francisco
JOSEPH LORAN PEASE, D.D.S., *Treasurer*,	Oakland
FRED G. BAIRD, D.D.S.,	San Francisco
G. MAURICE CROW, D.D.S.,	Los Angeles
H. R. HARBISON, D.D.S.,	San Diego
GARRETT NEWKIRK, M.D.,	Pasadena

TWENTY-SECOND ANNUAL REPORT

OF THE

BOARD OF DENTAL EXAMINERS

OF THE

STATE OF CALIFORNIA

TO THE

GOVERNOR OF CALIFORNIA.

December 1, 1906.

MEMBERS OF THE BOARD OF DENTAL EXAMINERS OF THE STATE OF CALIFORNIA—1906.

GEORGE A. WHITE, D.D.S., *President*, 1233½ State St., Santa Barbara
C. A. HERRICK, D.D.S., *Secretary*, - - - - - Jackson
E. G. HOWARD, D.D.S., *Treasurer*, 322 Bradbury Block, Los Angeles
FRED G. BAIRD, D.D.S., - - - - - San Francisco
ARTHUR B. MAYHEW, D.D.S., - - - - - Palo Alto
J. LORAN PEASE, D.D.S., - - - - - - Oakland
GARRETT NEWKIRK, M.D., - - - - - Pasadena

TWENTY-SECOND ANNUAL REPORT

OF THE

BOARD OF DENTAL EXAMINERS OF CALIFORNIA.

To his Excellency George C. Pardee,
Governor of the State of California.

Sir: The Board of Dental Examiners of California has the honor of submitting the following as the twenty-second annual report of its proceedings, together with an account of all moneys received and disbursed, in compliance with the requirements of that certain Act of the Legislature approved March 20, 1903, and amended and approved March 20, 1905, entitled "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation thereof, and to repeal an Act now in force relating to the same and known as 'An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California,' approved March 12, 1885."

Since December 1, 1905, the date of the last report, the Board has held three regular meetings: One in San Francisco from December 11 to December 20, 1905; one in Oakland from June 9 to June 16, 1906, and one in Los Angeles from June 18 to June 28, 1906, all dates inclusive.

The Executive Committee has held nine meetings during the year for the purpose of attending to necessary business between the regular meetings of the Board.

At the meeting held in San Francisco in December, 1905, officers for the ensuing year were elected as follows: Dr. George A. White of Santa Barbara, President; Dr. C. A. Herrick of Jackson, Secretary; and Dr. E. G. Howard of Los Angeles, Treasurer.

On January 9, 1906, your Excellency appointed two new members of the Board of Dental Examiners of California, to succeed Dr. Cool and Dr. Dunn, whose terms had expired: viz., Dr. Garrett Newkirk of Pasadena, and Dr. Joseph Loran Pease of Oakland.

At the meeting of the Board held in San Francisco in December, 1905, there were forty-one applicants for examination. Of these the following nineteen were successful and were granted licenses:

Morrison, J. B.
Burkholder, E. C.
Speer, G. B.
Kaufman, E. H.
Ditty, Amos
Beaser, H. P.
Freeman, C. E.
Jennings, G. P.
Peoples, J. W.
Townsend, Wilbur
Whomes, Arthur
Hopkins, J. C.
Shores, F. W.
Cutler, J. W.
Foerster, A. A. W.
Wright, P. B.
Chandler, E. D.
Rogers, W. W.
White, H. C.

At the meeting held in Oakland, in June, there were fifty-six applicants. The following named thirty-three were granted licenses:

Amelung, H. H.
Vanderhurst, A. S.
Scott, E. S.
Sheppard, R. H.
Corliss, W. B.
Lindsay, C. M.
Dye, F. M. M.
Lee, C. G.
Wallace, A. C.
Wilson, C. W.
Papandre, R. D.
Boynton, G. D.
Morris, E. H.
Taylor, H. H.
Fisher, G. N.
Boesch, M. S.
Glatt, E. C.
Shumard, E. C.
Stewart, C. L.
Towson, L.
Goodman, C. D.
Isacson, S. W.
Ledyard, B. C.
Coney, Z. T.
Colligan, F. J.
Griffin, J. J.
Smith, S. A.
Strub, C. H.
Peck, N. S.
Mason, W. M.
Linscott, L. M.
Miller, S. W.
Webber, P. A.

The examination in Los Angeles followed the one in Oakland, beginning on June 18th. At this time there were forty-four applicants, twenty-five of whom were successful. Following are the names of those who were granted licenses:

Trafford, H. L.
Goff, E. E.
McDonald, F. S.
Holcombe, C. L.
Ingalls, R. E.
Crandall, G. J.
Clapp, S. W.
Houston, R. B.
Kincaid, C. F.
Rea, V. H.
Bailie, H. C.
Roudebush, L. F.
McCoy, J. D.
Brown, A. R.
Justice, J. A.
McKenzie, T. W.
Sweet, W. S.
McBean, W. H.
Mail, W. R.
Clark, F. E.
Kerley, W. A.
West, J. A.
Darby, J. H.
Boeckman, H. F.
Lane, R. C.

At a special meeting of the Executive Committee called by the President in Oakland in May, 1906, a resolution was passed to the effect that the Board would issue, "gratis," substitute licenses to all practitioners of dentistry who had lost their licenses due to the calamitous earthquake and fire of April 18, 1906, provided that all annual fees of the applicant for substitute had been paid. And it was also moved that this privilege be extended to all unfortunates who make application to the Board, accompanied by the necessary affidavit, before December 1, 1906.

One hundred and fifty applications for substitute licenses were passed upon at the June meeting.

In addition to the above, four substitute licenses have been issued during the year to applicants other than those who suffered by the San Francisco fire.

During the year the Board has restored the licenses of three dentists who had forfeited the same by failure to register according to law.

Criminal prosecutions throughout the State have been many, with the exception of San Francisco, where the great disaster of April 18, 1906, upset all the work of the member of the Board having charge of that district.

We respectfully submit a short synopsis of the work done.

San Francisco County: Owing to the burning of records, that portion of this report from December 1, 1905, to April 18, 1906, has been made partly from memory and may therefore be incomplete or contain certain slight errors.

During January John Doe Landon (second arrest) had a jury trial and was acquitted.

During January and February cases pending against O. B. Hewitt, Charlie Fong, A. J. Breckenridge (second arrest), John Doe Kesseling and Valdamar Cavalsky were dismissed because one of the cases had been appealed on legal technicalities (affecting all), and the appeal sustained.

During March satisfactory evidence was secured against the following: S. L. Brasch (second arrest), Steinau, Valdamar Cavalsky (second arrest) and M. H. Schord (second arrest).

During March the case of M. H. Schord, on appeal, who had been sentenced on May 11, 1905, to pay a fine of $50 or serve fifty days in jail was affirmed.

Prior to April 18, 1906, detectives had located quite a number of illegal practitioners (in addition to those previously mentioned) and were gathering evidence against them, but the fire rendered the above work of no value.

Shortly after April 18th the courts ordered the dismissal of all cases pending. Owing to the unusual conditions existing in the courts and elsewhere, the Attorney for the Board advised the postponement of prosecutions. When the time was deemed opportune to proceed, demands as provided for in Subdivision 9 and Article 19 of the Dental Law were served on various persons, companies and associations.

Existing conditions made it extremely difficult to secure competent detectives. Finally a leading detective agency agreed to gather evidence. Under date of October 29, 1906, they reported that they had secured sufficient evidence in eleven cases which they would endeavor to finish before December 1, 1906.

ALAMEDA COUNTY: S. C. Hornef was arrested, and after numerous continuances he had a jury trial and was found "not guilty."

W. P. Winning arrested and plead guilty. Sentence is to be pronounced in January, 1907.

E. Conn arrested. After several continuances of the case, he plead guilty July 1, 1906, after spending six weeks in jail. Upon promising to leave the State sentence was suspended six months.

R. M. Ennis, complaint sworn to. He disappeared from the city before arrest could be made.

Eldon Davis ceased practicing upon being notified.

Otsuchi (Japanese) was arrested, had a jury trial, plead not guilty and was acquitted.

M. Uchumi, against whom evidence has been gathered, left Oakland before arrest could be made.

C. Ferguson after being notified has discontinued the practice of dentistry in Alameda County.

Charlie Fong, case pending.

J. P. Parr of Hayward. Complaint was sworn to, but he escaped arrest by leaving the county.

Los Angeles County: N. Kuns (second arrest); plead not guilty, but was convicted and fined $50.

A. I. Kennedy, plead guilty and was fined $50.

S. L. Leifer, upon hearing that a warrant was out for his arrest left the State.

—— Schraft was arrested, plead guilty, and was fined $50.

—— Milburn of the Crown Dental Company was arrested. He plead guilty and was fined $75.

—— Kilburn of Redondo was arrested. He plead guilty and was fined $50.

J. D. Merrick of Redondo was arrested, plead guilty, and was fined $50.

A. M. Suyetaka (Japanese) was arrested and the case is pending.

San Bernardino County: F. A. Couch of Redlands was tried and upon motion of the District Attorney (after being assured that Couch would leave the State within thirty days) he was not prosecuted.

A. W. McDavitt, whose case has not yet been set for trial.

San Diego County: W. E. Graf of San Diego was arrested on a bench warrant in Los Angeles. He was found guilty, and was paroled on the suggestion of the District Attorney until he had a chance to take the examination.

A. H. Belt of Oceanside, whose case is still pending.

Santa Barbara County: O. B. Hewitt was arrested, and the case is pending.

San Benito County: C. M. Griffith of Hollister was arrested, and fined $50.

Monterey County: J. A. Chappell of Salinas was arrested, but the case was dismissed owing to the general disturbance during the time of the earthquake.

Fresno County: C. E. Phillips was arrested, and the case is pending.

—— Lee (Chinese) was arrested, and the case is pending.

Santa Clara County: J. A. Rice (second arrest) was found not guilty.

D. P. Cameron (second arrest) plead guilty, and was fined $75.

Sonoma County: George B. Murray of Santa Rosa, complaint was filed, and the case is still pending.

Colusa County: A. J. Rust was arrested. He plead guilty, and was fined $50.

Calaveras County: J. M. Wallace (second arrest) plead guilty, and was fined $50.

Butte County: W. J. King of Gridley was arrested, and the case is pending.

Humboldt County: Ralph Schwarz, one of the proprietors of the Humboldt Dental Parlors, was arrested. He plead guilty, and was fined $50.

C. T. Starr of Fortuna was arrested. He had a jury trial, and was acquitted.

FINANCIAL STATEMENT.

The following is an account of the funds received and disbursed by the Board from December 1, 1905, to December 1, 1906:

REPORT OF SECRETARY.

GENERAL FUND.

RECEIPTS.

141 examination fees	$3,525 00	
6 restoration fees	150 00	
3 duplicate license fees	15 00	
4 fines	100 00	
Exchange	15	
		$3,790 15

DISBURSEMENTS.

Amounts turned over to Treasurer as follows:

December 12, 1905	$1,030 00	
June 11 to November 24, 1906	2,760 15	
		$3,790 15

REGISTRATION FUND.

RECEIPTS.

1,439 fees at $2.00 each	$2,878 00	
Exchange	40	
		$2,878 40

DISBURSEMENTS.

Amounts turned over to Treasurer as follows:

July 18 to November 24, 1906	$2,878 40

REPORT OF TREASURER.

GENERAL FUND.

December 1, 1905—balance on hand		$1,428 28
Over deposit by former Treasurer		78

RECEIPTS.

December 12, 1905, received from Secretary	$1,030 00	
June 11 to November 24, 1906, received from Secretary	2,760 15	
Fines	50 00	
Transferred from Registration Fund	74 90	
Interest on term deposit	20 00	
		3,935 05
		$5,364 11

DISBURSEMENTS.

Examination expenses	$189 38	
Auditing books	35 00	
Premium on bonds	30 00	
Board sundries	56 53	
Printing	421 95	
National Association dues	20 00	
Secretary's salary	320 00	
Secretary's sundries	51 63	
Mileage and compensation of members	3,371 55	
Postage	41 00	
		4,537 04
December 1, 1906—balance on hand		$827 07

REGISTRATION FUND.

December 6, 1905—balance on hand		$3,017 31

RECEIPTS.

July 8, 1906, to November 26, 1906, received from Secretary	$2,878 40	
Fines	43 75	
		2,922 15
		$5,939 46

DISBURSEMENTS.

Printing, postage and stationery	$349 02	
Secretary's salary and sundries	633 65	
Attorney's fees	1,338 30	
Board compensation in prosecutions	117 80	
Detective services	538 00	
Exchange on checks	5 80	
Transfer to general fund	74 90	
Auditing books	40 00	
Warrant not canceled	6 00	
		3,103 47
December 1, 1906—balance on hand		$2,835 99

All of which is respectfully submitted by the Board of Dental Examiners of California.

December 1, 1906.

GEORGE A. WHITE, D.D.S., President.

C. A. HERRICK, D.D.S., Secretary.

TWENTY-THIRD ANNUAL REPORT

OF THE

BOARD OF DENTAL EXAMINERS

OF THE

STATE OF CALIFORNIA

MEMBERS OF THE BOARD OF DENTAL EXAMINERS OF THE STATE OF CALIFORNIA—1907.

GARRETT NEWKIRK, M.D., *President*,	Pasadena
C. A. HERRICK, D.D.S., *Secretary*,	San Francisco
JOSEPH LORAN PEASE, D.D.S., *Treasurer*,	Oakland
FRED. G. BAIRD, D.D.S.,	San Francisco
ARTHUR B. MAYHEW, D.D.S.,	Sacramento
G. MAURICE CROW, D.D.S.,	Los Angeles
H. R. HARBISON, D.D.S.,	San Diego

TWENTY-THIRD ANNUAL REPORT

OF THE

BOARD OF DENTAL EXAMINERS OF CALIFORNIA.

To his Excellency James N. Gillett,
Governor of the State of California.

Sir: The Board of Dental Examiners of California has the honor of submitting the following as the twenty-third annual report of its proceedings, together with an account of all moneys received and disbursed, in compliance with the requirements of that certain Act of the Legislature approved March 20, 1903, and amended and approved March 20, 1905, and amended and approved March 6, 1907, entitled "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation thereof, and to repeal an Act now in force relating to the same and known as 'An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California,' approved March 12, 1885."

The Board has held three regular meetings since December 1, 1906; one in San Francisco and two in Los Angeles. The first of these meetings was held in Los Angeles from December 11 to December 22, 1906; the second, from June 8 to June 15, 1907, and the third in San Francisco from June 17 to June 27, 1907.

At the December meeting held in Los Angeles, there were forty-seven applicants for examination. The following named twenty-four were successful and were granted licenses:

Lape, J. B.
Cree, W. A.
Somerville, J. A.
Albergaria, J. S.
Flory, W. D.
Boege, J. H.
Foster, W. M.
Alexander, F. W.
Rossiter, V. A.
McBean, C. O.
Fitzgerald, F. J.
Vawter, M. B.
Polin, O. M.
Bates, H. W.
Truitt, S. P.
Speer, A. H.
Maltby, B. T.
Unland, T. H.
Moore, J. O.
Kanouse, J. G.
Willoughby, C. E.
Nichols, L. E.
Frank, G. W.
Church, H. E.

By order of Judge Graham of the Superior Court of San Francisco, a license was also issued to George C. Farmer at this meeting.

At this meeting, fifty duplicate licenses were ordered issued, forty-seven of them without charge, as the original licenses had been lost during the earthquake in San Francisco. The Board also restored the licenses of six dentists who had forfeited them by failure to register according to Section 10 of the Dental Law.

Officers for the ensuing year were elected as follows: President, Dr. Garrett Newkirk of Pasadena; Secretary, Dr. C. A. Herrick of Jackson; Treasurer, Dr. Joseph Loran Pease of Oakland.

At the June meeting in Los Angeles forty applicants presented themselves for examination. Twenty-three were successful and received licenses. Following are the names:

Burbeck, W. R.
Schafhirt, J. B.
Norman, Ida B.
Williams, C. E.
Rankine, C. M.
Ross, J. R.
Force, R. W.
Harwood, H. B.
Engstrom, C. O.
Osenburg, E. E.
Phillips, C. E.
McCollum, B. B.
Haas, H. H.
Viersen, L. A.
Allen, A. B.
Uhl, W. T.
Terry, C. H.
Richardson, G. L.
Spicer, P. F.
Wool, R. E.
Updyke, R. P.
Hammond, W. F.
McHargue, W. H.

At this time, seven duplicate licenses were ordered issued and one license was restored.

At the examination in San Francisco which followed, there were sixty-two applicants, one of whom was found ineligible to take the examination and the following received licenses:

Minaker, A. W.
Dias, E. X.
West, R. C.
Duggan, N. S.
Stern, L.
Clendenin, E. C.
Downes, E.
Schmidt, C. W.
Mitchell, H. C.
Driscoll, J. J.
Mulvihill, D. F.
Biggs, J. A.
Poole, G. T.
Clay, L. E.
Hall, S. W.
Elberg, H. M.
Byrne, D. W.
Vicary, E. E.
Ryan, H. G.
Martin, L. L.
Hoffman, B. J.
Fogarty, J. D.
Meyer, F. W.
Murchie, D. H.
Miller, H. E.
Bibbero, H. S.
Sexton, C. J.
Packwood, L. R.

At this meeting, two licenses were restored and one duplicate license was issued.

During the year, the Executive Committee has held four meetings for the transaction of necessary business.

On December 31, 1906, his Excellency George C. Pardee, Governor of California, appointed Dr. A. B. Mayhew and Dr. F. G. Baird members of the Board to succeed themselves. In April, Dr. G. A. White of Santa Barbara and Dr. E. G. Howard of Los Angeles resigned from the Board, and on April 24, 1907, your Excellency appointed Dr. G. M. Crow of Los Angeles and Dr. H. R. Harbison of San Diego to fill the unexpired terms of Dr. White and Dr. Howard. On September 25, 1907, Dr. G. M. Crow and Dr. Harbison were again appointed by your Excellency to succeed themselves.

Since the last report, the Board has been diligently trying to enforce the law against illegal practitioners and we submit the following report on prosecutions:

Alameda County: E. Conn, whose sentence was suspended in 1906, has left the State.

Chas. Fong (Chinese) was arrested, had a jury trial, was found guilty and fined $50.

G. G. Leong was arrested and the case is pending.

S. C. Hornef (second arrest), the case is pending.

Robt. Dunn, arrested and the case is pending.

Lem (Chinese), alias Dr. L. H. Dott, was arrested and the case is pending.

F. L. Stow, proprietor of the Boston Dental Parlors, was arrested and the case is pending.

S. J. Silva, associated with W. J. Smyth, was arrested and the case is pending.

The following have given up the illegal practice of dentistry in Alameda County owing to the investigation instituted by the Board: L. W. Ming, E. W. Christianson, E. G. Heyn, B. J. Leonard, one Calagaris, W. P. Winning, M. Utsumi, one Otsuchi, C. A. Stultz, H. W. Lyte, J. Logan Hocker, C. W. Everton, E. F. Rathburn, R. R. Bosworth, M. H. Smith, Gordon Cane, Woo (Chinese), D. J. Gilliland, W. P. King and K. Otsubi.

BUTTE COUNTY: W. J. King of Gridley was arrested, tried and acquitted. He was again arrested and the justice sustained a demurrer to our complaint. We appealed to the Superior Court and the demurrer was overruled, with instructions to the justice, L. T. Allen, to commit the defendant to answer. The defendant entered a plea of "not guilty," and the case is set for trial December 5, 1907.

LOS ANGELES COUNTY: S. H. B. Cochrane was arrested, tried, found guilty and fined $50, which he paid. He was arrested a second time, plead guilty, and again fined $50.

A. M. Suyetaka was arrested, plead guilty, and was fined $50, which he paid.

W. E. Graf was arrested for the third time and the case is pending.

C. E. Hill, who was practicing under the name of W. B. Hill, was arrested, put up cash bail of $50, but forfeited the same by failure to appear at the trial.

A. C. Pfaffle was arrested, tried and acquitted.

John Doe Fisher, who was practicing under the name of W. S. Beach, was arrested and the case is pending. He was employed by the Hutchason Dental Parlors. He put up $50 cash bail, and it is expected that he will plead guilty.

J. O. Metcalf of the "Yale Dentists" was arrested and put up $50 cash bail. He will probably plead guilty.

F. Packard was arrested, plead guilty, and was fined $50.

C. R. Woolems, who was practicing in the office of Dr. Frank Hyatt, was arrested, plead guilty, and was fined $50.

Evidence was gathered against W. L. Blodgett, who was with Dr. Ramsey's Albany Dentists, but he left the city before the arrest could be made.

Orange County: C. McArthur of Santa Ana, with the New System Dental Company, was arrested, convicted, and paid a fine of $50.

San Bernardino County: E. Bedford was arrested and the case is pending.

A. W. McDavitt was tried twice, the jury disagreeing in each instance. Evidence was secured for another trial in October, but the district attorney refused to issue the complaint, claiming that further prosecution is useless.

Sacramento County: T. R. Woolard was arrested, and the case was dismissed. He has ceased practicing.

David Charmichael, who was practicing under the name of F. E. Pratt, and who was running the Postgraduate Dental Company, was arrested, and put up $50 cash bail.

San Joaquin County: H. G. Martin was arrested, plead not guilty, had a jury trial and the jury disagreed. He was arrested a second time, plead not guilty, and was convicted. He was fined $50, which he paid.

Santa Barbara County: O. B. Hewitt of Carpinteria was arrested and tried twice on the same warrant, but the jury failed to agree. He was again arrested on a new charge, was convicted, and fined $100. A few weeks later he was again arrested in Los Olivas, and was again convicted. Sentence was suspended providing he would leave the county.

San Francisco County: J. C. Perry (second arrest), H. A. Breckenridge (third arrest), A. Steinau (second arrest) and C. H. Whitley (third arrest) were arrested in April, 1907, and the cases are pending.

H. C. Huck (third arrest) was also arrested in April, 1907, had a jury trial, and was acquitted in October, 1907.

C. E. Balzarina, O. J. Fortch, A. C. Hicks and S. L. Brasch were arrested in June, 1907, and the cases are pending.

R. D. Lowry, who was also arrested in June, 1907, had a jury trial in September, 1907, and was found not guilty.

M. H. Schord (fourth arrest), George McDaniel and F. Keseling (second arrest) were arrested in August, 1907, and the cases are pending.

K. Ninkakura and A. Sugiyama were arrested in October, 1907, and the cases are pending.

Detectives report that several against whom evidence was being gathered have left the city.

FINANCIAL STATEMENT.

The following is an account of the funds received and disbursed by the Board from December 1, 1906, to December 1, 1907.

REPORT OF SECRETARY.

GENERAL FUND.

RECEIPTS.

149 examination fees at $25 each	$3,725 00	
15 duplicate license fees at $5	75 00	
5 restoration fees at $25	125 00	
Part fine in case of H. M. Martin	25 00	
		$3,950 00

DISBURSEMENTS.

Amounts turned over to Treasurer	$3,950 00

REGISTRATION FUND.

RECEIPTS.

1601 annual registration fees at $2	$3,202 00	
Exchange on checks	72	
		$3,202 72

DISBURSEMENTS.

Amount turned over to the Treasurer	$3,202 72

REPORT OF TREASURER.

GENERAL FUND.

December 1, 1906—balance on hand		$827 07

RECEIPTS.

Amount received from the Secretary during the year	$3,950 00	
Interest Broadway Bank and Trust Co.	64 08	
Interest Central Bank of Oakland	1 90	
Part fines in cases of J. Milburn, A. I. Kennedy, R. D. Hass, J. D. Merrick	112 50	
		4,128 48
		$4,955 55

DISBURSEMENTS.

Typewriting, printing, postage, telephone and stationery	$193 76	
Examination expenses	232 30	
Inspecting Colleges	131 00	
Secretary's salary	385 00	
Dr. E. G. Howard, services as Treasurer	50 00	
Chest for storage for Board	16 00	
Return of duplicate license fee	5 00	
Mileage and Board compensation	3,494 30	
Return of examination fee	25 00	
Auditing books	10 00	
Part premiums on bonds of Secretary and Treasurer	15 00	
Safety deposit	11 50	
		4,568 86
December 1, 1907—balance on hand		$386 69

REGISTRATION FUND.

December 1, 1906—balance on hand		$2,835 99
RECEIPTS.		
Amounts received from the Secretary	$3,202 72	
Interest Central Bank, Oakland	17 21	
		3,219 93
		$6,055 92
DISBURSEMENTS.		
Typewriting, printing, postage, telephone, stationery, expressage	$170 77	
Clerical expenses of collecting the annual registration fee	715 00	
Part premium, bonds of Secretary and Treasurer	15 00	
Experting books	10 00	
Exchange	12 50	
Special counsel and detective fees	2,169 66	
Return of registration fees	10 00	
Dr. E. G. Howard, services as Treasurer	50 00	
		3,152 93
December 1, 1907—balance on hand		$2,902 99

All of which is respectfully submitted by the Board of Dental Examiners of California.

December 1, 1907.

GARRETT NEWKIRK, M.D., President.

C. A. HERRICK, D.D.S., Secretary.

DECISION OF THE SUPREME COURT ON THE CONSTITUTIONALITY OF THE DENTAL LAW.

Crim. No. 1115. In Bank. July 22, 1904.

Ex parte C. H. Whitley on *Habeas Corpus.*

Application for writ of *habeas corpus* prayed to be directed against George W. Wittman, Chief of Police of the City and County of San Francisco, State of California, who holds and restrains petitioner of his liberty in pursuance of a warrant issued by A. J. Fritz, Police Judge, upon a sworn complaint of one C. C. Hamilton.

William M. Cannon and Arthur W. Perry, for petitioner.

E. Myron Wolf, for Board of Dental Examiners, and Jordan, Treat & Brann, on behalf of the State Central Committee on Dental Legislation, *amicus curiae.*

James F. Peck and Charles C. Boynton, *amicus curiae.*

Petitioner was arrested for practicing dentistry without a license, contrary to the dental law of this State, and prosecutes this writ, claiming that said law is unconstitutional for several reasons.

The history of our dental law is found in enactments by the Legislature at its sessions in 1885, 1901, and 1903, and in order to properly appreciate the points made by petitioner it will be necessary to refer to some of the provisions of all these Acts. The original Act regulating the practice of dentistry was passed in 1885 (Stats. 1885, page 110), and it was provided in Section 1 thereof that "it shall be unlawful for any person, who is not at the time of the passage of this Act engaged in the practice of dentistry in this State, to commence such practice, unless he or she shall have obtained a certificate as hereinafter provided." Section 4 provided that, "within six months from the time this Act takes effect, it shall be the duty of every person who is now engaged in the practice of dentistry in this State, to cause his or her name and residence or place of business to be registered with the Board of Examiners."

The Act further provided for the examination by the Board of Examiners of applicants for dental certificates other than those engaged in practice at its passage, and provided that if the Board should determine that they possessed the requisite knowledge and skill in dental surgery, they should issue a certificate, which would entitle them to practice, and might also indorse as satisfactory diplomas from any reputable dental college, and issue certificates for the same purpose thereon.

In 1901 (Stats. 1901, page 564), an entirely new Act regulating the practice of dentistry in this State was passed—one more full, complete, and detailed than that of 1885, which it thereby repealed.

Section 1 of this latter Act provided that: "It shall be unlawful for any person to engage in the practice of dentistry in the State of California, unless said person shall have obtained a license from the Board of Dental Examiners, duly authorized and appointed under the provisions of this Act to issue licenses; *provided,* that this Act shall not affect the right, under the laws of the State of California, of dentists to practice dentistry, who have a lawful right to practice dentistry at the time of the passage of this Act."

Subsequent sections of this Act also provided, as in the Act of 1885, for issuance to others desiring to engage in the practice of dentistry, certificates or licenses entitling them to do so, upon compliance with certain prescribed conditions as to examination and so forth, which it is unnecessary to state now, as they will be referred to more fully hereafter when we come to an examination of further objections particularly urged against the provisions of the Act of 1901 and sections amendatory thereof in the Act of 1903.

This, too, is all the reference required to the particular sections of the Acts of 1885 and 1901, so as to fully understand and discuss petitioner's first contention.

1. He insists that Section 1 of the Act of 1885 was unconstitutional because it discriminated between two classes, in this, that it made it unlawful for any person to engage in the practice of dentistry after the passage of the Act without first obtaining a license, and, on the other hand, dispensed with the necessity of first obtaining such license in favor of those practicing at the time the Act was passed.

Notwithstanding this Act of 1885 was repealed *in toto* by the Act of 1901—and for that reason construction of its provisions would seem unnecessary—petitioner nevertheless claims that its construction is most important, and that a determination in favor of its validity is vital to the integrity of the Act of 1901. That if Section 1 of the Act of 1885 is unconstitutional, then he contends Section 1 of the Act of 1901 is equally so, because the persons provided for in the latter section, as a class exempt from obtaining a license, namely "persons who have a lawful right to practice dentistry" at the time of its passage, can only exist and be ascertained by virtue of the validity of the Act of 1885, and must necessarily consist, in the aggregate, of those who were practicing dentistry when it was enacted, and who were exempted by its terms from obtaining a license, and those to whom licenses had been issued on examinations, in compliance with its conditions, at the time the Act of 1901 was passed; that consequently in order to ascertain what dentists had "lawful right" to continue in practice at the passage of the Act of 1901, without an examination, there is necessarily involved a determination of the validity of Section 1 of the Act of 1885.

And that, unless the Act of 1885 was valid, there could exist no particular class in whose favor the Act of 1901 would operate as an exemption, because if it was void, then, as at the time the Act of 1901 was passed, every person who saw fit to do so had an unrestricted and absolute right to practice dentistry, the exemption by the Act of 1901 in favor of all those who had a "lawful right to practice dentistry" amounted to nothing. As everybody had a lawful right to practice, if there was no valid law prior to 1901, an exemption of all persons having "lawful right" from the provisions of that Act, left nobody upon whom the law could operate, because, if all had a lawful right, all were exempt. The Act of 1901 would, therefore, in its opening section, unless the Act of 1885 was constitutional, be meaningless, inoperative, and self-destructive.

Aside from this, a similar and independent attack is made upon the Act of 1901 that is made on the Act of 1885 as equally discriminating between classes, in requiring the procurement of a license by one, and exempting the other from doing so.

If, however, the Act of 1885 was valid, notwithstanding it exempted dentists practicing at the time of its passage from obtaining a license, and requiring others to do so, then certainly the Act of 1901, in so far as it carried into its provisions and also exempted those same persons as being within the class "having a lawful right to practice" under the Act of 1885, was also valid. As to the other members of the exempt class, under the Act of 1901, being those who had obtained a license under the Act of 1885, it can not be successfully contended that it was not proper to exempt them. They had already complied with the conditions of the law and obtained a license, and it was unnecessary, if not also unfair, to require them to do so again.

So that it will be sufficient to address ourselves to a consideration of the validity of Section 1 of the Act of 1885, because the law which determines that question will apply with equal force, and dispose of the similar objection to Section 1 of the Act of 1901, at least to the extent that it is claimed to be discriminating in this particular.

While counsel for petitioner attacks both these Acts upon the ground generally that they are discriminatory, he particularizes in that regard that they are obnoxious to various provisions of both the Constitution of this State and of the United States; that they are violative of the provisions of the one, because they constitute special legislation; make an arbitrary distinction in a class between dentists practicing at the time of the passage of the Act and those seeking to practice afterwards, when it should equally apply to all dentists, and when there exists no natural, intrinsic, or constitutional reason why the discrimination between them should be made; that it is violative of the provisions of both constitutions in that it attempts to grant special privileges and immunities to one class of dentists which it denies to another.

Approaching now the discussion of these propositions.

It is not questioned by counsel for petitioner but that the State has the right to regulate the practice of dentistry; to provide measures for the protection of the public against the incompetency and ignorance of those who, while they would assume the duties and responsibilities of that profession, are yet unfitted and unqualified to discharge them.

In fact, it must be conceded that it is a common and valid exercise of legislative power to prescribe regulations under which only those persons possessing proper qualifications shall be admitted to the practice of any profession or calling requiring special skill.

This right of legislation is always recognized as a salutary and wise exercise of the police power of the State for the protection and safety of the public against unskillful and incompetent persons.

And it is the fact that the State has this power which must largely enter into a determination of the validity of the sections in question. The legislation of the State of California on this subject is not new. Similar legislation has obtained in a large number of the States, and in some of these the courts have had occasion to pass on the identical question presented here. In some instances the question arose under Acts regulating the practice of medicine; in others, as here, regulating the practice of dentistry; but the same reasoning would apply and the same constitutional principles govern as to the validity of provisions of a dental as of a medical Act, because the profession of dentistry is but a special branch of the medical profession, and the power of the State to regulate as to both in the interest of the public is equally clear.

An examination of these authorities shows that an exemption in favor of those practicing at the time of the passage of an Act regulating the practice of dentistry, and which requires all others to obtain a license and certificate for that purpose, is open to none of the constitutional objections urged in the case at bar.

Such legislation has been uniformly upheld.

And, as the reasons therefor are stated in the opinions, it is unnecessary to discuss the point any further than to quote from them. They deal with all the objections urged by petitioner, both as to the provisions of the Acts in controversy being special and discriminatory legislation, and as being a grant of special or exclusive privileges or immunities.

In the case of *State* vs. *Randolph*, 23 Oregon, 74, involving the validity of an Act concerning physicians and surgeons, which exempted physicians in practice at its passage from its operation, the Supreme Court of that State said: "The first point is based on the assumption that this Act, or Section 13 of the Act, is in conflict with Section 20, Article I. of the State Constitution, which provides that 'no law shall be passed granting to any citizen or class of citizens privileges or immunities which, upon the same terms, shall not equally belong to all citizens'; and the second point is based on a like assumption that Section 13 of the Act is in conflict with Section 2 of Article IV of the Constitution of the United States, which provides that 'the citizens of each State shall be entitled to all privileges and immunities of citizens in the several States,' and also in conflict with that portion of the fourteenth amendment thereto which provides that 'no State shall make or enforce any law which shall abridge the privileges or immunities of the citizens of the United States.' Both of these contentions involve the same principle, and the discussion of one necessarily includes the other, so that their separate consideration is not necessarily to be pursued. Both proceed upon the hypothesis that the Act grants privileges or immunities to one class of persons while it denies the same privileges or immunities to another class. It is not thought that either of these contentions is tenable, or that the section referred to is in conflict with the Constitution of the State or of the United States. The right of every person to pursue any lawful business, occupation, or profession he may choose to pursue, subject to such restrictions as the Government may impose for the protection of the health, welfare, and safety of society, is unquestioned. * * * To provide means for the protection of the public health from the ignorance and incapacity of those who are unfitted to discharge the duties of a physician, our State, as other States have done, enacted the law in question; and unless it grants to some citizen or physician, or class of them, some right or immunity which, upon like terms or under similar circumstances, it denies to another, it is a valid exercise of the police power and must be upheld. Section 13 of the Act, in effect, only permits physicians who were engaged in the practice when the law took effect, upon registering as required by its proviso, to apply to the Board and obtain a certificate of qualification authorizing them to practice medicine or surgery without an examination. In a word, it permits persons who were engaged in the practice when the law took effect to continue in the practice without an examination. As it is the right of the State to prescribe qualifications based on knowledge or professional skill, necessarily the State must be the judge of such qualifications, and if the rule established to determine them is reasonable and appropriate for that purpose, it can not operate to deprive any one of the privilege or right to practice his profession. The test of qualification, under the Act, is based on medical skill and knowledge. If the person seeking to practice medicine has a diploma or license from some reputable institution, it is sufficient evidence, under the Act, of the requisite qualifications to entitle him to practice. It is only when the person wishing to practice has no such evidence of his qualification that the Act requires that he shall submit himself for examination by the Board. In establishing this rule the State saw fit, for reasons satisfactory to itself, to except from its provisions, by Section 13, those physicians who were engaged in the practice at the passage of the Act. In doing this it made the fact of being so engaged in the practice at that time sufficient evidence of qualification—equivalent to a diploma—rendering an examination unnecessary.''

In *State* vs. *Creditor,* 44 Kan. 565, it is said relative to a similar provision in the dental law of that State: ''No arbitrary or capricious conditions are imposed. The profession and practice are open to every citizen of the United States who is qualified, and who can produce evidence of the same. The Legislature saw fit to permit those practicing in the State when the Act was passed to continue to practice without diploma or other evidence of competency. * * * The Legislature proceeded upon the theory that the fact that they had been engaged in the practice within the State was sufficient evidence of their proficiency in the profession. This fact was made by the Legislature an evidence of skill and competency equivalent to a diploma from a dental college; and the wisdom of either test is a question for the Legislature and not for the courts. The Act can not be held to duly discriminate between persons or classes, and be unconstitutional because it exempts those engaged in the practice within the State when the law was enacted from the necessity of obtaining a diploma.''

In *Ex parte Spinney,* 10 Nev. 323, where an Act exempting dentists who had been practicing for a period of ten years next preceding its passage was involved, in sustaining the validity of the law, it is said: ''It in effect declared that the physician or surgeon who was engaged in the practice immediately preceding the passage of the Act, was as well qualified, in the judgment of the State, to continue the practice of his profession, as the student coming fresh from the halls of college with his diploma was to commence it. But in establishing this rule as to these physicians and surgeons, the State did not deny the privilege or the right of practicing medicine or surgery to any one. No class of citizens of this State is prohibited from the practice of medicine or surgery by the Act, provided they have the proper qualifications, and comply with the law in relation thereto. The error of the defendant's contention consists in assuming that the Act grants 'privileges or immunities' to one class of citizens or physicians of this State which it denies to other citizens of the State or other States. The Act does not grant privileges or immunities to any citizen or class of citizens, either within or without the State. It only establishes a rule of evidence by which qualification to practice medicine and surgery is to be determined. It makes the fact of a person being engaged in the practice when the law took effect sufficient evidence of his fitness to continue the practice of his profession without an examination, in the same way that the diploma of the student is accepted as sufficient evidence of his fitness to commence the practice without an examination.''

In *People* vs. *Phippen,* 70 Mich. 6, construing an Act excepting physicians who had practiced five years before its passage, the court said: "Statutes very similar to this have been upheld in many of the States where their constitutionality has been brought in question, and in many of the States very similar statutes have been enforced without question, and we are unable to find a case in the courts of any of our sister States, or in the Federal courts, where such statutes have been overturned upon constitutional grounds as abridging the privileges and immunities of citizens of the United States or as depriving any person of property without due process of law, or as being in conflict with Section 2 of Article IV, providing that the citizens of each State shall be entitled to all the privileges and immunities of the several States."

In the same line will be found the cases of *State* vs. *Green*, 112 Ind. 462; *State* vs. *Vandersluis*, 42 Minn. 129; *West* vs. *Clutter*, 37 Ohio St. 348. Citation is also made to the Am. and Eng. Ency. of Law, vol. 22, 2d ed., page 781.

Several cases are cited by counsel for petitioner in support of his contention; those nearest approaching the point at issue being *State* vs. *Hinman* and *State* vs. *Pennoyer*, 65 N. H., pages 104 and 102 respectively, and *Scholle* vs. *State*, 90 Md. 740. The first two cases involved the validity of an Act regulating the practice of dentistry, which exempted all persons from an examination who had resided and practiced dentistry continuously in the same town or city of the State for five years last past. The Act construed in *Scholle* vs. *State* exempted physicians from examination also because of residence in one place. These Acts were declared unconstitutional, and properly so. The language used in *State* vs. *Hinman* points the defect in all: "By an arbitrary test having no reference to skill, learning, or fitness for the practice of the profession, certain persons are exempt from the payment of a license fee to which others of equal and perhaps superior acquirements and experience are subjected. It is a discrimination founded solely upon the accidental circumstances of residence, or of a change of residence, and falls within the prohibition of the Constitution."

In these cases last cited, particular individuals of a class of practicing dentists were exempted by reason of locality, and given special privileges. It was the exemption of a class within a class for purely local reasons.

In the cases we have cited, however, fitness and learning are alone taken into consideration, and the fact of a person being in practice when the law took effect was deemed by the Legislature sufficient evidence of fitness to continue in the practice without further examination.

We think the cases we have quoted from and those we have cited fully sustain the view, that the exemption from examination under the Act of 1885, carried into the Act of 1901, of those who were practicing the profession of dentistry when they were passed, and exacting from those who sought the right to practice after its passage, an examination as to their qualifications, is not discriminatory.

All sections of the Act operate equally upon all the actually practicing dentists in the State, which was the only existing class at its passage, and which was the only class concerned, and the only one upon which they could operate.

They simply made the fact of actual practice at its passage such sufficient evidence of competency, as a successful examination of those applying to practice after its passage.

Without discussing this matter further, we think these cases sustain the propositions that the legislation complained of is neither special nor class, and that thereby no privileges or immunities are conferred upon one class to the detriment of another, and, as a consequence, that neither Section 1 of the Act of 1885, nor the similar section of the Act of 1901, is violative of any of the provisions of the State or Federal Constitution, as insisted upon by petitioner.

2. It is next claimed by petitioner that Section 12 of the Act of 1901, as amended by the Act of 1903, arbitrarily creates three classes of persons who may practice dentistry in the State after examination by the State Board of Dental Examiners, namely, first, graduates of reputable dental colleges, and second, graduates of high schools, or similar institutions of learning in this State, or any State of the United States, requiring a three years' course of study, who have served an apprenticeship of four years with licensed practitioners within this State; third, dentists from other States in the United States who have been licensed practitioners for five years.

We find no merit in this claim of petitioner. It is entirely within the power of a legislature to fix any reasonable standard for determining the competency of an applicant for admission to the practice of dentistry. It might, as under the Act regulating the practice of medicine and surgery in this State (Stats. 1901, page 56), where only those who are graduates from a medical college can be admitted to practice, have also made a similar single standard, limiting admission to practice dentistry to those alone who had graduated from some dental college. As this might have been the sole condition upon which an applicant could be examined, it can not be said that legislation which enlarges the right and extends it to others is discriminatory. The law does not operate to exclude any one from the profession. The field is left open to all who are in possession of the required qualifications. It simply fixes the standard under which all persons who desire to enter the profession are brought as nearly as possible to the same degree of professional competency.

The law, no doubt, is discriminatory, but not in any constitutional sense. It does not discriminate between classes. The discrimination goes to the degree of learning and skill which all applicants for examination must possess. It discriminates between those who have the necessary degree of learning and skill, and those who have not; between those who are able and those who are unable to acquire it. It is not an unreasonable or capricious discrimination applying to classes as such, or members of a class, but is based solely upon professional qualifications. It is a discrimination which, in the interest of the public welfare, it is the duty of the Legislature to make, and concerning the necessity for which, and its nature and extent—whether an examination and right to practice shall depend on the possession by the applicant of a diploma of a dental college only, or be extended to others and how far—depends primarily upon the judgment of the Legislature, which, when reasonably exercised, the courts can not control.

These principles will be found fully discussed and sustained in *State* vs. *Vandersluis, supra,* and *Dent* vs. *West Virginia,* 129 U. S. 122, as also in *Ex parte Gerino,* the decision in which case was filed June 1st of this year, and is reported in Vol. 27 Cal. Dec., page 978.

3. It is further claimed that the operation of Section 12 of the Act of 1903, which provides that "No person shall be eligible for examination by the State Board of Dental Examiners who shall not furnish satisfactory evidence of having graduated from a reputable dental college, which must have been indorsed by the Board of Dental Examiners of California," is unconstitutional and void, and a delegation of power of a judicial nature to the Board of Examiners, which, if exercised in an arbitrary and unlawful manner, it is beyond the power of the court to control.

There is no foundation for the claim that the statute attempts to confer judicial power upon the Board in the sense that it is prohibited by the Constitution.

It is not at all uncommon for inferior boards or officers to be invested with power which calls for the determination of facts, and the exercise of discretion, in the discharge of the duties of their office. This power, it is true, is in a sense judicial, but it can not be said that it is an exercise of "judicial power, as that term is used in the Constitution in conferring judicial power upon courts. The question is, however, not an open one in this State, and seems to have been settled adversely to petitioner's contention in *County of Los Angeles* vs. *Spencer,* 126 Cal. 670.

Upon the other point, that the power conferred on the Board is of such a character as, if exercised arbitrarily, it will be beyond the power of the court to control it, it may be said that petitioner does not seem to have applied to the court on any complaint that the Board has taken such arbitrary action. He has not complained to any court that the Board has unjustly and arbitrarily dealt with him, but is here con-tending that the law is unconstitutional, and that, under it, his right to practice is not subject to action or determination by the Board at all. If he has been unjustly and arbitrarily dealt with, and should apply to the courts for redress, it will be doubtless found, as is stated in *Dent* vs. *West Virginia,* 129 U. S. 124, where the same objection was raised as to power conferred on the Board of Medical Examiners of West Virginia, that, "If in the proceedings under the statute, there should be any unfair or unjust action upon the part of the Board in refusing him a certificate, we doubt not that a remedy would be found in the courts of the State." (*Reetz* vs. *Mich.,* 188 U. S. 505; *Wisconsin* vs. *Chittenden,* 112 Wis. 558.)

It is further insisted that this Section 12 of the Act of 1903 is obnoxious to the constitutional provisions because it delegates to the Board of Examiners the power to decide what colleges are reputable, not from any standard furnished by the Legislature, but from their own arbitrary view upon the subject.

But it must be remembered that the Act regulating the practice of dentistry and similar Acts are not passed to promote the personal ends of individuals, but as salutary enactments in the exercise of the police power of the State to legislate for the safety, health, and welfare of the people. The boards which are selected under such legislative power are to that extent agencies of the State, and the Board of Dental Examiners under the Dentistry Act is a particular instrumentality selected as a State agency in the regulation of the practice of dentistry. While the Legislature, in conserving the public welfare, recognized that the possession of a diploma from a regular dental college, where acquiring the theory and practice of medicine fully engaged the time and attention of the student, was a high evidence of his ability to practice dentistry, it also assumed that there might be institutions whose required standard of scholarship was so low that the possession of a diploma from them would be little, if any, evidence of proficiency in dentistry. Or, that there might be pretended dental institutions requiring no preparation and fraudulently issuing diplomas after a perfunctory, if any, examination, and in sole consideration of a fee. In this condition of things, while the Legislature intended that only diplomas from a reputable dental college should be recognized by the Board, it realized that it was impracticable, if not impossible, for it to adopt any fixed standard by which that matter could be determined in advance. It realized, as said by the court in *Wisconsin* vs. *Chittenden, supra,* that "What is reputable in a dental college must necessarily be determined from a standpoint of men of scientific attainments in the line of work it represents, not from that of mere laymen," and committed the determination of that matter to the State agency it created, consisting of dentists, presumably learned, trained, and eminent in the profession, and obligated, under the law, to deal fairly and justly with all applicants and the colleges from which they presented their diplomas. We do not perceive that in so doing any provision of the organic law was violated. The power to determine whether a college was reputable had to be lodged somewhere, and it was properly committed to the only body which could fairly and intelligently determine, not only as to the qualifications of the applicant, but upon the reputation of the college whose diploma he claimed to possess. This is a power which seems to be usually given by the Legislature to boards of examiners, and its commission is sustained by the courts. (*State* vs. *Chittenden,* 112 Wis. 569; *Williams* vs. *Dental Examiners,* 93 Tenn. 627; *People* vs. *Dental Examiners,* 110 Ill. 180; *Dent* vs. *W. Va.,* 129 U. S. 124; *State* vs. *Call,* 121 N. C. 646; *The State* vs. *Francis,* 57 Ohio St. 15; *Gothard* vs. *People,* 74 Pac. Rep. [Colo.] 891.)

Practically the same point was made by the petitioner in *Ex parte Gerino, supra,* and decided adversely to him.

The case of *Van Vleck* vs. *Board of Dental Examiners,* 48 Pac. Rep. 223, is cited by both sides, in the case at bar, on the question just disposed of. That was a department decision in which a rehearing was granted, and, before any hearing or further decision was rendered by this court, the proceeding was dismissed on motion here, hence the department decision in that case is not authority.

This disposes of the principal and main points urged by the petitioner against the validity of the various sections of these Acts as affecting their constitutionality. The objections leveled against Section 12 of the Act of 1903, that it is discriminatory between classes, and unconstitutional, for the other reasons suggested, are equally asserted against similar provisions in the Acts of 1885 and 1901, so that, without descanting particularly on those provisions, it may be said, generally, that the views we have expressed and the conclusion we have reached apply equally to them as to Section 12 of the Act of 1903.

Other objections urged against the provisions in several of these Acts we deem untenable and requiring no special notice.

The writ is dismissed and the petitioner remanded to the custody of the Chief of Police of the City and County of San Francisco.

LORIGAN, J.

We concur:

McFARLAND, J.
ANGELLOTTI, J.
SHAW, J.
HENSHAW, J.
VAN DYKE, J.

DENTAL LAW OF CALIFORNIA.

*An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California, providing penalties for the violation hereof, and to repeal an Act now in force relating to the same and known as "An Act to insure the better education of practitioners of dental surgery, and to regulate the practice of dentistry in the State of California," approved March 12, 1885.**

[Approved March 23, 1901; amended and approved March 20, 1903, and March 20, 1905, and March 2, 1907.]

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be unlawful for any person to engage in the practice of dentistry in the State of California unless said person shall have obtained a license from a Board of Dental Examiners, duly authorized and appointed under the provisions of this Act to issue licenses; *provided*, that this Act shall not affect the right, under the laws of the State of California, of dentists to practice dentistry who have lawful right to practice dentistry at the time of the passage of this Act.

SEC. 2. A Board of Dental Examiners to consist of seven (7) reputable and ethical practicing dentists is hereby created, to be known as the Board of Dental Examiners of California, whose duty it shall be to carry out the purposes and enforce the provisions of this Act. The members of this board shall be appointed by the Governor of California, all of whom shall have been actively and legally engaged in the practice of dentistry in the State of California, for at least five (5) years next preceding the date of their appointment, and none of whom shall be members of the faculty of any dental college or dental department of any medical college in the State of California, or shall have any financial interest in any such college. The said seven (7) shall compose the Board of Dental Examiners of California. The term for which the members of said board shall hold office shall be four (4) years, except that two of the members of the board first to be appointed under this Act shall hold their term of office for the term of one year, two for the term of two years, two for the term of three years, and one for the term of four years, and until their successors are duly appointed and qualified. In case a vacancy occurs in the membership of said board, such vacancy shall be filled by appointment by the Governor, within thirty (30) days after such vacancy occurs.

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*Sections 10, 12, 14, 15, 19, and 25 amended; Sections 16, 17, and 18 repealed, and new section, numbered 21½, added in 1903. Section 11 repealed March 20, 1905.

Sec. 3. It shall be the power and duty of said board to organize by the election of one of its members president, another secretary, and another treasurer; to meet at least twice each year, at such time and place as the board may designate, for the purpose of transacting the business of the board, and at such other times as the board may elect, or on the call of the president of the board, or of not less than four (4) members thereof; a written notice of the time, place, and object of such called meeting to be mailed by the secretary of said board to all the members thereof not parties to the call, at least fifteen (15) days before the day of meeting; to examine all applicants for licenses to practice dentistry according to the provisions of this Act; to collect and apply all fees as directed by this Act; to keep a book showing the names of all persons to whom licenses have been granted by said board to practice dentistry, and such other books as may be necessary to plainly show all the acts and proceedings of said board; to have and to use a seal bearing the name "Board of Dental Examiners of California."

Sec. 4. Out of the funds coming into the possession of the board, each member of said board may receive as compensation ten dollars ($10.00) for each day actually spent in attending to the duties of his office, and mileage at the rate of five cents ($.05) per mile for all distances actually traveled in going to and coming from the meetings of the board. Said expenses shall be paid from the fees and fines received by the board under the provisions of this Act, and no part of the salary or other expenses of the board shall ever be paid out of the State Treasury.

Sec. 5. Each member of the board shall, upon his qualification and the organization of the board, file with the secretary his postoffice address, and thereafter any notice of any change therein. Any notice sent to the address so on file, shall be deemed to comply with the requirements of this Act as to notice to them.

Sec. 6. All books of said board shall be of public record and at all times during business hours open to public inspection. A certified copy of any part or all thereof shall be primary evidence in any court of this State. The original books shall be kept in the office of the secretary of said board, wherever he may reside, and he shall furnish to any person making application therefor a copy of any part thereof, upon the applicant paying a fee of twenty-five cents ($.25) per hundred words so copied, the said fee to belong to the secretary. All copies shall be certified by the secretary.

Sec. 7. The Governor shall have the power to remove from office at any time, any member of the board for continued neglect of duty required by this Act, or for incompetency, unprofessional or dishonorable conduct.

Sec. 8. Said board shall examine all applicants for examination who shall furnish satisfactory evidence of having complied with the provisions of this Act relating to qualification for examination, and all persons satisfactorily passing such examinations shall be granted by said board a license to practice dentistry in the State of California. The examination of applicants shall be elementary and practical in character, but sufficiently thorough to test the fitness of the candidate to practice dentistry. It shall include, written in the English language, questions on the following subjects: Anatomy, physiology, chemistry, materia medica, therapeutics, metallurgy, histology, pathology, operative and prosthetic dentistry, hygiene and dental jurisprudence. The answers to which shall be written in the English language. Demonstrations of the applicant's skill in operative and prosthetic dentistry must also be given. All persons successfully passing such examinations shall be registered as licensed dentists on the board register, as provided in section three, and shall also receive a certificate of such registration; said certificate to be signed by the president and secretary of said board. In no case shall any applicant be examined or given a certificate who is not twenty-one years of age.

Sec. 9. Any member of the board may inquire of any applicant for examination concerning his character, qualifications or experience, and may take testimony of any one in regard thereto, under oath, which he is hereby empowered to administer.

Sec. 10. Every person now licensed to practice dentistry in this State, who has failed to register his license with the clerk of the county wherein his place of business is located, as provided by law, must register the same within sixty days after this Act takes effect, and every person who shall hereafter be licensed to practice dentistry in this State, shall within six months thereafter register in the office of the clerk of the county where his place of business is located, in a book kept by the clerk for such purpose, and called a register of dentists, his name, age, office address, the date and number of his license to practice dentistry, and the date of such registration, which registration he shall be entitled to make only upon showing to the County Clerk his license or a copy thereof certified by the secretary of the board over its seal, and making an affidavit stating his name, age, birthplace, the number of his license and the date of its issue; that he is the identical person named in the license; that before receiving the same he complied with all the preliminary requirements of this statute and the rules of the Board of Dental Examiners as to the terms and the amount of study and examination; that no money, other than the fees prescribed by this statute and said rules, was paid directly or indirectly for such license, and that no fraud, misrepresentation or mistake in a material regard was employed or occurred in order that such license should be conferred. The County Clerk shall preserve such affidavit in a bound volume and shall issue to every licentiate duly registering and making such affidavit, a certificate of registration in his county, which shall include a transcript of the registration. Such transcript and license may be offered as primary evidence in all courts of the facts therein stated. A copy of such certificate of registration shall be sent by the County Clerk to the secretary of the board within five (5) days after it is made. The County Clerk's fees for taking such registration and affidavit and issuing such certificate of registration shall be one (1) dollar. A practicing dentist having registered a lawful authority to practice dentistry in one county of the State, and removing such practice or part thereof to another county, shall show or send by registered mail to the clerk of such other county his certificate of registration. If such certificate clearly shows that the original registration was of an authority issued by the Board of Dental Examiners, or if the certificate of registration itself is indorsed by the secretary of the Board of Dental Examiners as entitled to registration, the clerk shall thereupon register the applicant in the register of dentists of the latter county on receipt of a fee of fifty (50) cents, and shall stamp or indorse on such certificate of registration the date and his name preceded by the words ''registered also in ——— county,'' and return the certificate of registration to the applicant. Any lawfully registered person who shall thereafter change his name according to law shall register the new name with a marginal note of the former name with the clerk of the county or counties where he is practicing. The clerk shall note upon the margin of his former registration in ink the fact of such change, and a cross reference to the new registration. The clerk shall forthwith notify the secretary of the board of such change. Any County Clerk who knowingly shall make or suffer to be made upon the register of dentists kept in his office any entry other than that provided for in this Act, shall be liable to a penalty of fifty dollars, to be recovered by and paid to the said State Board of Dental Examiners in a suit in any court having jurisdiction. Any failure, neglect or refusal on the part of any person holding such license to register the same with the clerk of said county as above directed for a period of six months after the issuance thereof shall *ipso facto* work a forfeiture of his license, and it shall not be restored except upon the payment to said board of twenty-five (25) dollars. Any suspension, revocation or reinstatement of a license shall with the date thereof be forthwith noted by the County Clerk on the margin of the registration thereof upon receipt of notice from the secretary of the board. [*Amendment of 1903.*]

[*Section 11 repealed March 20, 1905.*]

SEC. 12. No person shall be eligible for examination by the State Board of Dental Examiners who shall not furnish satisfactory evidence of having graduated from a reputable dental college, which must have been indorsed by the Board of Dental Examiners of California; or who shall not have graduated from a high school or similar institution of learning, in this or some other State of the United States, requiring a three years' course of study, and who can not furnish to the Board of Dental Examiners an affidavit, containing his or her name, the name of his or her preceptor, and the names of at least two reputable witnesses, certified to in the State of California before a notary public, showing that he or she has completed an apprenticeship of four years of twelve months each, with a licensed practitioner of dentistry, in the State of California, or can not furnish to said Board of Examiners a certificate from the State Board of Dental Examiners, or similar body, of some other State in the United States, showing that he or she has been a licensed practitioner of dentistry in that State for at least five (5) years. [*Amendment of 1903.*]

SEC. 13. From and after the passage of this Act any and all persons desiring to enter upon the practice of dentistry in the State of California, without graduating from a reputable college in the United States, or producing satisfactory evidence of having been a licensed practitioner of dentistry in some other State for at least five years, must file with the Board of Dental Examiners an affidavit, certified to before a notary public of the State of California, of his intention to begin an apprenticeship with a licensed practitioner of dentistry in this State, and the said affidavit must certify that the affiant has regularly graduated from a high school or similar institution of learning in the United States, as provided in section twelve of this Act, and contain in full, the names of both affiant and his proposed preceptor and the names of two reputable witnesses, together with the date of beginning of his proposed term of apprenticeship; and the Board of Dental Examiners shall issue to affiant a receipt for same.

SEC. 14. Every person applying to the Board of Dental Examiners for a license to practice dentistry shall pay to the board a fee of twenty-five (25) dollars, which shall in no case be refunded. Every licensed dentist shall, on or before the first day of May of each year, except the one in which he is licensed, pay to the secretary of the Board of Dental Examiners a fee of two (2) dollars, which shall be used exclusively for the prosecution of violators of this Act and for expenses of collecting said fee. The year for which a fee shall be paid shall begin the July first following the May when it becomes due and end the succeeding June thirtieth. The board may reduce or remit althogether said fee for any year, but such reduction or remission must be made alike to all liable to pay the same. In case any person defaults in paying said fee, his license may be revoked by the Board of Dental Examiners on thirty days' notice in writing from the secretary, unless within said time said fee is paid, together with such penalty not exceeding ten (10) dollars, as the board may impose. Upon payment of said fee and penalty the board shall reinstate the delinquent's license. On or before the first day of July of each year the secretary of the board shall send to the County Clerk of each county in the State a certified list of all practicing dentists therein who have paid said fee, and the clerk shall enter or paste the same in the register of dentists. Necessary expenses, per diem compensation and mileage of the members of the board incurred while in attendance on meetings not for prosecuting violators of this Act shall be paid out of the other fees and fines provided for in this Act. All moneys received under this Act shall be deposited in some reliable bank in the name of the board, and shall be withdrawn only on the joint check of the president and the secretary of the board. [*Amendment of 1903.*]

SEC. 15. Any person shall be understood to be practicing dentistry within the meaning of this Act who shall display a sign or in any way advertise himself as a dentist, or who shall, for a fee, salary or reward, paid directly or indirectly either to himself or to some other person, perform operations of any kind upon, or treat diseases or lesions of the human teeth or jaws, or correct malimposed positions thereof; but nothing in this Act contained shall prohibit bona fide students of dentistry from operating in the clinical departments of the laboratory of a reputable dental college, or an unlicensed person from performing merely mechanical work upon inert matter in a dental office or laboratory or the student of a licentiate from assisting his preceptor in dental operations while in the presence of and under the personal supervision of his instructor; or a duly licensed physician from treating diseases of the mouth, or performing operations in oral surgery. But nothing in the provisions of this Act shall be construed to permit the performance of dental operations by any unlicensed persons under cover of the name of a regular practitioner of dentistry. [*Amendment of 1907.*]

[*Sections 16, 17, and 18 repealed in 1903.*]

SEC. 19. Any person, company or association shall be guilty of a misdemeanor, and upon conviction thereof shall be punishable with a fine of not less than fifty (50) dollars or more than five hundred (500) dollars, or by imprisonment for not less than five (5) days nor more than six (6) months in the county jail, or by both fine and imprisonment, who

1. Shall sell or barter, or offer to sell or barter, any diploma or document, conferring or purporting to confer any dental degree, or any

certificate or transcript, made or purporting to be made, pursuant to the laws regulating the license and registration of dentists; or

2. Shall purchase or procure by barter, any such diploma, certificate or transcript, with intent that the same shall be used as evidence of the holder's qualification to practice dentistry, or in fraud of the laws regulating such practice; or

3. Shall with fraudulent intent, alter in a material regard any such diploma, certificate or transcript; or

4. Shall use or attempt to use any such diploma, certificate, or transcript, which has been purchased, fraudulently issued, counterfeited or materially altered, either as a license or color of license to practice dentistry, or in order to procure registration as a dentist; or

5. Shall practice dentistry under a false or assumed name; or

6. Shall assume the degree of "doctor of dental surgery" or "doctor of dental medicine," or shall append the letters "D.D.S." or "D.M.D." to his or her name, not having duly conferred upon him or her, by diploma from a recognized dental college or school legally empowered to confer the same, the right to assume said title; or shall assume any title, or append any letters to his or her name, with the intent to represent falsely that he or she has received a dental degree or license; or

7. Shall in an affidavit, required of an applicant for examination, license, or registration, under this Act, willfully make a false statement in a material regard; or

8. Shall engage in the practice of dentistry under any title or name without causing to be displayed in a conspicuous manner and in a conspicuous place in his or her office the name of each and every person employed in the practice of dentistry therein, together with the word mechanic or apprentice after the name of each unlicensed person employed; or

9. Shall within ten days after demand, made by the secretary of the board, fail to furnish to said board the name and address of all persons practicing or assisting in the practice of dentistry in the office of said person, company or association, at any time within sixty days prior to said notice, together with a sworn statement showing under and by what license or authority said person, company or association, and said employé are and have been practicing dentistry, but such affidavit shall not be used as evidence against such person, company or association in any proceeding under this section; or

10. Is practicing dentistry in the State without a license, or whose license has been revoked or suspended. [*Amendment of 1903.*]

Sec. 20. It is hereby further provided, that the conferring of degrees and the bestowing of diplomas, by reputable dental colleges of this State, who have been indorsed by the Board of Dental Examiners of California, and are members of the National Association of Dental

Faculties, are not included in the foregoing penalties, nor shall their rights and prerogatives ever be abridged in any manner whatsoever.

Sec. 21. All fines, penalties, or forfeitures, not including the examination fee, imposed or collected for the violation of any of the foregoing provisions of this Act, unless otherwise specified, shall be paid as follows: One half into the common school fund in the county in which the prosecution is had, and one half to the treasurer of this board, to be turned into the regular funds of this board, and it shall be the duty of the County Treasurer of each county, upon the receipt by him of any such fines, penalties or forfeitures, to forthwith pay over the same one half to the treasurer of this board. Said board, or any member or officer thereof, may prefer a complaint for violation of the law regulating the practice of dentistry, before any court of competent jurisdiction, and may by its officers, counsel, and agents, aid in presenting the law or facts before said court, in any proceeding taken thereon; and it shall be the duty of the District Attorney of each county of this State to prosecute all violations of the aforesaid provisions of this Act in their respective counties in which such violations occur.

Sec. 21½. Any dentist may have his license revoked or suspended by the Board of Dental Examiners for any of the following causes:

1. His conviction of a felony or misdemeanor involving moral turpitude, in which case the record of conviction or a certified copy thereof, certified by the clerk of the court, or by the judge in whose court the conviction is had, shall be conclusive evidence.

2. For unprofessional conduct or for gross ignorance, or inefficiency in his profession. Unprofessional conduct shall mean employing what are known as cappers, or steerers, to obtain business; the obtaining of any fee by fraud or misrepresentation; willfully betraying professional secrets; employing directly or indirectly any student or any suspended or unlicensed dentist to perform operations of any kind, or to treat lesions of the human teeth or jaws, or correct malimposed formations thereof, except as heretofore provided in section fifteen; the advertisement of dental business or treatment or devices in which untruthful, improbable or impossible statements are made, or habitual intemperance or gross immorality.

The proceedings to revoke or suspend any license under the first subdivision of section twenty-one and one half, must be taken by the board on the receipt of a certified copy of the record of conviction. The proceedings under the second subdivision of section twenty-one and one half may be taken by the board from the matters within its knowledge, or may be taken upon the information of another. All accusations must be in writing, verified by some party familiar with the facts therein charged, and three copies thereof must be filed with the secretary of the board. Upon receiving the accusation the board shall, if it deem it sufficient, make an order setting the same for hearing, and requiring the accused to appear and answer it at said hearing, at a specified time and place, and the secretary shall cause a copy of the order and of the accusation to be served upon the accused at least ten (10) days before the day appointed in the order for said hearing. The accused must appear at the time appointed in the order and answer the charges and make his defense to the same, unless for sufficient cause the board assign another day for that purpose. If he do not appear the board may proceed and determine the accusation in his absence. If the accused plead guilty or refuse to answer the charges, or upon the hearing thereof the board shall find them or any of them true, it may proceed to a judgment revoking his license or suspending it. The board and the accused may have the benefit of counsel, and the board shall have power to administer oaths, take the depositions of witnesses in the manner provided by law in civil cases, and to compel them to attend before it in person the same as in civil cases, by subpœna issued over the signature of the secretary and the seal of the board and in the name of the people of the State of California. Upon the revocation of any license, the fact shall be noted upon the records of the Board of Dental Examiners and the license shall be marked as canceled, upon the date of its revocation. [*New section added 1903.*]

SEC. 22. The members of the Board of Dental Examiners shall make an annual report of its proceedings to the Governor of California by the first of December of each year, together with an account of all moneys received and disbursed by them, pursuant to this Act.

SEC. 23. Four members of said Board of Dental Examiners shall constitute a quorum for the transaction of business at any meeting of the board.

SEC. 24. Nothing in this Act shall be so construed as to interfere with the rights and privileges of physicians and surgeons in the discharge of their duties.

SEC. 25. This Act shall take effect immediately, and all laws in conflict with this Act are hereby repealed. [*Amendment of 1903.*]

GENERAL INFORMATION.

One of the questions submitted to the Attorney-General and referred to in the preceding report was: "Are those portions of Section 14 requiring licensed dentists to pay annual fees and providing for the revocation of licenses in default of payment, constitutional?"

In answering the above question, the Attorney-General gave an exhaustive opinion, closing as follows: "I therefore conclude that the requirement that dentists pay an annual fee is a proper exercise of legislative authority."

Those asking for information should send a stamp for reply.

All money paid to the Board should be sent to the Secretary.

Any one failing to receive an official, numbered receipt for money paid will confer a favor by communicating such fact to the Secretary.

The law does not exempt a non-resident or retired dentist from the payment of the registration fee; however, if he does not wish to keep his license valid in California he may omit paying the fee.

Attention is particularly called to the following portion of Section 15: "But nothing in this Act contained shall prohibit * * * the student of a licentiate from *assisting his preceptor* in dental operations while in the *presence* of and under the *personal supervision* of his instructor." A student performing operations in a separate chair while his preceptor is conducting his own practice, or a student performing dental operations during his preceptor's absence, is violating the letter and the spirit of the law, and may be prosecuted for violating subdivision 10 of Section 19. His preceptor lays himself liable under subdivision 2 of Section 21½.

Diplomas from dental colleges or licenses from other States give their holders no right to practice dentistry in California without first passing an examination.

California does not interchange licenses with other States.

The Board does not give out any questions whatsoever.

The next examination will be held in San Francisco beginning on June 13, 1908. This will be followed by an examination in Los Angeles beginning on June 24, 1908.

The winter examination will be held in San Francisco beginning on December 10, 1908. Each applicant must come prepared to perform any operation in prosthetic or operative dentistry that may be assigned to him. All work must be done in the presence of the Board. Applicants must furnish all necessary instruments, materials, and patients.

A complete set of rules and instructions governing the examinations will be given the applicants at the time of the examinations.

The following are the dental organizations in California:

San Diego Dental Society.
Los Angeles Association of Dental Alumni.
Alumni Association of the Dental Department of the University of Southern California.
Southern California Dental Association.
Santa Barbara County Dental Society.
Santa Cruz Dental Society.
Santa Clara Valley Dental Society.
Alameda County Dental Society.
San Francisco Dental Association.
Sacramento Dental Society.
Humblodt County Dental Association.
Dental Alumni Association of the College of Physicians and Surgeons.
Alumni Association of the Dental Department of the University of California.
California State Dental Association.

Under our present law it is very necessary that the Board should have the correct addresses of all dentists licensed to practice in California, whether they reside in the State or not. The migratory habits of many dentists have made the task of securing change of address a very difficult one. We appeal to every member of our profession to assist the Board in this work.

Since December 1, 1907, the Board has held an examination and the following forty-four applicants were granted licenses:

Daley, H. T.
Carter, L. E.
Duff, H. S.
Magill, J. C.
Talbott, J. L.
Fratus, Mary E.
Mhoon, W. J.
Smith, L. T.
Bell, Margaret J.
Barabe, E. J.
Sontheimer, A. R.
Whelan, W. F.
Lyon, G. F.
McKay, J. H.
Hoagland, W. W.
Benney, C. R.
Lauler, C. E.
Skinner, R. B.
Ehred, C. T.
Wilson, C. E.
Usher, C. W.
Butler, S. L.
Sharp, G. C.
Strasser, J. E.
Packson, E. S.
Terry, T. D.
Martin, H. G.
Bartmann, G. H.
Randall, C. H.
Oates, J. A.
Shields, J. E.
Menne, W. A.
Gallagher, C. V.
Shiina, T.
Horn, C. M.
Jones, J. C.
Post, F. S.
Parker, A. H.
Watson, S. E.
Stokes, A. W.
Forester, C. O.
Wilson, W. C.
Snyder, G. A
Learn, H. W.

REGISTER OF LICENSED DENTAL PRACTITIONERS, 1908.

This Register does not include the names of those who have failed to register their licenses according to Section 10 of the Dental Law.

Name.	Place of Practice.
Abbay, W. H.	Oakland
Abraham, Henry	San Francisco
Abrams, George	Sacramento
Acheson, N. B.	San Diego
Acker, A. V.	Reedley
Adams, S. H.	
Aiken, G. S.	Paia, Maui, T. H.
Aiken, P. B.	Pine Grove
Albergaria, J. S.	Sacramento
Alberti, D. A.	San Francisco
Albright, F. H.	Red Bluff
Alderson, J. W.	San Francisco
Alexander, F. W.	San Bernardino
Alexander, M. O.	San Francisco
Alger, E. J.	Albuquerque, N. M.
Allen, A. B.	Los Angeles
Allen, C. A.	Long Beach
Allen, H. G.	San Francisco
Allen, Mrs. R. McM.	
Allen, R. H.	Oakland
Allen, W. E.	San Diego
Allin, Ernest	Los Angeles
Alonsen, H., Jr.	Ashland, Ore.
Alsberge, E. W.	St. Helena
Amelung, H. H.	Santa Cruz
Ames, G. F.	Alameda
Anderson, D. P.	Santa Rosa
Anderson, F. W.	Winters
Anderson, R. C.	Los Angeles
Anderson, W. H. B.	Vancouver, B. C.
Apablasa, C. J.	Durango, Mexico
Arbogast, A. A.	San Francisco
Archer, C. S.	Portland, Ore.
Archer, I. B.	North San Juan
Argall, F. L.	San José
Armstrong, J. J.	Vallejo
Armstrong, W. H.	San Francisco
Arner, M. E.	Vallejo
Arnold, B. C.	Los Angeles
Arnold, E. B.	Los Angeles
Arnold, F. N.	Los Angeles
Arroyo, Jorge	Paris, France
Asahina, T.	San Francisco
Asay, C. E.	Visalia
Asay, J. L.	San José
Ashby, S. J.	Redding
Ashley, J. W.	San José
Ashworth, F. D.	San Francisco
Ashworth, F. P.	San Francisco
Aten, R. R.	Fresno
Aten, W. O.	San Francisco
Atwell, Francis	Tacoma, Wash.
Atwater, H. G.	Los Angeles
Atwood, D. G.	Plainfield, N. J.
Atwood, W. A.	San Francisco
Auble, E. F.	Alturas
Austin, A. B.	Long Beach
Austin, W. E.	Modesto
Austin, W. P.	Salinas
Avery, W. N.	San José
Axton, F. R.	San Francisco
Ayers, C. S.	Oakland
Bachman, C. W.	Los Angeles
Bacigalupi, Julia	San Francisco
Backman, G. S.	San Francisco
Bacon, A. A.	
Bacon, W. R.	San Francisco
Badgley, A.	
Badgley, A. R.	Fairmont, W. Va.
Badgley, E. E.	
Baer, A.	San Francisco
Baer, J.	San Francisco
Bagby, H. C.	Santa Maria
Bagley, W. S.	
Bailey, A. S.	Menominee, Mich.
Bailey, G. E.	Whittier
Bailey, I. R.	Pinole
Bailey, L. C.	Mazatlan, Mexico
Bailie, H. C.	Los Angeles
Bailhachi, G. E.	San Francisco
Baird, E. E.	Sanger
Baird, F. G.	San Francisco
Baird, M. L.	San Francisco
Baker, A. W.	San Francisco
Baker, D. B.	San José
Baker, W. A.	Santa Ana
Baldwin, C. V.	Los Angeles
Baldwin, I. F.	Banning
Ball, A. E.	Redlands
Barber, H. B.	

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Barber, John	
Barber, W. C.	Downer's Grove, Ill.
Bar Due, W. N.	San Francisco
Barham, W. W.	Yreka
Barker, A. M.	San José
Barkman, Isabella Cook	West Berkeley
Barnes, A. McL.	Oakland
Barnes, B.	Douglas, Arizona
Barnes, F. J.	San Diego
Barnett, E. S.	Salt Lake, Utah
Barnett, Jos.	Los Gatos
Barney, J. C.	Round Mountain
Barr, T. I. C.	San Rafael
Barrett, C. G.	Sacramento
Barrett, T. F.	San Francisco
Barringer, L.	
Bartlett, U. G.	San Francisco
Bartram, E. E.	Los Angeles
Basford, C. R.	Lakeport
Bates, C. P.	Ukiah
Bates, H. W.	Los Angeles
Bauer, C. F.	San Francisco
Bauske, R. E.	Oakland
Baxter, J. C.	Independence
Beach, W. S.	Rocklin
Beacon, C. W.	Crescent City
Beals, C. H.	Angels
Bean, G. L.	San Francisco
Beatie, A. L.	Oregon City, Ore.
Beazer, H. P.	Tuolumne
Beazley, W. S.	Los Angeles
Bebb, Wm.	Los Angeles
Bedford, L. N.	Los Angeles
Bedwell, J. L.	Pt. Richmond
Beem, G. O.	Los Angeles
Beers, C. J.	Los Angeles
Belfils, E. K.	Fresno
Bell, C. H.	San Francisco
Bell, Margaret J.	San Francisco
Bell, W. J.	Los Angeles
Belt, J. G.	Safford, Arizona
Benbrook, C. M.	Los Angeles
Benjamin, C. W.	Geyserville
Benjamin, E. H.	San Francisco
Bennett, A. G.	San José
Bennett, Guy	Chico
Bennett, Jean I.	British India
Benney, C. R.	Los Angeles
Bennion, S. E.	Hutchinson, Minn.
Berger, L. O.	San José
Bergman, N. A.	Spokane, Wash.
Bergstrom, G.	San Francisco
Bernheim, J. R.	care Sur. Gen., U.S.A.
Best, B. C.	San Francisco
Best, J. P.	Long Beach
Bethel, F. J.	Seattle, Wash.
Betterton, E. L.	
Bettis, H. S.	Boise City, Idaho
Beverton, D. W.	Pacific Grove
Bibbero, H. S.	San Francisco
Biddle, E. W.	Healdsburg
Biggs, J. A.	San Francisco
Billings, W. M.	Berkeley
Bills, A. V.	San Diego
Binney, F. A.	San Francisco
Bird, W. R.	Los Angeles
Bishop, M. F.	Alameda
Black, J. A.	Galveston, Texas
Blackburn, D. E.	Pescadero
Blackwell, B. G.	Upland
Blain, J. C.	San Francisco
Blair, C. L.	
Blaisdell, J. H.	
Blake, A. E.	San Francisco
Bland, J. H.	San José
Bland, O.	Cherokee Woods, Okla.
Blankman, Wm.	San Francisco
Blauer, R. J.	San José
Bliss, C. L.	Santa Cruz
Bliss, F. A.	San Francisco
Bliss, F. W.	Santa Cruz
Block, C.	
Block, S. D.	San Francisco
Blodgett, J. M.	Lodi
Blondin, L. D.	Oakland
Bloomer, E. O.	Los Angeles
Blosser, E. E.	Santa Maria
Boeckman, H. F.	Pasadena
Boege, J. H.	Santa Ana
Boesch, Matilda S.	San José
Boeseke, B. C.	Santa Barbara
Bogart, S. C.	Los Angeles
Bonham, C. A.	Red Bluff
Bonham, J. F.	Sebastopol
Bonnell, F. C.	Hollister
Boone, N. I.	Red Bluff
Bonstell, C. L.	Eureka
Borger, J. N.	San Francisco
Bostwick, E. C.	San Francisco
Bourne, R. R.	Hopkinsville, Ky.
Bowen, J. J.	New York, N. Y.
Bowers, R. H.	Sacramento
Bowker, R. Edith	Modesto
Bowman, C. H.	Los Angeles
Bowman, Amy G.	Los Angeles
Bowman, I. L.	Nevada City
Boxton, Chas.	San Francisco
Boyd, B. B.	Los Angeles
Boyd, E. J.	
Boyd, Ida M.	Los Angeles
Boyd, S. A.	San Francisco
Boyens, P. J.	Weed

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Boyes, E. B.	Oakland
Boyes, H. D.	San Francisco
Boynton, G. D.	San Francisco
Boys, H. S.	Paso Robles
Bradbury, E. P.	Santa Barbara
Brainard, A. D.	
Bray, G. F. I.	
Breene, F. T.	San José
Brewer, B. B.	San Francisco
Brewer, F. A.	Soledad
Bridges, J. S.	Chicago, Ill.
Briggs, W. H.	Stockton
Brigham, E. T.	Redlands
Brizius, W. J.	Los Angeles
Broad, E. J.	San Francisco
Broad, Mrs. E. J.	San Francisco
Broadwater, W. E.	Astoria, Ore.
Brodbeck, H. W.	Los Angeles
Brodnax, Bland	Guatemala, C. A.
Bronson, O. E.	Madera
Brooks, F. A.	San Francisco
Brooks, F. S.	Martinez
Brooks, J. A.	Pacific Grove
Brooks, W. E.	Oakland
Brown, Albert	San Francisco
Brown, Alexander	Mesa City, Arizona
Brown, A. R.	Los Angeles
Brown, A. V.	San Francisco
Brown, C. D.	San Francisco
Brown, C. H.	San Francisco
Brown, E. E.	Fort Bragg
Brown, E. J.	Seattle, Wash.
Brown, E. P.	Cottonwood Falls, Kan.
Brown, F. T.	Oakland
Brown, G. L.	Bakersfield
Brown, Horace E.	Los Angeles
Brown, Holmes G.	Los Angeles
Brown, H. S.	Los Angeles
Brown, Harry G.	Long Beach
Brown, Henry	Butte, Mont.
Brown, J. A.	McCloud
Brown, J. G.	Oakland
Brown, John	Sawtelle
Brown, M. A.	San Francisco
Brown, W. G.	
Brown, Wm.	Calhoun, Ill.
Browning W. F.	San Francisco
Brun, L. E.	San Francisco
Bryant, F. A.	San Francisco
Bryden, N. B.	
Buck, Kate D.	Los Angeles
Buckeridge, E.	
Buell, E. B.	Escondido
Buell, H. C.	Los Angeles
Bullard, J. A.	Chicago, Ill.
Bullock, W. M.	San Francisco
Bundy, L.	Medford, Ore.
Burbeck, W. R.	Los Angeles
Burfeind, W. M. H.	San Luis Obispo
Burgess, R. F.	
Burke, S. E.	Los Angeles
Burkholder, E. C.	St. Louis, Mo.
Burham, W.	San Francisco
Burns, J. B.	Oakland
Burns, O. B.	San Francisco
Burns, P. M.	San Francisco
Burns, R. E.	Los Angeles
Burns, Robt., Jr.	San Francisco
Burr, R. H.	Stockton
Burt, F. E.	Glendale
Burton, Frank	Stockton
Bush, W. P.	Berkeley
Bush, F. J. H.	San Francisco
Butler, W. N.	Hartford, Conn.
Butterfield, C. L.	Watsonville
Byrne, D. W.	Santa Cruz
Caffarata, A. J.	San Francisco
Cahill, S. D.	Angels Camp
Calder, H. F.	Los Angeles
Caldwell, C. L.	Tracy
Caldwell, F. M., Jr.	Stockton
Caldwell, W. L.	Stockton
Caler, P. B.	Globe, Arizona
Callaghan, T. B.	Eureka
Callender, M. N.	San Francisco
Calmes, H. P.	Fruitvale
Cameron, A. C.	Redlands
Cameron, A. D.	Riverside
Camicia, L. S.	
Camp, F. H.	Willits
Campbell, R. E.	Woodland
Cane, Alfred	Oakland
Caranza, V. A.	Cocales, C. A.
Carew, J. A.	San Francisco
Carlson, Adam	Los Angeles
Carlton, H. P.	Oakland
Carlyon, P. H.	Olympia, Wash.
Carmichael, F. E.	Eureka
Carmichael, T. M.	San José
Carpenter, B. L.	Porterville
Carpenter, O.	White Lake, N. Y.
Carr, G. B.	Sacramento
Carrillo, Y. R.	Los Angeles
Carroll, H. H.	San Francisco
Carroll, J. C.	San Francisco
Carroll, J. M.	Oakland
Carter, L. E.	San Francisco
Casaday, G. H.	San Francisco
Case, C. E.	Los Angeles
Case, E. G.	Ukiah
Casey, T. F.	San Francisco
Cassilly, J. P.	

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Castle, C. C.	Merced
Cauch, F. L.	San José
Cave, D.	Los Angeles
Chalfant, C. W.	Willits
Chalfant, John	San Francisco
Chapman, A.	Vallejo
Chapman, C. W.	Nevada City
Chapman, Mrs. N. E.	Nevada City
Chapman, S. A.	Virginia City
Chambers, W. K.	Los Angeles
Chance, A. W.	Portland
Chandler, E. D.	Los Angeles
Chandler, H. S.	Honolulu, T. H.
Chapline, W. E.	Los Angeles
Chapman, I. H.	Burlingame
Chappel, H. G.	Oakland
Chappell, J. F.	Vallejo
Chappell, McCoy	Yerington, Nev.
Charles, M. S.	Alhambra
Chase, G. M.	San Francisco
Chase, H. E.	Boston, Mass.
Chase, Maurice	
Chase, W. J.	San Francisco
Cheadle, E. M.	Lebanon, Ore.
Child, Mrs. M. M.	Santa Barbara
Childs, J. E.	Arcata
Chilton, Jessie	Fullerton
Chisholm, A. A.	Napa
Chismore, H. J.	San Francisco
Christensen, G. A.	San Francisco
Christie, J. E.	Salt Lake City, Utah
Christopher, T.	
Church, H. E.	Los Angeles
Ciley, J. L.	Elk Creek
Clapp, S. W.	Pomona
Clark, F. E.	Honolulu, T. H.
Clark, Franklin E.	Florence
Clark, W. M.	Riverside
Clark, W. N.	Los Angeles
Clarke, J. P.	San Francisco
Clarke, W. H.	Upper Lake
Clay, E. A.	San Francisco
Clay, L. E.	San Francisco
Clayton, W. E.	Los Angeles
Clazie, F.	Oakland
Clement, C. E.	Berkeley
Cline, F. J.	Covina
Close, R. M.	Oakland
Cochrane, E. O.	San Francisco
Cockburn E. A.	Eureka
Cockerton, D. H.	Oakland
Cockrill, R. B.	Fresno
Coe, C. S.	Palo Alto
Coffin, A. M.	Reno, Nev.
Cogswell, Thos.	San Diego
Coke, P. S.	Oakland
Colburn, O. M.	San Francisco
Cole, C. E.	Banning
Cole, H.	Santa Rosa
Colegrove, J. A.	Los Angeles
Coleman, B. F.	Gilroy
Colestock, L. A.	Pleasanton
Colgan, A. J.	Santa Ana
Colligan, F. J.	San Francisco
Collins, A. W.	San Francisco
Collins, F. E.	Deming, N. M.
Collins, G. W.	Vermillion, S. Dak.
Collins, M. J.	Oakland
Combs, J. E.	Visalia
Compton, G. T.	San Francisco
Comte, G. A.	Los Angeles
Coney, D. M.	San Francisco
Coney, Z. T.	San Francisco
Congdon, M. J.	Berkeley
Conner, E. F.	Dinuba
Conner, G. S.	St. Helena
Connolly, C. L.	Santa Rosa
Conradt, H. J.	Novato
Conwell, C. C.	Berkeley
Cook, A. R.	Salt Lake City, Utah
Cook, J. A.	Long Beach
Cook, J. F.	Los Angeles
Cook, W. E.	Eureka
Cool, G. W.	Los Angeles
Cool, R. H.	San Francisco
Coomes, A. M.	Cloverdale
Coomes, F. E.	Sacramento
Cooper, A. F.	Arcata
Cooper, A. N.	San Francisco
Cooper, E. M.	Napa
Cooper, J. C.	Fresno
Cooper, J. H.	
Cooper, J. H.	Hanford
Cooper, M. L.	Modesto
Copsey, H. B.	Eureka
Corbett, W. F.	Middletown
Corbiere, C. C.	Redding
Corliss, W. B.	Eureka
Cornwall, A.	Oakland
Corwin, Cecil	Hayward
Corwin, L. T.	Oakland
Cory, B. B.	Fresno
Cosad, A. B.	Oakland
Cothran, M. H.	San José
Coulson, N. T.	San Francisco
Covert, A. T.	Long Beach
Covington, W. T.	Los Angeles
Cowan, E. L.	Los Angeles
Cox, G. E.	Los Angeles
Craig, H. T.	San Francisco
Craig, M. W.	Mill Valley
Craig, W. H.	Niles

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Craigie, H.	San Francisco
Crandall, G. J.	Los Angeles
Cranz, L. T.	San Francisco
Crawford, E. H.	Santa Rosa
Crawford, J. S.	Los Angeles
Craycroft, W. W.	Fresno
Creagh, J. W.	Alameda
Cree, W. A.	San Francisco
Criswell, H. P.	San Francisco
Criswell, R. B.	San Francisco
Croall, A. B. P.	Larkspur
Croft, S.	Los Angeles
Cronkhite, J. A.	Los Angeles
Cross, W. W.	
Crossett, E. T.	Jersey City, N. J.
Crossett, T.	
Crow, G. M.	Los Angeles
Crow, S. H.	Sierraville
Crum, F. A.	Oroville
Cummings, C. H.	San Francisco
Cummings, Elizabeth	Berkeley
Cummings, J. E.	San Francisco
Cummings, M. F.	Berkeley
Cummings, N. C.	Redwood City
Cummings, P. S.	Mexico
Cunningham, F. R.	Los Angeles
Cunningham, R. G.	Los Angeles
Cunningham, S. J.	San Francisco
Cureton, Edw.	Stockton
Cureton, H.	San José
Curragh, J. M.	San José
Curran, J. F.	Los Angeles
Curtiss, F. A.	San José
Cushing, S. R.	San Francisco
Custer, C. A.	Seattle, Wash.
Cutler, J. W.	Watsonville
Dahlen, P. J.	Hartford, Conn.
Daley, H. T.	San Francisco
Daly, T. H.	Mt. Carmel, Ill.
Danforth, H. T.	
Daniels, G. E.	Healdsburg
Danziger, G. A.	San Francisco
Darby, J. H.	Long Beach
Darneal, W. E.	Elmhurst
Dart, E. K.	Santa Maria
Davenport, D. D.	Berkeley
Davidson, J. E.	Oakland
Davidson, Rob	
Davis, Alice M.	Hayward
Davis, C. A.	Los Angeles
Davis, C. E.	St. Helena
Davis, E. N. W.	Tonopah, Nev.
Davis, E. W.	
Davis, F. B.	Oakland
Davis, H. C.	San Francisco
Davis, H. E.	Papeete, Tahiti, S. I.
Davis, H. P.	San Francisco
Davis, H. S.	San Francisco
Davis, S. C.	San Francisco
Davis, W. E.	San Francisco
Davy, J. W.	San José
Day, R. A.	Oakland
Deacon, A. P.	Willows
Dean, C. O.	San Francisco
Dean, G. S.	San Francisco
Dean J. S.	Redlands
Dean, O. S.	Oakland
Decker, C. W.	San Francisco
Decker, J. H.	Pt. Richmond
Deffenbacher, D. S.	Templeton
Deichmiller, C.	Los Angeles
Delucchi, J. A.	Sutter Creek
Deming, R. H.	Visalia
Dempsey, H. E.	Vallejo
Dennis, C. C.	Oakland
De Puy, Leo	Pittsburg, Pa.
Derby, A. J.	San Francisco
Derby, A. T.	San Francisco
Deuel, E. C.	Sacramento
Devlin, C. A.	Shanghai, China
De Vore, W. G.	Tempe, Arizona
Dewlaney, C. W.	Santa Barbara
Diamond, P. T.	Chicago, Ill.
Dick, A. N.	Woodland
Dick, A. Y.	Woodland
Dickover, J. J.	Santa Barbara
Dillman, I. F.	Los Angeles
Dimmick, J.	Oakland
Dimock, H. C.	Lompoc
Dinsmore, A. M.	Ferndale
Ditty, Amos	Pomona
Dixon, M. M.	Los Angeles
Dobbins, J. W.	Grass Valley
Dobson, W. E.	Los Angeles
Dodell, X.	San Francisco
Dodge, H. D.	Mexico
Dodson, E. M.	Los Angeles
Doll, C. V.	Marysville
Dollin, A. F.	San Francisco
Donnelly, G. S.	San Francisco
Doolittle, C. V.	Pomona
Dornberger, E. L.	Mountain View
Douglas, G.	
Dovey, W. R.	Petaluma
Dow, E. L.	Oakland
Dowell, W. J.	Oakland
Dowling, J.	Ireland
Downing, H. S.	Los Angeles
Doyle, B. W.	Fresno
Doyle, E. M.	Sacramento
Doyle, F. C.	Los Angeles
Drollard, T. W.	Santa Cruz

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Drucker, A. C.	Oakland
Drucker, G. I.	San Francisco
DuBois, C. H.	San Rafael
Duckett, C. S.	Berkeley
Duckett, H. C.	Sacramento
Duggan, N. S.	Berkeley
Dias, E. X.	Sacramento
Downes, E.	Santa Rosa
Driscoll, J. J.	San Francisco
Dunbar, L. L.	San Francisco
Dunbar, P. H.	Stirling City
Dundass, E. G.	Los Angeles
Dungan, G. A.	Eureka
Dungan, F. L.	Ferndale
Dunn, J. H.	Pomona
Dunn, J. M.	Oakland
Dunn, M. J.	Berkeley
Dunn, R. K.	Los Angeles
Durham, J. H.	Irvington
Dye, F. M. M.	Berkeley
Dyer, E. C.	San Francisco
Duff, H. S.	Napa
Earl, G. W.	Gilroy
Eason, J. A.	San Francisco
Eastman, W. W.	Sonora
Eaton, Du Bois	Centerville
Ede, L. G.	Reno, Nev.
Eddy, E. D.	Salinas
Edmiston, B. S.	
Edmonds, J. H.	Los Angeles
Edmonds, J. M.	New York, N. Y.
Edwards, A. L.	San Francisco
Edwards, B. F.	Oakland
Edwards, C. O.	Oakland
Edwards, D. P.	Crescent City
Edwards, J. W.	San Francisco
Ehred, C. T.	Los Angeles
Eidenmiller, F. H.	Concord
Eisen, E. G.	Los Angeles
Eisenbrand, G. F.	Chicago, Ill
Elberg, H. M.	San Francisco
Eller, H. C.	Etna Mills
Elliott, D. C.	Mayfield
Ellis, A. J.	Pasadena
Ellis, W. A.	San Francisco
Ellwanger, G. J.	
Elvidge, G. F.	Madera
Elworthy, F. W.	San Francisco
Emery, C. A.	
Engs, J. S.	Oakland
Engstrom, C. J. R.	Los Angeles
Engstrom, C. O.	Sacramento
Ensign, J. H.	San Mateo
Epperson, H. V.	Long Beach
Epperson, J. H.	Ogden, Utah
Epperson, J. W.	Los Angeles
Epsteen, H.	San Francisco
Erhardt, P. C.	Dresden, Germany
Eshbach, D. M.	
Espenosa, M.	Mexico
Estes, W. B.	San Francisco
Evans, A. O.	Los Angeles
Evans, E. E.	Oakland
Evans, J. H.	Highlands
Evans, W. H.	Napa
Everts, C. P.	Berkeley
Ewing, F. L.	Blackwell, Okla.
Fairweather, N. S.	Honolulu, T. H.
Fare, John	
Farley, R. E.	San Francisco
Farman, C. E.	Oakland
Farman, C. H.	Napa
Ferguson, G. C.	
Ferguson, T. H.	Alameda
Fiddyment, G. F.	Lockport, Ill.
Fischer, F.	San Francisco
Fischer, L. W.	San José
Fisher, F. H.	
Fisher, G. N.	Dos Palos
Fitch, O. P.	Placerville
Fitch, W. W.	Pomona
Fitzgerald, F. J.	Los Angeles
Fitzgibbon, J. C.	San Francisco
Flanders, G. H.	Whittier
Fleckenstein, W. J.	Los Angeles
Fleissner, H. H.	San Francisco
Fleming, C. K.	San José
Fletcher, Thos.	San Francisco
Flood, A. M.	San Francisco
Flood, W. A.	Anaheim
Flory, W. D.	Los Angeles
Floyd, M. J. A.	Kerby, Ore.
Foerster, A. A. W.	San Francisco
Fogarty, J. D.	Jackson
Follansbee, H. E.	River Falls, Wis.
Foote, C. I.	San Bernardino
Force, R. W.	Long Beach
Ford, A. J.	San Francisco
Ford, L. E.	Los Angeles
Forester, C. O.	San Francisco
Forrest, J. M., Jr.	San Francisco
Forrester, H. E.	Pueblo, Colo.
Foster, H. C.	La Canared, Mexico
Foster, W. M.	Los Angeles
Fountain, M. F.	Blue Lake
Fowler, A. A.	San José
Fowler, J. R.	San Luis Obispo
Fowler, W. S.	San Francisco
Fox, C. E.	Los Angeles
Fox, C. H.	Bakersfield
Fox, G. L.	Modesto
Fox, H. B.	

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Fox, J. M.	San Francisco
Frain, C. A.	Cleveland, O.
Frank, G. W.	San Bernardino
Fraser, W. E.	San Francisco
Fratus, Mary E.	Vallejo
Frazer, I. A.	San José
Frazer, T. J.	San Francisco
Frazier, S. H.	Santa Rosa
Frederick, H. A.	San Francisco
Fredericks, C. J.	Oakland
Free, G. W.	Fresno
Freeburger, F. Q.	Portland, Ore.
Freeman, C. E.	Redlands
Freitas, E. L.	Los Angeles
French, A. W.	Saratoga
French, H. W.	Oakland
Frenzel, F. H.	Berkeley
Fugler, C. A.	San Francisco
Fuller, C. H.	San Mateo
Fuller, F. N.	Sisson
Fulsom, H. A.	Los Angeles
Fulstone, J. W.	Mexico
Gabbs, E. S.	Alameda
Gabbs, M. F.	San Francisco
Galbraith, M. D.	Tarentum, Pa.
Galbreath, A. J.	San Francisco
Galeoto, S.	San Francisco
Gallagher, C. V.	San Francisco
Gallot, J.	Sacramento
Gallup, T. E.	Santa Clara
Gambitz, L. R.	San Francisco
Gambitz, M. R.	San Francisco
Gammons, W. E.	Alameda
Garcia, M. J.	San Leandro
Gardner, Edmund	Redding
Gardner, R. C.	Fort Bragg
Garnett, W. M.	Los Angeles
Garrison, D. M.	San Luis Obispo
Garrison, D. R.	San Francisco
Garrott, A. C.	Los Angeles
Garver, W. M.	Los Angeles
Gaskill, P. D.	Oakland
Gaston, A. A.	San José
Gaston, W. A.	San José
Gates, H. E.	San Francisco
Gates, Mrs. I. M.	Eureka
Gates, W. G.	Paso Robles
Gautier, L. A.	San Francisco
Gaylord, H. A.	Pasadena
Gedge, H. E.	San Francisco
Geiger, H. H.	Kennett
George, E.	Hayward
Gholson, J. A.	Clarksville, Tenn.
Gibson, A. L.	Ukiah
Gibson, F. R.	Tonopah, Nev.
Gibson, F. W.	Oroville
Gibson, G. W.	
Giddings, W. A.	
Giffin, R. B.	Sacramento
Giguette, F. A.	Pasadena
Gilbert, A. H.	San Diego
Gilbert, A. J.	Stockton
Gilbert, C. C.	San Francisco
Gilbert, G. W.	Fresno
Gilbert, O. C.	Bellingham, Wash.
Gilbertson, J. C.	Oakland
Gillespie, D. S.	Los Angeles
Gilman, C. D.	Oakland
Gilman, S. M.	Oakland
Gilson, R. E.	Oakland
Gilstrop, J. M.	Oakland
Ginno, L. F.	Berkeley
Ginno, J. W.	Berkeley
Girardey, W. O.	Sacramento
Giusti, J. J.	Berlin, Germany
Glasgow, H. J.	Fresno
Glasgow, N. B.	San Bernardino
Glasscock, F. A.	Winthrop
Glatt, E. C.	Eureka
Gleason, H. C.	Los Angeles
Gleaves, A. D.	San Diego
Glidden, M. D.	Stockton
Goff, E. E.	Fortuna
Gonzales, F. I.	San Francisco
Good, C. L.	San Diego
Goode, W. W.	Carson, Nev.
Goodrich, G. A.	Los Angeles
Goodrich, V. A.	San Pedro
Goodearle, J. H.	Oroville
Goodman, N. W.	Los Angeles
Gore, Arthur	Alameda
Gorton, C. D.	San Francisco
Gothard, J. T.	Marianao, Cuba
Gottenberg, H. W.	Sonoma
Gough, J. F.	San Francisco
Gould, A. D.	Owego, N. Y.
Gove, G. W.	Berkeley
Gove, May Blossom	Berkeley
Graham, A. B.	Montezuma, Iowa
Graham, G. F.	San Francisco
Graham, H. J.	Oroville
Graham, Louis	San Francisco
Grant, A. H.	Downieville
Grant, F. T.	Sacramento
Grant, J. T.	Woodland
Gray, C. F.	Winchester, Ind.
Gray, D. H.	
Gray, F. A.	Orange
Gray, G. W.	Albany, Ore.
Gray, H. J.	Santa Cruz
Gray, John	
Gray, J. W.	Los Angeles

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Gray, W. S.	Marysville
Green, M. L.	Oakland
Green, W. F.	Modesto
Greene, W.	Guatemala, C. A.
Greenlaw, H. T.	Superior, Wis.
Greenlaw, M. A.	San Francisco
Gresham, J. L.	Coalinga
Gribbin, J. J.	New York, N. Y.
Griesser, A. M. H.	Oakland
Griffin, F. M.	Manson, Iowa
Griffin, J. J.	San Francisco
Griffith, A. C.	Los Angeles
Griffiths, Allen	San Francisco
Grimes, A.	Los Angeles
Griner, O. T.	Lakeport
Gross, C. F.	Oakland
Grossman, M. E.	Honolulu, T. H.
Grotefend, G. A.	Redding
Grove, L. H.	Los Angeles
Grove, W. C.	Modesto
Gruss, F. J.	San Francisco
Grütner, A. T.	San Francisco
Gunsberger, B. M.	San Francisco
Guthrie, J. E.	Los Angeles
Guthrie, T. A.	Woodland
Guyer, C. N.	Los Angeles
Gwin, W. R., Jr.	Los Angeles
Gwinn, W. M.	San Francisco
Haas, H. H.	Los Angeles
Hackett, A. E.	San Francisco
Hackett, C. C.	Napa
Hackett, F. M.	San Francisco
Hackett, S. A.	Oakland
Haines, B. W.	Los Angeles
Haines, N. J.	
Hale, L. T.	Los Angeles
Hale, R. L.	San Francisco
Hall, E. C.	
Hall, R. T.	Fresno
Hall, S. W.	Berkeley
Hall, T. W.	Oakland
Hall, W. C.	Petaluma
Hall, W. H.	Denver, Colo.
Hallock, C. H.	Los Angeles
Halsey, N. S.	San Rafael
Halsey, W. H.	Oakland
Halsted, E. P.	San Francisco
Halsted, J. L.	San Francisco
Hambleton, W. D.	Ocean Park
Hamilton, Cyrus	Eureka, Nev.
Hamilton, J. W.	San Francisco
Hamlin, B. R.	Alameda
Hammer, H. F.	New York, N. Y.
Hammond, T. F.	Stockton
Hammond, W. F.	Los Angeles
Hansen, W. A.	San Francisco
Hanson, C. T.	San Francisco
Hanson, H. P.	San José
Harris, G. R.	San Francisco
Harris, M. P.	Grass Valley
Harbison, H. R.	San Diego
Harbour, Gennette W.	Los Angeles
Hardcastle, George	San Francisco
Harding, W. C.	San Francisco
Hardy, C. S.	San Francisco
Hardy, J. R.	San Diego
Hare, D. A.	San Francisco
Hargrave, Walter	Covelo
Hargrove, G. H.	Los Angeles
Harms, M. F. E.	Pleasanton
Harms, R. G. C.	Oakland
Harnden, F. W.	San Francisco
Harper, B. W.	Hollywood
Harper, J. A.	Corvallis, Ore.
Harrell, T. P.	Los Angeles
Harris, G. M.	North San Juan, Nev.
Harris, G. N.	Bellingham, Wash.
Harris, Isabelle D.	San Francisco
Harrison, E. L.	San Francisco
Harshall, A. K.	San Francisco
Hart, C. E.	San Francisco
Hart, O. P.	Needles
Harth, A. P.	Lindsay
Hartman, P. C.	Campbell
Harvey, C. L.	Watsonville
Harwood, E. M.	Los Angeles
Harwood, H. B.	Los Angeles
Haselhurst, A. O.	Stockton
Hasslinger, O. A.	San Francisco
Hastings, Robt.	New York
Hatch, J. H.	San Francisco
Hatcher, J. H.	Ontario
Hathaway, G. E.	Redlands
Hathaway, H. W.	Los Angeles
Haughawout, H. C.	Los Angeles
Hauselt, C. P.	San Francisco
Hawley, A. H.	Sacramento
Hawley, D. E.	Antioch
Hawver, J. C.	Auburn
Hays, A. P.	Los Angeles
Hays, H. McD.	Colton
Hays, I. W., Jr.	Grass Valley
Heacock, F. T.	San Francisco
Heacock, W. R.	Redlands
Head, A. W.	Los Angeles
Head, T. D.	Redding
Head, W. W.	Chico
Heaney, W. P.	San Francisco
Hearn, F. G.	
Hedrick, Lyman	San Francisco
Heider, W. T.	East Oakland
Hein, G. N.	San Francisco

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Heino, J.	Mill Valley
Heinzman, W. H.	Austin
Heitman, F. W.	Merced
Heitman, H. L.	Merced
Heller, C. C.	Los Angeles
Heller, L. C.	San Francisco
Hempstead, J. E.	
Henderson, H. N.	Berkeley
Henderson, N.	Alameda
Henderson, R. W.	Stockton
Henderson, W. D.	Berkeley
Henderson, W. R.	Stockton
Hendricks, P.	Los Angeles
Hendricks, H. T.	Hanford
Hennessy, J. C.	Reno, Nev.
Herbert, C. P.	Riverside
Herbert, E. F.	Santa Barbara
Herkner, C. E.	Grass Valley
Herrick, C. A.	San Francisco
Herrington, W. M.	San Francisco
Hervey, A. R.	Santa Ana
Heseman, C. E.	Riverside
Hesketh, W. R.	Los Angeles
Hewes, R. E.	San Diego
Hewitt, H. G.	Healdsburg
Hill, A. L.	San Francisco
Hibbard, C. W.	San Francisco
Hickey, Jos.	Portland
Higby, N. G.	Pomona
Higgins, C. R.	Fort Bragg
Higgins, R. M.	Oakland
Higgins, T. S.	San Francisco
High, C. B.	Honolulu, T. H.
Hill, A. B.	Berkeley
Hill, A. S.	San Francisco
Hill, T. L.	Sausalito
Hill, W. B.	
Hiller, E. D.	Los Angeles
Hilliker, E. P.	Los Angeles
Hinckley, I. L.	Fillmore
Hines, J. P.	San Francisco
Hines, L. B.	Lodi
Hinman, A., Jr.	Ashland
Hinman, H. T.	Eureka
Hiniker, A. J.	Goldfield
Hipkins, Henry	San Francisco
Hirth, C. E.	Vernal, Utah
Hirtz, N. F.	Los Angeles
Hoagland, W. W.	Los Angeles
Hocker, J. M.	San Francisco
Hodgen, J. D.	San Francisco
Hodges, G. A.	Turlock
Hoffer, Virgil	Santa Rosa
Hofleng, Fred	
Holcomb, C. L.	Kingsburg
Holcombe, J. D.	Globe, Ariz.
Holden, S. R.	Duluth, Minn.
Holladay, A. C.	Long Beach
Holladay, W. R.	Los Angeles
Holland, F. E.	Woodland
Hollingsworth, M. W.	Santa Barbara
Hollingsworth, R. M.	Monterey
Holloway, E. S.	Colusa
Holman, F. D.	Los Angeles
Holmes, C. A.	Seattle, Wash.
Holmes, L. B.	Fairbanks, Alaska
Homan, W. W.	Los Angeles
Honodel, W. R.	Chico
Hooker, A. H.	San Diego
Hooker, A. O.	San José
Hooper, Harry	San Francisco
Hopkins, E. L.	Fresno
Hopkins, J. C.	Los Angeles
Hosmer, Ernest	Los Angeles
Houck, F. H.	Anaheim
Howard, E. G.	Los Angeles
Howard, E. J.	Launceston, Tasmania
Howard, J. L.	Marysville
Howard, O. J.	Fresno
Howatt, A. B.	Chicago, Ill.
Howatt, G. A.	Scotia
Howe, A. B.	Berkeley
Howe, E. B.	Riverside
Houston, R. B.	Calexico
Hubbard, G. A.	San Francisco
Hubbell, A. B.	Santa Rosa
Huddle, W. F.	Los Angeles
Huddy, G. H.	Honolulu, T. H.
Hudgens, A. L.	Tonopah, Nev.
Huebner, O. C.	Healdsburg
Huff, W. F.	Riverside
Hughes, W. R.	Alameda
Hullinger, A. J.	Fresno
Hultberg, F. L.	San Francisco
Humelbaugh, A. C.	Los Angeles
Humphrey, J. G.	Alameda
Hunger, F. J.	Sacramento
Hunsaker, A. L.	
Hunsaker, G. W.	Arroyo Grande
Hunter, G. E. Lamberson	Oakland
Hunter, O. R.	Oakland
Hurd, E. L.	Hoquiam, Wash.
Hurd, E. M.	Portland, Ore.
Hursch, R. L.	San Francisco
Hurtt, J. M.	Pomona
Hus, F. L. M.	Oakland
Husted, F. R.	San José
Husted, G. B.	Modesto
Hutchason, C. B.	St. Joseph, Mo.
Hutchason, W. E.	Los Angeles
Hutchins, J. M.	San Francisco
Hutchison, J. E.	El Dorado

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Hutton, J. A. D.	Berkeley
Hyatt, Frank	Los Angeles
Hyde, E. C.	Los Angeles
Ingalls, R. E.	Fort Leavenworth, Kan.
Ingersoll, A. E.	Eureka
Inglehart, T. N.	San Ffancisco
Irgens, L. S.	Oakland
Ironside, F. A.	Butte, Mont.
Irving, A. E.	Los Angeles
Isacson, S. W.	San Francisco
Ivey, J. R.	Nevada City
Jacobs, F. O.	San Francisco
Jackson, J. A.	San Francisco
Jackson, W. N.	San Francisco
Jaegeling, J. P.	San Francisco
James, E. P.	Oakland
Janes, R. K.	Pasadena
Janke, W. E.	San Francisco
Jarvis, C. C.	Los Angeles
Jarvis, C. F.	Oakland
Jeffery, J. A.	San Francisco
Jenkins, F. M.	San Bernardino
Jennings, G. P.	Watsonville
Jessup, A. A.	Boise City, Idaho
Jessup, A. H.	Whittier
Jewell, A. A.	Oakland
Jewett, Stanley	Marysville
Johnson, F. D.	Oakland
Johnson, J. H.	
Johnson, J. H.	Waukon, Iowa
Johnson, J. W.	Portland, Ore.
Johnston, G. K.	Santa Maria
Johnston, Robt.	Eureka
Jones, C. V.	Sonora
Jones, Ellis	San Francisco
Jones, E. L.	Stockton
Jones, E. M.	San Francisco
Jones, H. McK.	Pomona
Jones, J. C.	San Francisco
Jones, L. D.	San Diego
Jones, L. G.	San Diego
Jones, P. C.	Fort Bragg
Jones, P. C.	San Francisco
Jones, T. R.	San Francisco
Jordan, H. L.	
Jordan, Minnie E.	Los Angeles
Josselyn, A. D.	Chicago, Ill.
Jurgens, C. H.	Oakland
Justice, J. A.	Los Angeles
Kanouse, J. G.	Los Angeles
Kaschedin, N.	Los Angeles
Kauffung, L. H.	San Francisco
Kaufmann, E. H.	San Francisco
Keagy, J. M.	San Pedro
Keeffe, E. D.	San Francisco
Keel, C. W.	Monticello, Ill.
Keene, H. H.	San Francisco
Keene, J. M.	Medford, Ore.
Keesing, J. B.	San Francisco
Keller, P. W.	Long Beach
Kelley, G. F.	Truckee
Kellogg, A. C.	San Francisco
Kelly, A. G.	San Francisco
Kelly, N. D.	San Francisco
Kemp, B. P.	Suisun City
Kemp Van Ee, F.	San Francisco
Kempe, M. V.	Oakland
Kennedy, A. S.	
Kennedy, W. F.	Los Angeles
Kenney, I. B.	Eagle Bend, Minn.
Kenworthy, L.	San Leandro
Keogh, Joseph Benj.	San Francisco
Kerley, W. A.	Los Angeles
Kertchem, D. J.	Stockton
Kerwin, L. J.	Sunnyvale
Kestler, F. S.	Sacramento
Ketchem, E. T.	Santa Maria
Key, J. W.	San Francisco
Key, T. B.	Hanford
Keys, T. R. E.	San Francisco
Kimerer, L. L.	Wheatland
Kincaid, C. F.	Colfax, Wash.
King, Berdine	Gridley
King, H. C.	Tonopah, Nev.
King, J. F.	Oakland
King, John J.	Los Gatos
King, J. S.	Banning
King, L. A.	Oakland
King, W. Z.	San Francisco
Kinley, F. J.	Healdsburg
Kirby, A. H.	Los Angeles
Kirk, H. M.	Pasadena
Kirkpatrick, H. C.	Santa Cruz
Kirkwood, I. S.	Price, Utah
Kitchen, M. Edna	Santa Cruz
Kleeman, F. C.	Oakland
Klein, N.	Santa Cruz
Kleiser, G. W.	San Francisco
Kleiser, J. A.	San Francisco
Kline, A. E.	Marysville
Knepper, G.	Los Angeles
Knowles, C. W.	San Francisco
Knowles, S. E.	San Francisco
Knowles, W. A. L.	San Francisco
Knowlton, J. S.	San Francisco
Knox, A. J.	San Francisco
Knox, H. B.	Oakland
Koehler, Frank	
Kriechbaum, G. H.	Los Angeles
Kroech, E. C.	Los Angeles
Kroeck, P. H.	San Francisco
Krueger, O. F.	Healdsburg

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Kumle, Lambert	Dixon
Kuns, C. A.	Los Angeles
Kuster, C. F.	Seattle, Wash.
Kutch, A. J.	Los Angeles
La Baree, W. H.	Oakland
Lackey, W. L.	Porterville
Lacoste, H. L.	San Francisco
La Force, J. E.	
Lamb, Louis	Benicia
Lancaster, C. E.	So. San Francisco
Lane, C. C.	San Francisco
Lane, C. E.	Lititz, Pa.
Lane, C. S.	Santa Barbara
Lane, F. J.	San Francisco
Lane, N. G. McD.	San Francisco
Lane, R. C.	Los Angeles
Lane, Wm. R.	Lakeport
Lang, J. E.	Oxnard
Langdon, F. C.	Los Angeles
Lape, J. B.	Los Angeles
Larison, C. A.	Yreka
Lassen, J. P.	San Francisco
Latham, H. E.	Philadelphia, Pa.
Latimer, D. H.	Hanford
Laughlin, J. O.	San Francisco
Laughlin, O. A.	
Lauler, C. E.	San Francisco
Lawford, C. D. V.	San Jacinto
Lawrence, W. H.	San Francisco
Lawton, W. J. P.	Reno, Nev.
Learn, H. W.	San Diego
Leavelle, A. B.	Hollywood
Ledyard, B. C.	San José
Ledyard, F. K.	San José
Lee, C. G.	Oakland
Lee, C. M.	San Francisco
Leek, G. W.	San Francisco
Leek, I. G.	San Francisco
Leek, J. J.	San Francisco
Leighton, C. H.	Brooklyn, N. Y.
Lemmon, C. F.	Ventura
Lemon, C. H.	Salinas
Lemon, G. B.	Salinas
Leonard, C. N.	
Leonard, J. G.	Reno, Nev.
Leonhardi, C. J.	
Leong, Faith Sai So	Oakland
Leppo, D. H.	Santa Rosa
Leslie, E. W.	Pasadena
Leslie, R. Y.	Pasadena
Leslie, Wm. W.	Porterville
Letcher, I. W.	San Francisco
Levinger, L. V.	San Francisco
Leviston, F. E.	Oakland
Levkowicz, M. W.	San Francisco
Levy, W. H.	San Francisco
Lewis, M. J.	San Francisco
Lewis, J. W. F.	Calistoga
Lewis, W. F.	Portland, Ore.
Lightcap, S. E.	Mobile, Ala.
Likens, G. W.	Crockett
Likens, J. W.	San Francisco
Lindsay, C. M.	Oakland
Lindsay, J. A.	Sacramento
Lindsey, Chas. M.	Santa Monica
Linscott, L. M.	Santa Cruz
Linscott, W. R.	Santa Cruz
Litchfield, O. J.	Healdsburg
Little, G. B.	Palo Alto
Littler, S. J.	Petaluma
Litton, C. A.	San Francisco
Lochman, O. G.	Los Angeles
Locke, Della M. Johnson	Halfmoon Bay
Locke, F. H.	Oakland
Lockwood, A. T.	Visalia
Logan, W. C.	Astoria, Ore.
Long, G. E.	San Pedro
Lord, C. C.	San Diego
Lord, F. F.	San Francisco
Lord, Mrs. C. B.	
Loring, E. L.	West Berkeley
Louisson, W. S.	Goldfield, Nev.
Lovegrove, W. R.	San Francisco
Lovejoy, F. E.	Petaluma
Lowder, W. D.	Los Angeles
Lowder, W. L.	Los Angeles
Lowers, T. H.	Los Angeles
Lubbock, W. C.	
Lucchetti, A. F.	San Francisco
Luccock, J. P.	Independence
Luce, Geo. J.	San Francisco
Luce, S. T.	Selma
Ludlow, Wm. B., Jr.	Berkeley
Luedke, C. D.	Oxnard
Lundy, E. A.	Los Angeles
Lundborg, K. M.	Lakeport
Lyman, E. H.	San Bernardino
Lynch, T. A.	Downey
Lynn, T. M.	Los Angeles
Lyons, W. C.	Denver, Colo.
Magill, J. C.	San Francisco
Mason, W. M.	Berkeley
Macdonald, A. E.	San Francisco
MacDonald, Flora M.	San Francisco
MacMillan, H. A.	Seattle, Wash.
MacMillan, J. E.	Pasadena
MacMullin, D. A.	Orange
MacNevin, G. M.	Vallejo
Maiden, Wm. R.	Los Angeles
Mail, W. R.	Ocean Park
Maldonado, E.	Los Angeles
Malech, T. G.	

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Mallett, Albert	Stockton
Malone, A. F.	Rio Vista
Malone, G. E.	Dunsmuir
Maltby, B. T.	Long Beach
Manchester, M. R.	
Mancilla, M.	
March, H. D.	Chico
Marckres, C. C.	San José
Mariotte, L. P. A.	Oakland
Marizuya, C. J.	Zuezaltenaugo, C. A.
Markey, C. E.	Pasadena
Marks, L. H.	Oroville
Markwitz, L.	San Francisco
Marsh, C. E.	San Diego
Marshall, L. C.	Vacaville
Martin, Geo.	Berlin, Germany
Martin, F. J.	Oakdale
Martin, F. P.	Alameda
Martin, L. L.	Jackson
Martin, S. D.	
Martin, Todd	Fresno
Martin, Wm.	Linkville, Ore.
Marx, M. L.	San Francisco
Masser, W. H.	
Massie, H. C.	Aetna Springs
Mathis, R. C.	Los Angeles
Matson, A. P.	San Francisco
Matsuda, M.	San Francisco
Matthews, C. F.	
Matthews, E. S.	San Diego
Matthews, J. O. B.	Petaluma
Mauk, E. H.	Alameda
Maunder, P.	
Mayhew, A. B.	Sacramento
Mayhew, W. H.	San Francisco
Maynard, C. C.	San José
Maynard, S. C.	San José
Mazza, Jos. H.	Petaluma
McArthur, J. F.	San Fernando
McAvoy, R. C.	Los Angeles
McBain, Jas. A.	Weaverville
McBean, C. O.	Los Angeles
McBean, W. H.	Redondo
McCabe, Edward	Watsonville
McCan, F. A.	Stockton
McCargar, Richard	Red Bluff
McCarthy, C. J.	San Francisco
McCarthy, J. P.	San Francisco
McCarty, C. H.	Chicago, Ill.
McCarty, W. H.	Chicago, Ill.
McClaskey, F. T.	Susanville
McClinton, Ray	Launceston, Tasmania
McClish, J. M.	Healdsburg
McClure, J. F.	Ukiah
McComb, V. J.	Pine Bluff, Ark.
McCowen, C. S.	Palo Alto
McCowen, Geo.	Ukiah
McCoy, J. C.	Los Angeles
McCoy, J. D.	Los Angeles
McCracken, W. J.	East Auburn
McCurry, J. M.	San Luis Obispo
McDaniel, G. T.	San Francisco
McDermid, John	
McDonald, F. S.	
McFadyen, A.	San Francisco
McFarland, G. H.	San Bernardino
McFarlin, R. F.	Oakland
McGaughey, C. W.	Oroville
McGough, James A.	Weaverville
McGovern, J. C.	San Francisco
McGowan, J. E.	Pomona
McGowan, J. L.	Monterey
McGraw, D. F.	San Francisco
McHargue, W. H.	Colton
McIntire, A. A.	Palo Alto
McIntyre, T. W.	
McKay, W. W.	Philadelphia, Pa.
McKean, N. D.	Alameda
McKenzie, A. W.	San Francisco
McKenzie, T. W.	Randsburg
McKellops, H. L.	St. Louis, Mo.
McKinney, C. W.	Newcastle
McLain, A. F.	
McLaren, J. A.	
McLaughlin, G. V.	San Francisco
McLaughlin, W. F.	San Francisco
McLeod, A. D.	Los Angeles
McLernon, T. J.	Cleveland, O.
McMahon, L. J.	San Francisco
McMath, J. F. O.	Oakland
McMurray, Milton	San Francisco
McNeil, H. A.	Virginia City, Nev.
McNutt, R. B.	Chicago, Ill.
McQueen, J. S.	Bishop
McQuilkin, E. R.	Pacific Grove
McQuitty, W. A.	San Francisco
McWilliams, W. L.	Mt. Jewett, Pa.
Meek, C. A.	Berkeley
Meek, R. W.	Oakland
Mendes, C.	
Menendez, H.	Sonora
Menendez, J. A.	Sonora
Menges, M. A.	Santa Ana
Menken, P. H., Jr.	Sacramento
Menne, W. A.	San Francisco
Menton, H. O. F.	Santa Clara
Meredith, G. H.	San Francisco
Merrill, A. P.	
Merrill, F. B.	Chicago, Ill.
Merriman, A. F., Jr.	Oakland
Merriman, W. C.	Oakland
Merritt, C. H.	Oakland

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Mertes, J. P.	Los Angeles
Mervy, E. T.	San Francisco
Mervy, Mrs. M. V.	Corte Madera
Meseroll, J. M.	Los Angeles
Metcalf, F. H.	Sacramento
Metzger, E. S.	Redondo
Meyer, Albert	San Francisco
Meyer, F. W.	Oakland
Meyer, H. S.	San Francisco
Meyer, P. J.	San Francisco
Meyer, W. A.	San Francisco
Meyer, W. P.	San Francisco
Mhoon, W. J.	San Francisco
Middleton, J. E.	Nevada City
Miles, A. D. E.	Tampico, Mexico
Miles, H. S.	Los Angeles
Millar, R. F.	San Francisco
Millar, J. B. F.	San Francisco
Millard, G. A.	Los Angeles
Miller, G. A.	Los Angeles
Miller, G. E.	San Francisco
Miller, G. G.	Los Angeles
Miller, Herman	San Francisco
Miller, J. A.	Berkeley
Miller, O. L.	San Francisco
Miller, S. W.	Amador City
Miller, W. C.	Los Angeles
Milliken, C. T.	Sacramento
Milliken, G. T.	Elk
Milliken, H. L.	San Bernardino
Milliken, J. D.	Iloilo, Manila, P. I.
Millberry, A. H.	San Francisco
Millberry, G. S.	San Francisco
Minahen, G. E.	Stockton
Minaker, A. W.	San Francisco
Miller, Henley E.	Reno, Nev.
Mills, C. W.	Arcata
Minor, H. E.	Stockton
Minor, I. S.	Eureka
Mitchell, A. B.	Los Angeles
Mitchell, H. C.	Guatemala City, C. A.
Mitchell, M. N.	Martinez
Moad, Mrs. S. R.	Santa Cruz
Mobley, W. G.	Oakland
Mogan, C. J.	San Francisco
Molitor, M. D.	
Monroe, Geo.	Monrovia
Montague, J. S.	Los Angeles
Moody, Kate C.	Los Angeles
Moody, J. D.	Los Angeles
Moore, H. T.	San Francisco
Moore, Harry W.	Ocean Park
Moore, H. W.	Santa Barbara
Moore, J. C. Y.	Chicago, Ill.
Moore, J. E.	Watsonville
Moore, J. O.	San Francisco
Moore, J. S., Jr.	San Francisco
Moore, L. W.	Antioch
Moore, Roy	Mendocino
Moore, R. I.	San Francisco
Moore, T. E.	Berkeley
Moorhead, T. B.	Whittier
Morey, C. L.	Oakland
Morffew, Thos.	San Francisco
Morgan, A. N.	Nevada City
Morgan, Thos. H.	Los Angeles
Mories, A. H.	Alameda
Morris, Amiel	San Francisco
Morris, C. A.	San Francisco
Morris, E. H.	San Francisco
Morris, T. H.	San Francisco
Morris, R. W.	Los Angeles
Morris, W. J.	Redlands
Morrison, E. H.	Pomona
Morrison, J. B.	Pasadena
Morrison, J. W.	Downey
Morse, W. D.	Pasadena
Morton, H. R., Jr.	Berkeley
Morton, R. E.	Dinuba
Mosher, G. E.	Pomona
Mosher, Geo. H.	Los Angeles
Mosher, W. J.	Oakland
Moulton, H. G.	Guatemala City, C. A.
Mueller, A.	Chicago, Ill.
Mulrenin, E. M.	San Francisco
Mulvihill, D. F.	San Franciscco
Mundell, W. A.	San Francisco
Mungen, W. W.	Los Angeles
Munson, V. W.	Quincy, Ill.
Murchie, D. H.	Nevada City
Murphy, Chester V.	Boulder Creek
Murphy, R. N.	San Francisco
Musselman, D.	Madison
Myers, O. P. H.	San Francisco
Nash, D. E.	San José
Neblett, J. W.	Riverside
Neel, R. E.	Long Beach
Neel, W. E.	Los Angeles
Nelson, R. W.	San Luis Obispo
Nelson, W. H.	San Luis Obispo
Neto, Jos. R.	Point Arena
Nevius, G. F.	San Francisco
Neubauer, F.	San Francisco
Newell, E. W.	Searchlight, Nev.
Newgarden, Chas.	New York, N. Y.
Newkirk, Garrett	Pasadena
Newman, H. C.	Los Angeles
Newton, Ernest	Fort Jones
Nichols, L. E.	Los Angeles
Nicolai, Chas. J.	San Francisco
Noble, C. G.	San Francisco
Noble, C. S.	Arroyo Grande

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Noble, H. D.	San Francisco
Nordlund, W. J.	Oakland
Norman, Ida B.	Los Angeles
Novitzky, J. F.	San Francisco
Nuckolls, H. M.	Turlock
Numbers, S. G.	Los Angeles
Oates, J. A.	Compton
O'Brien, E. W.	Grass Valley
O'Brien, J.	Guatemala City, C. A.
O'Connell, F. E.	Seattle, Wash.
O'Connell, G. D.	San Francisco
O'Connell, R. E.	San Francisco
O'Connell, T.	San Francisco
O'Connor, Delia	Buffalo, Ill.
O'Conner, D. L.	Fortuna
O'Connor, J. T.	Sacramento
Ogden, F. R.	Oakland
Ogle, Wm. O.	San Francisco
Ohea, G. H.	San Leandro
Ohhara, T. H.	Japan
Okubo, Ituge	San Francisco
Orella, V. P.	San Francisco
O'Rourke, Wm.	Oakland
Osenburg, E. E.	San Francisco
Ostrom, D. A., Jr.	San Francisco
Packard, C. W.	Riverside
Packard, H. R.	Ontario
Packard, L. M.	Los Angeles
Packson, E. S.	Los Angeles
Pague, F. C.	Oakland
Painter, E. D.	San Francisco
Painter, J. B.	San Francisco
Palmer, A. H.	Pasadena
Palmer, Edgar	Los Angeles
Palmer, F. M.	Los Angeles
Pancoast, F.	San Francisco
Papandre, R. D.	Oakland
Park, E. E.	San Francisco
Parker, C. H.	Los Angeles
Parker, D. S.	
Parker, E. R.	Los Angeles
Parker, Francis M.	Los Angeles
Parker, J. A.	San Francisco
Parker, J. E.	Pasadena
Parker, J. P.	Santa Cruz
Parker, J. Tyler	Pasadena
Parker, W. S.	Los Angeles
Parks, E. C.	Eureka
Parks, L. H.	San Francisco
Parr, E. F.	Berkeley
Parr, W. H.	Yreka
Parsons, J. G.	San Diego
Parsons, P. M.	Oakland
Patterson, A. D.	Visalia
Patton, M. A.	Santa Ana
Payne, C. S.	San Francisco
Payne, R. E.	New York, N. Y.
Peake, Walter,	Bairritz, France
Pearce, B. F.	San Francisco
Pearce, C. H.	San Francisco
Pearce, C. L.	
Pearce, F. B.	San José
Pease, Jos. L.	Oakland
Peel, Jonathan M.	San Francisco
Peck, N. S.	Merced
Pegot, L. C.	Corte Madera
Peiper, E. O.	San José
Peoples, J. W.	Petaluma
Peper, Wm.	San Diego
Pepper, C. F.	Los Angeles
Perkins, E. W.	San Francisco
Perkins, H. F.	Eureka
Perkins, P. J.	San Francisco
Perrault, J. T.	San Francisco
Perren, W. E.	San José
Perry, C. A.	Grass Valley
Perry, E. E.	Ross
Pershing, R. S.	
Pescia, A. F.	San Francisco
Peters, A. B.	San Francisco
Peters, E. K.	Fresno
Peters, Harry C.	Irvington
Peters, Herman C.	Orange
Pfister, Jos.	San Francisco
Philips, R. F.	Los Angeles
Phillips, C. E.	Fresno
Phillips, F. H.	Petaluma
Phillips, G. H.	Hanford
Phillips, H. J.	West Berkeley
Phipps, I. D.	Medford, Ore.
Pickett, Burk	San Diego
Piper, S. L.	San Francisco
Pirkey, F. Z.	Colusa
Pirkey, M.	Willows
Pitres, E.	San Francisco
Pitt, C. S.	Sebastopol
Place, Lloyd M.	Palo Alto
Platt, F. L.	San Francisco
Pless, F. G.	San Francisco
Pless, H. T.	San Francisco
Pletcher, C. B.	Oakland
Plomteaux, H. J.	Oakland
Plunkett, J. A.	Oakland
Polin, O. M.	San Luis Obispo
Pollok, J. H.	
Pomeroy, G. E.	San Francisco
Poole, G. T.	Richmond
Poplin, R. L.	Santa Paula
Porter, C. B., Jr.	San Francisco
Porter, E. M.	Napa
Porter, J. P., Jr.	Angels Camp
Porter, L. C.	Monterey

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Porter, S. P.	Napa
Porter, W. S.	Napa
Porterfield, R. H.	San Francisco
Posner, Milton M.	San Francisco
Pospisiel, Jos.	Washington, D. C.
Post, C. E.	San Francisco
Potter, Fred W.	Redding
Powel, J. N.	
Powell, A. J.	Hayward
Powell, Henry, Jr.	Hayward
Powell, J. D.	Sacramento
Powell, J. N.	San Francisco
Power, R. H.	Berkeley
Prall, J. N.	
Prather, W. R.	Merced
Pratt, A. C.	
Pratt, E. W.	San José
Pratt, F. E.	
Preshaw, R. G.	
Preston, A. P.	Manila, P. I.
Prey, Otto F.	Guatemala City, C. A.
Price, G. W.	Los Angeles
Price, J. T.	Los Angeles
Price, W. E.	Oakland
Prince, A. D.	San Francisco
Pring, E.	San Francisco
Proctor, D. A.	Oakland
Proctor, M. M. S.	Los Angeles
Proll, R. B.	Alameda
Prosser, J. L.	Oakland
Pruitt, Minnie L. (Fisher)	Oakland
Purcell, G. E.	
Pyle, Fletcher S.	San Francisco
Quinne, J. J.	Montgomery Creek
Quirk, T. H.	Vancouver, B. C.
Rabe, John	San Francisco
Rader, G. O.	San Francisco
Ralls, R. F.	Kansas
Ramsey, W. W.	Los Angeles
Randall, C. H.	San Francisco
Rankin, J. H.	Santa Rosa
Rankine, C. M.	Los Angeles
Rannells, A. W.	Los Angeles
Ransom, H. E.	Los Angeles
Rantz, W. A.	Placerville
Ratcliff, A. D.	
Raugh, J. M.	Santa Ana
Rawlins, G. E.	Orland
Raymond, G. W.	Honolulu, T. H.
Rea, C. T.	San Francisco
Rea, F. E.	Ukiah
Rea, John	
Rea, Stanley	
Rea, V. H.	Elgin, Ill.
Read, Emma T.	San Diego
Reading, W. W.	Portland, Ore.
Reamer, H.	Pasadena
Redmond, J. J.	San Francisco
Redmond, J. M.	Arcata
Reed, A. R.	Pomona
Reed, C. W.	Santa Rosa
Reed, J. H.	Lancaster, Wis.
Reed, J. W.	Mexico, Mo.
Reed, U. D.	Los Angeles
Rees, F. G.	Oak Park
Reese, John S.	Oakland
Regnart, P. S.	San José
Regensburger, A. T.	San Francisco
Reich, C. L.	Ingleside
Reid, H. E.	Reno, Nev.
Reid, T. B.	Sacramento
Remington, C. L.	
Rendall, R. S.	
Renwick, W. H.	Sacramento
Requa, H. D.	Los Angeles
Reynolds, D. L.	Pasadena
Reynolds, H. C.	Palo Alto
Reynolds, P. R.	Santa Ana
Rhoades, R. H.	Manila, P. I.
Rhodes, C. E.	Reno, Nev.
Rhodes, S. R.	San José
Rhone, C. E.	Los Angeles
Rice, C. E.	Los Angeles
Rice, E. V.	Azusa
Richards, C. W.	San Francisco
Richards, H. G.	San Francisco
Richards, W. F.	Sacramento
Richards, W. H.	Santa Cruz
Richards, W. P.	So. Pasadena
Richardson, C. C.	Chico
Richardson, E. E.	Berkeley
Richardson, E. M.	San Francisco
Richardson, G. L.	Santa Paula
Ricks, C. C.	Los Angeles
Rietzke, G.	San Francisco
Rinckel, E. J.	Butte, Mont.
Rinebold, J. J.	Etna Mills
Ritz, Royal A.	
Roberts, D. E.	Murphys
Roberts, J. M.	Los Angeles
Roberts, N. J.	Waukegan, Ill.
Roberts, S. H.	San Francisco
Robertson, John	San Francisco
Robinson, F. A.	Los Angeles
Robinson, F. O.	San José
Robinson, R. D.	Los Angeles
Robinson, W. H.	Alameda
Roche, G. W. W.	San Francisco
Roche, H. N.	San Francisco
Rodden, G. F.	San Francisco
Rodgers, H. B.	Watsonville
Rodolph, C. T.	San Francisco

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Rodolph, F. E.	San Francisco
Rodolph, G. W.	San Francisco
Rogers, E. J.	Bridgeville
Rogers, Guy	Bakersfield
Rogers, Thos. L.	Berkeley
Rogers, W. W.	Pasadena
Rohner, Frank	Napa
Rohrer, E. J.	Nevada
Roller, Anna D. (Joost)	San Francisco
Roller, O. P.	Los Angeles
Romaine, C.	Los Angeles
Ronna, Julius	San Bernardino
Rood, R. A.	San Diego
Root, C. B.	Fresno
Root, W. A.	Sacramento
Roper, W. J.	Prescott, Ariz.
Rose, F. N.	San Francisco
Ross, Donald H.	Los Angeles
Ross, J. R.	Los Angeles
Rossiter, V. A.	Los Angeles
Roth, L. J.	Los Angeles
Roudebush, L. F.	Los Angeles
Rowand, J. T.	
Rule, R. W.	Oakland
Rulison, D. W.	Reno, Nev.
Rulison, F. J.	Susanville
Rulison, H. M.	Reno, Nev.
Rulofson, A. C., Jr.	San Francisco
Ruttan, G. M.	
Ryan, H. G.	San Francisco
Sabichi, J. R.	Los Angeles
Sabin, C. R.	Calistoga
Salisbury, S. E.	Monrovia
Salmon, Wm. S.	San Francisco
Samuels, L. G.	San Francisco
Sanderson, A. L.	San Mateo
Sandford, L. N.	San Francisco
Sands, D. S.	Los Angeles
Sanger, I.	Manila, P. I.
Saul, O. M.	Los Angeles
Savage, A. H.	Pasadena
Savage, C. W.	Santa Rosa
Savage, F. L.	Livermore
Savage, Henry	
Savage, S. L.	Livermore
Sawhill, F.	McDonald, Penn.
Sawyer, F. E.	San Rafael
Saxby, J. B.	Santa Barbara
Saxe, F. J.	Oakland
Scannavino, John A.	San Francisco
Schacht, C. W.	Jackson
Schaefer, S. G.	Los Angeles
Schafhirt, J. B.	Los Angeles
Scheier, R. B.	San Francisco
Schenck, R. E.	South Bend, Wash.
Scheu, R. E.	San Francisco
Schiffman, A. F.	Los Angeles
Schiller, Maurice	San Diego
Schillig, G. E.	Marysville
Schlott, E. F.	San Francisco
Schmidt, C. W.	Oakland
Schmidt, G. L.	Oakland
Schneider, Joe	San Salvador, C. A.
Schott, W. E.	Berkeley
Schroeder, E. R.	Alameda
Schroeder, H. C. H.	San Francisco
Schroeder, R. A.	Los Angeles
Schultheis, C. F.	Oakland
Schultze, E. H.	San Francisco
Schumacher, F.	San José
Schumer, A. C.	Oakland
Schwaner, W. F.	Oakland
Schwarz, Chas. G.	Oakland
Scott, C. W.	Fruitvale
Scott, E. F.	Hollister
Scott, E. S.	Noyo
Scott, E. W.	Berkeley
Scott, F. T.	Sacramento
Scott, J. H.	Sacramento
Scott, M. E.	Berkeley
Scott, W. K.	Alameda
Scudder, R. C.	Los Angeles
Seager, H. L.	San Francisco
Seely, M. J.	San Francisco
Sehorn, W. A.	Oakland
Seibel, P. H.	San Francisco
Seiferd, F. J.	San Francisco
Semler, Ludwig	Encampment, Wyo
Sevier, L. R.	Los Angeles
Sexton, C. J.	San Francisco
Seydel, F. W.	Chico
Shankey, W. G.	San Francisco
Sharp, G. C.	Los Angeles
Sharp, J. G.	San Francisco
Sharp, W. F.	San Francisco
Shartel, W. W.	Cedarville
Shaw, A. A.	Los Angeles
Shaw, F. I.	Seattle, Wash.
Shaw, H. H.	China
Shaw, I. G.	Sacramento
Shaw, J. F.	Nevada City
Shellhorn, A. L.	Los Angeles
Shepard, E. P.	San Diego
Shepard, S. B.	Oakland
Shepard, Wm.	Alameda
Shepherd, G. F.	Anderson
Shepherd, Harris B.	Los Angeles
Sheppard, H. M.	San Francisco
Sheppard, R. H.	Redding
Sheriff, E. W.	San Diego
Sherman, C. A.	Los Angeles
Shields, J. E.	San Diego

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Shiina, T.	Los Angeles
Shoaff, W. R.	Los Angeles
Shoemaker, R. H.	Pasadena
Shores, F. W.	Oakland
Short, E. N.	San Francisco
Shuey, G. E.	Oakland
Shumard, E. C.	Laton
Sibley, R. R.	Oakland
Sibley, W. E.	Los Angeles
Sichel, G. W.	San Francisco
Sichel, Henry	San Francisco
Sichel, Henry, Jr.	San Francisco
Sichel, Leo	San Francisco
Sieberst, W. H.	New York, N. Y.
Simms, J. B.	Arcata
Simms, T. F.	Modesto
Simmons, B. F.	San Leandro
Simmons, W. A.	Represa
Simmons, W. H.	Oakland
Simons, B. R.	Philadelphia, Pa.
Simpson, A. L.	San Francisco
Simpson, G. W.	Santa Barbara
Simpson, J. H.	Hayward
Simpson, Jennie M.	
Singleton, W. E.	Santa Ana
Sisson, E. K.	San Mateo
Skillen, R. G.	Pasadena
Skinner, C. G.	Los Angeles
Sloan, J. H.	Los Angeles
Sloat, C. F.	Corralitos
Small, H. E.	Los Angeles
Small, J. L.	Palo Alto
Smith, A. D.	Los Angeles
Smith, A. L.	Monrovia
Smith, C. C.	San Bernardino
Smith, C. D.	Angels Camp
Smith, C. H.	Cloverdale
Smith, C. L.	Tulare
Smith, F. J.	San José
Smith, G. H.	Sausalito
Smith, H. O.	Sacramento
Smith, Harry D.	Alameda
Smith, Henry Stephen	San Diego
Smith, Horace A.	Los Angeles
Smith, Hulbert S.	Kirkwood, Mo.
Smith, J. F.	
Smith, John F.	Forest Hill
Smith, Judson G.	Los Angeles
Smith, J. Leroy	Woodland
Smith, J. McC.	Manhattan, Nev.
Smith, M. E.	San Francisco
Smith, N. R.	Santa Monica
Smith, R. E.	Sacramento
Smith, Robt. E.	Santa Rosa
Smith, Sydney A.	San Diego
Smith, T. M.	San Francisco
Smith, T. Sidney	Palo Alto
Smith, Uriel	Sacramento
Smith, W. Albert	Los Angeles
Smith, Wm. C.	Pasadena
Smith, W. O.	Brooklyn, N. Y.
Smyth, T. U.	San Francisco
Smyth, W. J.	Oakland
Snavely, A. C.	Los Angeles
Snavely, M. E.	Los Angeles
Snell, A. T.	Los Angeles
Snook, J. C.	National City
Snow, F. T.	San José
Snyder, G. A.	San Luis Obispo
Sobey, Arthur L.	Berkeley
Sobey, A. W.	San Francisco
Soher, H. C.	San Francisco
Solley, A. A.	San Francisco
Somerville, J. A.	Los Angeles
Sontheimer, A. R.	San José
Southworth, S. S., Sr.	Bolinas
Southworth, S. S., Jr.	San Francisco
Sparks, A. E.	Alameda
Sparks, E. F. K.	Los Angeles
Sparhawk, E. E.	Oakland
Sparrevohn, H. R.	Los Angeles
Spates, A. P.	Los Angeles
Spear, T. R.	San Francisco
Speer, A. H.	Long Beach
Speer, Geo. B.	Los Angeles
Spence, S. J.	Chattanooga, Tenn.
Spencer, Roy L.	Los Angeles
Spicer, P. F.	Manti, Utah
Spiess, G.	San Francisco
Spinks, A. M.	Los Angeles
Spinks, M. E.	Los Angeles
Spinks, W. H.	Los Angeles
Sprague, Geo. H.	Los Angeles
Sprake, W. T.	San José
Spratt, C. W.	Weaverville
Squier, R. M.	Napa
Staire, H. M.	Ventura
Staire, J. M.	Ventura
Stalder, J. M.	Oakland
Stallman, G. E.	San Francisco
Stambaugh, C. D.	Los Angeles
Stanford, G. G.	San Francisco
Stanton, J. C.	Fairfield
Stapff, F. W.	San Francisco
Stare, Chas. B.	Los Angeles
Stark, T. A.	San Francisco
Stauter, C. E.	Los Angeles
St. Clair, J. A.	Newman
Stealey, T. S.	San Francisco
Steele, Dan L.	Myrtle Point, Ore.
Steele, Judge F.	Visalia
Steinwand, A. R.	Selma

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Stephens, C. J.	San Francisco
Stephens, H. A.	
Stephens, H. H.	
Stephenson, Harley H.	Sacramento
Stern, H. S.	San Francisco
Stern, Leslie	St. Helena
Stevens, A. J.	Los Angeles
Stevens, C.	Los Angeles
Stevens, F. E.	Los Angeles
Stevens, F. N.	
Stewart, C. L.	Grass Valley
Stewart, J. H.	Downey
Stewart, R.	Quincy
Stich, Benj. M.	San Francisco
Stickel, J. L.	San Francisco
Stickney, F. W.	Santa Barbara
Stiles, Henry	San Francisco
Stine, F. M.	
Stineman, J. H.	Roseville
Stinson, C. G.	Santa Barbara
Stirling, M. G. Fitzpatrick	San Francisco
Stoakes, F. C.	Hayward
Stocking, C. H.	Los Angeles
Stofflet, J. H.	Bishop
Stokes, A. W.	San Francisco
Stokes, F. R.	San Francisco
Stokes, T. P.	San Francisco
Stoll, B. F.	San Francisco
Stone, J. T.	Petaluma
Stone, W. W.	Placerville
Strasser, J. E.	Los Angeles
Strickland, S. L.	San Francisco
Strub, C. H.	Sacramento
Stryker, W. C.	Pasadena
Stuart, S. L.	Ventura
Sturgis, Mrs. A. M. S.	Manila, P. I.
Stuttmeister, W. O.	Redwood City
Suggett, A. H.	Marysville
Sullivan, A. S.	San Francisco
Sullivan, H. F.	Oakland
Sullivan, J. L.	Marysville
Sullivan, J. P.	San Francisco
Sullivan, M. J.	San Francisco
Sullivan, T. X.	San Francisco
Summers, R. A.	Oakland
Sumner, C. M.	Placerville
Swain, E. M.	San Francisco
Swain, Homer	Chico
Swain, H. P.	San Francisco
Swanberg, N. A.	Seattle, Wash.
Swartwout, L. D.	Los Angeles
Sweet, W. S.	Long Beach
Sweetser, L. O.	San Francisco
Swigert, G. O.	Udall, Kan.
Sykes, A. E.	Oakland
Sylvester, A. J.	San Francisco
Sylvester, C. W.	Los Angeles
Sylvester, H., Jr.	San Francisco
Symington, W. H. L.	Santa Monica
Symmons, S. J.	Oakland
Switser, Anna	
Taber, M. E.	Riverside
Taft, F. D.	San Francisco
Taggert, John E.	Burlington, Vt.
Tait, E. R.	Oakland
Tait, J. E.	San Francisco
Takagi, B. S. N.	Los Angeles
Talbott, H. I.	Goldfield, Nev.
Tate, A. W., Jr.	Watsonville
Tate, S. P., Jr.	Oakland
Taylor, A. Q.	Los Angeles
Taylor, A. W.	Berkeley
Taylor, C. G.	San Francisco
Taylor, F. S.	Los Angeles
Taylor, J. M.	
Taylor, R. L.	San Anselmo
Taylor, W. E.	Alameda
Taylor, W. J.	Sacramento
Taylor, W. N.	Fruitvale
Teague, Fred	Oakland
Teague, L. A.	Fresno
Tennyson, C. B.	Lodi
Tennyson, H. A.	San José
Terry, C. H.	San Francisco
Terry, T. D.	San Francisco
Thatcher, J. W.	San Francisco
Theller, E. A.	Berkeley
Theller, S. S.	Oakland
Therkof, Geo. A.	Livermore
Therkof, G. H.	San Francisco
Thomas, A. J.	Sacramento
Thomas, C. L.	Los Angeles
Thomas, Jas. Robert	Ukiah
Thomas, H. B.	Smith's Grove
Thomas, Montgomery	Fresno
Thomas, W. G.	Grass Valley
Thompson, R. P.	
Thornburg, F. S.	Pasadena
Thrailkell, W. O.	
Thurston, J. H.	Los Angeles
Tibbetts, A. L.	Petaluma
Tibbitts, A. G.	Los Angeles
Timerman, E. C.	Oakland
Timmons, A. J.	Yreka
Titcomb, C. B.	
Tizzard, S. B.	Los Angeles
Tobriner, Oscar	San Francisco
Todd, Baxter	Los Angeles
Todd, C.	Sacramento
Todd, P. I.	Los Angeles
Todd, R. A.	Corona
Tolhurst, G. W.	Los Angeles

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Tolhurst, S. H.	Los Angeles
Tolton, C. J.	Sacramento
Tomkins, G. H.	East Oakland
Tomlinson, C. McR.	Eureka
Tope, John H.	
Toprahanian, A. G.	San Diego
Toprahanian, H. G.	New York, N. Y.
Townsend, E. L.	Los Angeles
Townsend, J. R.	Pasadena
Townsend, Wilbur	Los Angeles
Toye, W. O.	San Francisco
Toyson, Leroy	Vacaville
Trafford, H. L.	Los Angeles
Travers, H. P.	Oakland
Treen, Robt. de G.	Los Angeles
Treen, T. O.	Los Angeles
Tremper, R. H.	Ontario
Treyer, E. J.	Oakland
Tristram, G. T.	Chicago, Ill.
Trueman, H. G.	San Francisco
Truesdell, E. C.	Los Angeles
Truitt, S. P.	Lompoc
Trumpour, J. P.	San Francisco
Tryon, W. M.	San Francisco
Tucker, A. C.	Los Angeles
Tucker, I. L.	Oroville
Tudor, J. P.	
Tufts, J. B.	San Francisco
Tufts, Le Roy	Berkeley
Turner, H. C.	San Andreas
Turner, R. L. H.	Los Angeles
Turner, P. T.	Stockton
Turner, W. A.	San Luis Obispo
Twiggs, W. A.	San Francisco
Twist, J. F.	San Francisco
Ulsteen, E. A.	Oakland
Uhl, W. T.	Los Angeles
Unland, T. H.	Los Angeles
Updyke, R. P.	Compton
Upham, F. F.	Dixon
Upton, E. A.	Oakland
Usher, C. W.	San Francisco
Urmy, H. N.	Los Angeles
Van Amringe, D. R.	Sonoma
Van Crom, A. L.	Upland
Vanderhurst, A. S.	Monterey
Vanderlip, G. G.	San Rafael
Vanderlip, J. T.	San Francisco
Vandever, G. Y.	San Francisco
Van Meter, W. H.	
Van Orden, G. N.	San Francisco
Van Orden, L.	San Francisco
Van Vleck, J. D.	Los Angeles
Van Wormer, E. B.	Upland
Van Wyck, Crittenden	San Francisco
Vawter, M. B.	San Diego
Veale, A. F.	San Francisco
Vecki, V. J.	Danville
Verrinder, A. E.	Victoria, B. C.
Vicary, E. E.	Oakland
Victor, E. R.	Bakersfield
Viersen, L. A.	Santa Ana
Viney, A. W.	Pasadena
Vogel, Thos. A.	San Francisco
Vogelman, D. J.	Vallejo
Voorhies, G. L.	Vallejo
Vorwald, T. F.	Dubuque, Iowa
Wachhorst, N. B.	San Francisco
Wachs, M.	Oakland
Wadleigh, W. M.	Ely, Nev.
Wadsworth, W. H.	Berkeley
Waggoner, Lloyd B.	Sacramento
Wagner, A. C. F.	San Francisco
Wagner, R.	Los Angeles
Wait, R. L.	Sacramento
Walden, W. A.	Stockton
Walk, C. L.	Oakland
Walk, Jasper J.	Oakland
Walker, G. H.	Los Angeles
Walker, J. T.	
Walker, Lu Ella (Cool)	Oakland
Wall, A. C.	Honolulu, T. H.
Wallace, Andy C.	San Francisco
Wallace, A. H.	Oakland
Wallace, L. E.	San Francisco
Wallace, W. G.	Stockton
Walsh, J. W.	Oakland
Walsh, R. L.	San Francisco
Walsh, W. E.	San Diego
Walton, P. J.	Fruitvale
Walton, S. L.	San José
Walton, W. McK.	San Francisco
Wanberg, G. E.	Marshalltown, Ia.
Ward, A. W.	San Francisco
Ward, H. B.	San Francisco
Ward, J. N.	Auburn
Wardlaw, H. J.	Los Gatos
Ware, Wm. H.	Manila, P. I.
Warnekros, W. L.	Santa Barbara
Warner, A.	San Francisco
Warner, John	
Washer, W. A.	
Wasley, D. W.	Chico
Wassman, Max	San José
Wasson, J. C.	San José
Waterbury, J. E.	Pizmo
Waterman, E. R.	Copperopolis
Watkins, Annie R.	Los Angeles
Watkins, F. D.	St. Helena
Watkins, W. H.	Oakland
Watson, S. E.	San Diego
Watts, L. W.	Oakland

REGISTER OF LICENSED DENTAL PRACTITIONERS—Continued.

Name.	Place of Practice.
Wayne, A. F.	Redlands
Weaver, C. R.	Gilroy
Webber, P. A.	Sacramento
Webster, F. E.	Suisun
Weisbach, L. C.	San Francisco
Weldon, C. A.	Vacaville
Weldon, E. J.	Sacramento
West, J. A.	
West, John A.	Los Angeles
West, Raleigh C.	Tracy
West, Russell C.	Arbuckle
Weston, C. S.	Oakland
Weston, W. H.	Australia, N. Z.
Westphal, E. W.	San Francisco
Westphal, O. F.	San Francisco
Weyer, G. A.	Modesto
Wheeler, T. R.	San Francisco
Whelan, W. A.	San Francisco
Whelan, W. F.	Santa Monica
Whitcomb, N. T.	San Francisco
Whitcombe, S. E.	San Francisco
White, A. L.	San Francisco
White, G. A.	Santa Barbara
White, C. M., Jr.	Chico
White, H. C.	Benicia
White, J. M.	Los Angeles
White, J. R.	Los Angeles
White, L. L.	Junction City, Ore.
White, R. W.	Eureka
Whitman, E. W.	Oakland
Whitnack, C. A.	
Whitney, E. O.	Seattle, Wash.
Whittaker, E. E.	Fresno
Whitted, Chas.	Santa Ana
Whitted, R. E.	Santa Ana
Whomes, Arthur	Los Angeles
Whomes, George	Los Angeles
Whomes, R. W.	Los Angeles
Wieder, J. E.	San Francisco
Wilbur, P. S.	Bakersfield
Wilcox, W. C.	Stockton
Wilcox, W. I.	San Francisco
Wilcoxon, C. R.	Woodland
Wild, M. C.	Piqua, O.
Wilder, D. R.	Los Angeles
Wiley, J. N.	
Wilkins, F. E.	Oakland
Wilkins, P. J.	Colusa
Williams, Carlos	Lincoln
Williams, C. C.	Fresno
Williams, C. E.	Los Angeles
Williams, E. G.	Oakland
Williams, Ernest Guy	Lodi
Williams, J. J.	Pacific Grove
Willard, S. S.	Corona
Willoughby, C. E.	Santa Barbara
Willsey, T. F.	Napa
Wilson, C. H.	
Wilson, Chas. W.	San Francisco
Wilson, H. D.	Los Angeles
Wilson, J. F.	Jackson
Wilson, M. W.	
Wilson, O. T.	Oakland
Wilson, W. C.	Huntington, Pa.
Wilson, William Christopher	Gridley
Wing, Geo.	Ferndale
Wing, Wm.	Eureka
Wise, Chas. F.	Oakland
Wise, Fannie E.	Oakland
Wismer, P.	San Francisco
Wolf, F. O.	Yokohama, Japan
Wolfe, F. DeK.	Fresno
Wood, A. B.	
Wood, C. C.	Oakdale
Wood, Wm.	Sacramento
Woodward, W. S.	New York, N. Y.
Wool, R. E.	Ocean Park
Woolsey, E. G.	Ione
Woolsey, R. I.	Berkeley
Worral, G. H.	Santa Clara
Worthington, M. M.	Bakersfield
Worthley, A. H.	Arbuckle
Wren, J. S.	Loyalton
Wright, A. O.	Oakland
Wright, B. E.	Portland, Ore.
Wright, P. B.	Milwaukee, Wis.
Wright, R. B.	Oakland
Wright, W. S.	Lompoc
Wuillemin, P. M.	Oakland
Wyatt, M. O.	Winters
Wymore, G. H.	Santa Rosa
Yant, G. A.	San José
Yant, Henry	Leadville, Colo.
Yates, L. G.	Santa Barbara
Yemen, J. P.	Yuma, Ariz.
Young, C. E.	San Francisco
Young, H. G.	San Francisco
Young, J. A.	San Diego
Young, J. E.	San Francisco
Young, J. R.	Chico
Young, Robt. Jas.	Tulare
Younger, E. A.	San Francisco
Younger, W. J.	Paris, France
Yount, G. B.	Redwood City
Zeigler, C. L.	San Francisco
Zeller, M. J.	San Francisco
Zesch, L. Von M.	San Francisco

DECEASED LICENTIATES.

dams, Q. L.
rbeely, H. J.
rnold, Otto
ustin, H.
aldwin, F. M.
ates, B. F.
aynes, H. F.
eers, Barrett
elden, R. K.
endix, C. W.
ernard, Geo.
ernard, H. A.
ertrand, E. H.
irge, J. J.
lake, C. E.
lake, R. J.
londin, Arthur
lood, J. N.
olton, Thomas
ometter, Frank
otsford, George
owles, J. B.
oyd, C. W.
oyd, G. H.
rewer, John L.
riggs, C. M.
righam, K. A.
Brower, R. C.
ryan, A. C.
urch, M. A.
urleson, F. D.
urnette, E. F.
afferato, A.
aldwell, F. M., Sr.
ard, I. D.
ard, W. H.
ase, G. A.
ase, I. M.
avanaugh, C. S.
lark, F. N.
lark, M. E.
ogswell, J. L.
ole, R. E.
ombs, H. M.
ook, Israel
ool, W. P.
ooper, G. W.
opsey, A. N.
Cranz, F. H.
Croone, Wm.
Cutlar, R.
Davenport, A. C.
DeCrow, Warren
Dempster, Jas.
Dennis, S. W.
Dentler, E. F.
Dick, W. A.
Dohrman, W. F.
Domeniconi, Jas.
Dorrance, F. C.
Doulton, G. H.
Doyle, J. H.
Drucker, W. E.
Dutch, Wm.
Dyer, J. J.
Ellis, P. L.
Emerson, E. W.
Esterle, A. M.
Farmer, E. W.
Farnsworth, J. F.
Fickett, S. H.
Finigan, L.
Fitzpatrick, Wm.
Forbes, W. W.
French, L. W.
Gardinier, Thos.
Gates, O. J.
Gazarian, H.
Gibbon, J. A.
Gildea, B. M.
Goddard, C. L.
Goe, S. E.
Gonzales, I. T.
Goodell, L. E.
Gordon, O. L.
Gould, H. W.
Graham, L. E.
Graves, U. L.
Gray, R. F.
Gray, W. O.
Greenbaum, L.
Griswold, W. F.
Halsey, I. S.
Hann, W. D.
Harlan, C. N.
Harris, S. M.
Hart, A. C.
Hartman, W. P.
Hatcher, S. H.
Hendricks, J. D.
Herron, H. H.
Hitchcock, J. W.
Hodgen, I. N.
Hoffman, M.
Hogshead, W. H.
Hollingsworth, J. W.
Holmes, Stephen
Horner, J. Van C.
Hyde, A. T.
Hyde, C. G.
Jacobs, B. R.
Jenkins, O. C.
Jennin, E. L.
Jessup, J. G.
Jewell, W. S.
Kincaid, S. W.
Kingsbury, W. B.
Kitchen, C. A.
Knapp, A. R.
Knox, H. E.
La Due, W. K.
Lansdowne, F.
Larkin, G. W.
Lawrence, G. O.
Lee, D. B.
Lee, E. W.
Lee, L. A.
Libbey, J. L.
Light, W. W.
Lightbody, H., Jr.
Lillard, W. F.
Little, F. F.
Little, J. R.
Livermore, G. W.
Locke, C. W.
Lovejoy, G. E.
Lucas, D. L.
Lundborg, J. A. W.
Marsh, W. J.
Marshall, Mabel E.
McAlpin, A. C.
McCargar, P.
McGettigan, C. A.
Merriman, A. F., Sr.
Mitchell, H. H.
Moad, B. R.
Moore, C.
Moore, J. S.
Moore, W. A.
Morton, H. R., Sr.
Moterne, C. F.
Moulton, C. R.
Mueller, F. E.
Musselman, S.
Neumann, L.
Newsom, G. W.
Norman, G. H.
Nye, W. E.
Oviatt, S. M.
Parsons, M. W.
Pendleton, B. F.
Pennington, A. R.
Perkins, C. O.
Petton, L. D.
Pierson, H. H.
Porter, J. M.
Porter, J. S.
Prather, W. J.
Quick, E. P.
Rainey, T. H.
Rau, Henry
Ray, C. B.
Read, W. S.
Reith, W. C.
Relley, J. W.
Remington, J. W.
Roberts, H. F.
Rogers, E. P.
Rogers, F. S.
Ross, C. G.
Rubell, W. H.
Russell, E. W.
Sand, J. E.
Saul, G. M.
Schwartzchild, F.
Sheets, H. C.
Shields, F. M.
Shrewsbury, N.
Sichel, Max
Simms, C.
Smith, F. Z.
Smith, J. B. M.

DECEASED LICENTIATES—Continued.

Smith, R. W.
Smith, W. B.
Spaw, C. R.
Stanley, W. H.
Stauffer, H. W.
Stealey, E. M.
Stephenson, C. H.
Strain, E. L.
Sublett, W. A.
Swift, T. E.
Swigert, H. I.
Taggart, D. R.
Tebbets, F. F.
Thrall, H. H.
Tulles, Morgain
Tyson, Chas.
Upchurch, N. B.
Van Aukin, J. R.
Van Winkle, H. M.
Verrinder, R. T.
Vidaver, N. J.
Von Bonhorst, C. G.
Wade, Thos.
Walker, A. J.
Walker, C. H.
Waltz, G. W.
Ward, S. T.
Webster, L. D.
Wells, L. W.
Westover, G. C.
Whipple, T. S.
White, F. H.
Whitlock, Alma
Wilbert, J. L.
Williams, V. A.
Winter, J. W.
Winter, W. G.
Wooley, P. J.

REPORT

OF THE

STATE VETERINARIAN

OF

CALIFORNIA

For the Two Years Ending June 30, 1908.

CHARLES KEANE, State Veterinarian.

SACRAMENTO:
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REPORT OF THE STATE VETERINARIAN.

To His Excellency, J. N. GILLETT,
Governor of California.

DEAR SIR: I respectfully beg leave to submit my report as State Veterinarian for the fifty-eighth and fifty-ninth fiscal years. Unfortunately, on account of the inadequacy of our office force, we are unable to present accurate statistics of the work that has been accomplished through the efforts of this department for the past two years. However, in several lines the results have been very gratifying. I refer especially to cattle tick and sheep scab eradication.

New avenues, whereby this department can be of material assistance to the livestock interests, are being opened up, but this new work must necessarily be, more or less, neglected on account of work on hand. For example, glanders, a most virulent infective disease of equines, and also communicable to man, exists in many counties in this State. Wherever our attention is called to the existence of this disease in any locality, measures are adopted whereby the affected animals are destroyed and surrounding premises cleaned and disinfected. However, this disease is constantly increasing among our horse and mule stock, and this can only be prevented by a systematic course of inspection in the counties in which the disease is known to exist.

The same might be said of the disease known as anthrax. This disease is the cause of extensive fatalities on some of our cattle ranches situated in the Sacramento and San Joaquin valleys. In order to check the further spread of these animal plagues a complete system of veterinary sanitary police must be adopted.

Furthermore, during the early part of the present century several of the New England states were visited by a serious animal plague. I refer to contagious foot and mouth disease, which affects cattle, sheep, hogs, and other animals. Before this disease was finally exterminated the livestock interests in these states suffered serious financial losses. This disease was introduced from Europe, either by means of diseased stock or through intermediate bearers of infection. (At the present writing, November, 1908, foot and mouth disease has again been introduced into New York, Delaware, Maryland, and Pennsylvania from the outside.) California is so situated that it is possible that disease in the shape of animal plagues might at some time be introduced from the Orient, where such diseases devastate livestock. For these reasons it is essential that this department be organized in a manner to combat and exterminate our prevalent diseases and also to prevent, as far as possible, the introduction of exotic diseases.

The day of the large stockowner in California is nearing an end. Already many of the large ranches in the valleys, where for years great herds of cattle, sheep, and horses were kept, are being cut up into smaller tracts. In years past the large ranch owner looked upon the loss of a certain percentage of his livestock as a natural event, and his possessions were so extensive that he did not feel the loss. Not so with the small ranch owner with his fewer number of livestock. He cannot afford to lose any, and a serious loss may cripple him financially. He needs protection and advice, and it is for this purpose that this department was created.

With the cutting up of the extensive land grants into smaller parcels, the work of this department increases. This is well exemplified in the fight to exterminate the cattle tick. For example, the Laguna de Tache land grant, located in the western part of Fresno County, along the Kings River, is tick infested land. For several years past small parcels of this grant have been sold to settlers, the majority of whom conduct dairies. Their cows became infested with the cattle tick, and, instead of the one large infested ranch, we have numbers of small ones. On the large ranches the work of eradicating the ticks is easier, inasmuch as the starvation method can be resorted to; while on the smaller infested ranches the tick must be fought by continued disinfection of the cattle. In order to see that this work is properly done a continual official supervision of the work becomes necessary.

SHEEP SCAB.

In March, 1908, the work of eradicating scabies in sheep was inaugurated by this department. Although improperly equipped for the successful carrying out of a work of this magnitude, it was seen that something should be done to eradicate and check the further progress of this disease. The United States Department of Agriculture, through the Bureau of Animal Industry, was called upon for assistance in the shape of inspectors to coöperate with this department in the work of supervising the dippings of sheep. This assistance was promised to us with the provision that the State of California would do its share of supplying a certain number of inspectors. As we had no appropriation available for such work, the task of requesting the various boards of supervisors, in counties in which sheep are located, to make suitable appropriations in order to pay for the services of State inspectors, was resorted to. On the whole, the various interested counties acted promptly, so that the State was enabled, during the period from March 15th to June 30th, 1908, to place at different times an average of 65 inspectors in the field. The aggregate amount of money appropriated by the different counties was approximately $25,000. While the majority of these men made excellent inspectors, a number of them were inexperienced in this work; consequently, it was some time before they were competent to properly carry on the work in the respective districts to which they were assigned. In the same period of time the Federal Government placed in the field 40 inspectors, many of whom were experienced men in this line of work. The Federal inspectors worked under the supervision of a local inspector in charge.

Before starting the work the Federal inspector in charge and the state veterinarian adopted plans whereby the work would be conducted systematically and thoroughly. It was decided to divide the state into districts and place in charge of each district an experienced federal inspector, who supervised the work of both federal and state inspectors in his respective district. A system of inspectors' reports was issued to the inspectors, and they were required to send these reports to Sacramento on the completion of each day's work. These reports showed in detail the number, condition, location, and owner of the sheep dipped, as well as the kind of parasiticide used in the dipping.

On March 2, 1908, Your Excellency, at the request of the State Veterinarian, issued a proclamation to the effect that between the dates of March 15, 1908, and July 15, 1908, all sheep in the State of California would be required to be dipped by the State Veterinarian or his duly authorized agent, in solutions sanctioned by said officials. It was decided to dip unexposed, clean sheep only once, and sheep exposed to, or infected with scabies, twice. This general dipping of all the sheep in the State was considered necessary in the inauguration of this work on account of the fact that preliminary inspections of flocks in different localities showed that a large proportion of our sheep were infected with scabies. From a compilation of inspection and dipping reports it was shown that about 65 per cent of the entire number of sheep in this state were infected. In some instances this infection was mild, but in many cases the disease was in an advanced stage.

Ideally it would appear that a general dipping, such as our sheep were subjected to, would completely eradicate scab. But in a work of this magnitude it is impossible to get ideal results. However, scabies has been greatly reduced; so much so that the further dipping of clean sheep is not considered necessary. Attention will be paid to infected and directly exposed sheep.

A number of obstacles were met with in the conduct of the work. Feeding conditions were bad. California did not receive her normal quota of rainfall. In the San Joaquin and Sacramento valleys practically no late rains fell. Consequently the feed was short and ripened early. The calls for inspectors to supervise dippings in conformity with the proclamation seemed to come in all together. Sheepmen wished to comply with the regulation and then move sheep to the summer ranges early, in order to get new feeding grounds and to prevent damage to lambs from foxtail. In other places both feed and water were short. Eventually enough inspectors were appointed to attend to all official work.

Following is a summary of the sheep dipped between March 15 and June 30, 1908, showing number of infected and free sheep, as well as the number of sheep dipped once and twice, and the dippings supervised by State and Federal inspectors.

Number of infected sheep	2,278,860	
Number of free sheep	702,761	
		2,981,621
Number of sheep dipped twice	2,243,354	
Number of sheep dipped once	738,267	
		2,981,621
Number of sheep dipped by State inspectors once	260,605	
Number of sheep dipped by State inspectors twice	1,328,900	
		1,589,505
Number of sheep dipped by Federal inspectors once	477,662	
Number of sheep dipped by Federal inspectors twice	914,454	
		1,392,116
		2,981,621
Total dippings by State inspectors	2,918,405	
Total dippings by Federal inspectors	2,306,570	
Total dippings for four months ending June 30, 1908		5,224,975

NOTE.—The discrepancy in the figures between number of infected sheep (2,278,860) and number of sheep dipped twice (2,243,354) is due principally to the fact that after one dipping some of these sheep were sold for slaughter.

While many of the interested counties coöperated with the State in sheep scab eradition work in the spring of 1908, it is very improbable that we will receive the same coöperation throughout 1909. Furthermore, it would be very desirable for the state to have at its command a sufficient number of temporary inspectors in order that this work may be completed as soon as possible. For this reason I would respectfully recommend that an emergency appropriation be granted this department in order to employ ten inspectors for the period between March 1st and June 30th, inclusive, of this fiscal year.

I would also recommend an appropriation of $12,000 to pay for the service and traveling expenses of ten temporary sheep inspectors to serve whenever required during the sixty-first fiscal year, at the end of which time I believe this State will be practically free from sheep scabies.

CATTLE TICK ERADICATION.

The chief efforts of this department for the past two years have been directed to a continuation of the fight against the southern cattle fever tick (Boophilus annulatus). Considering the nature of the work and the antagonism we formerly met with in some sections in the conduct of this fight, the results have been very gratifying. Where we formerly met with considerable opposition, this has now been reduced to a minimum. Several years ago the work of eradicating the cattle tick was considered a hopeless task, even by many of the most intelligent cattlemen. Now, with practically few exceptions, we have the hearty coöperation of the cattlemen in this work and as a result rapid strides have been made in this line.

In his annual report to the secretary of the United States Department of Agriculture for the year 1907, the chief of the Bureau of Animal Industry says, "Such good results were obtained in California (in the eradication of the cattle tick) that an area of about 20,000 square miles was released from quarantine August 1, 1907, and it is believed to be only a question of a short time when the infection in California will be confined to a comparatively small area along the southern coast."

The area of quarantine territory in the United States due to cattle tick infestation, stretches clear across the southern part of the country from California to Florida, omitting Arizona and New Mexico. In all this territory, from January 1 to October 31, 1907, 40,970 square miles of territory were cleaned and removed from quarantine, of which 21,486 square miles were in California.

The importance of exterminating the cattle tick cannot be denied. It is estimated that the losses in the United States, directly and indirectly, due to the cattle tick, amount to more than $25,000,000 annually. In the past, California has shared her quota of this loss. At the present time, however, the loss in California is reduced to a minimum. This is due to the fact that rigid quarantines are maintained on every infested ranch and all infested ranches are in process of cleaning. Furthermore, during the two years last past there has been no extension of the infestation to points outside of the quarantined area, due to maintenance of our state quarantine, which prevents the movements of all cattle from the quarantined area to points outside of same.

In response to our plea the legislature of 1907 wisely enacted a law giving the State Veterinarian authority to seize and disinfect cattle for the purpose of eradicating ticks therefrom in cases where owners refused to follow our instructions. The conferring of this authority upon the State Veterinarian became necessary from the fact that a few recalcitrant owners of tick infested cattle refused to adopt measures to eradicate the ticks on same. Their cattle being immune to Texas fever and not being required to move their stock for feed, quarantines had no effect on them. At the same time surrounding clean ranches were constantly being exposed to infestation. It became necessary to apply this law in several instances, two of which occurred in San Luis Obispo County. In suing one party to collect expenses the state received a decision in the Superior Court of San Luis Obispo County. In the other case the lien was collected without the matter going to trial.

On July 15, 1906, by proclamation issued by the Governor, all of Merced County, including two large ranches that extend over into Madera County, was removed from quarantine.

On February 1, 1907, there was removed from quarantine all that area of territory in Madera and Fresno counties situated east of the right of way of the main line of the Southern Pacific railroad. At the same time Santa Barbara County was placed in the provisionally quarantined area, which allows the movements of cattle from Santa Barbara County at all times of the year after they have been inspected and found free from cattle ticks. The work had progressed so well in this county that the movement of cattle after inspection was considered safe.

On August 1, 1907, there was removed from quarantine Kings, Tulare, Kern, and that portion of San Bernardino County situated east of the one hundred and sixteenth meridian west longitude. On the same date Los Angeles County and that part of San Bernardino County situated west of the one hundred and sixteenth meridian west longitude, were placed in the provisionally quarantined area, from which cattle may be removed at all times of the year after they have been inspected and found free from cattle ticks.

On February 1, 1908, the work of cattle tick eradication had progressed so well in Ventura and Riverside counties that they were also placed in the provisionally quarantined area, from which cattle may be moved at all times of the year after they have been inspected and found free from ticks.

To sum up: San Diego, Imperial and Orange counties are at present the only strictly quarantined counties left in the state.

San Luis Obispo, Santa Barbara, Ventura, Riverside, and Los Angeles counties, that part of Fresno County situated west of the right of way of the Southern Pacific railroad, and that part of San Bernardino County situated west of the one hundred and sixteenth meridian west longitude, are in the provisionally quarantined area. One, and possibly more of these provisionally quarantined counties is now also clean and will shortly be entirely removed from quarantine restrictions.

The work has also progressed so well in San Diego, Imperial, and Orange counties that they will shortly be placed in the provisionally quarantined area.

Two specific appropriations have been made by Congress to the United States Department of Agriculture in order to enable that department to coöperate with the authorities in the different tick infested states in the work of cattle tick eradication. Without this assistance California would not have made the progress she has. The inspectors of the Bureau of Animal Industry, acting under the supervision of a chief inspector, Dr. W. M. MacKellar, working with the county and state officials, devoted their entire time to this work, uncovering infestation and supervising dippings in accordance with state laws.

A number of methods for the eradication of the ticks have been used. These included pasture rotation, dipping, spraying, and hand dressing. It has been our practice to recommend the least expensive and most advantageous method to suit each individual case. For instance, on some of the large ranches, where large herds are run, the starvation method is usually adopted. This is the most desirable method and is adopted from our knowledge of the life history of the tick. Cattle, horses, and mules are taken off of any part of an infested pasture, which is then fenced off and allowed to remain idle for a certain length of time, varying, to the time of year the cattle were taken off, usually about eight to ten months. In this time all the ticks that were left on the pasture, afer removal of the cattle, will die. The cattle are then thoroughly dipped in a parasiticide in order to kill all ticks on them and are then placed on the pasture that has been idle. Then the stock is removed from another field in a similar manner.

At times an entire ranch is rested up and cleaned in one year. At other times one half, one third, or as much of the ranch as can conveniently be sacrificed at one time is cleaned.

Sheep are also utilized in the work of cleaning large ranches. While in a few rare instances several cattle ticks have been found on sheep, for all practical purposes we have found that these animals can be placed on an infested field after cattle, horses and mules have been taken off, and after a period of from eight to ten months all ticks on the fields will have died. At the expiration of this time clean cattle can be placed on these fields with comparative safety. In this manner no feed is sacrificed. The sebacious secretions in the skin of sheep appear to be obnoxious to the cattle tick. On the small infested ranches, where pasture rotation is out of the question, dipping in a parasiticide solution is resorted to. This method, while slower than pasture rotation, is also adopted from our knowledge of the life history of the tick. The aim is to prevent regenerations of ticks, and this is accomplished by dipping all cattle on an infested ranch every three or four weeks during the summer, fall, and early winter months. The tick infests cattle as a small, minute seed tick. It sucks the blood of the animal and, after undergoing two moults, the female enlarges until it reaches maturity at the end of three to six weeks, at which time she loosens her hold and drops to the ground and lays several thousand eggs. After a certain period, according to the weather, the majority of these eggs hatch and the young seed ticks emerge and again infest cattle. In order to prevent regeneration of ticks the cattle are dipped every three or four weeks in order to destroy female ticks nearing maturity on the animals, thereby preventing further reproduction.

It was a difficult matter for a long time to find a suitable parasiticide that would kill the ticks without injuring the cattle. Prior to 1907 crude petroleum oil floated on water in a dipping vat was used. Infested cattle were made to swim through this liquid. While the oil was very effective in destroying the ticks, it was also found that in many cases it would injure cattle by blistering the skin. This was especially evident in the case of milk cows in which the skin of the udder was often blistered, resulting in a falling off, and at times a suppression, of the milk yield.

The arsenical dip was first used in California during 1907, and such good results were obtained that it has been our most effective remedy ever since. The formula used is:

Arsenic	8 pounds
Carbonate of soda	24 pounds
Soap	24 pounds
Pine tar	1 gallon
Water	500 gallons

This solution, being poisonous in nature, is carefully used in order that cattle dipped in same are not poisoned themselves. However, I might state that no authentic case of cattle poisoning from this dipping solution has been brought to our notice. In several instances it was reported that cattle dipped in the arsenical solution had been poisoned, but upon investigation it was found that deaths were due to other causes. One notable case occurred in Orange County, where a number of cattle were dipped in this solution preparatory to moving them on to a tick free pasture. Subsequently several head of these cattle died from what was claimed to be arsenical poisoning, due to the cattle drinking the dip while swimming through the vat. Upon autopsy not the slightest indication of arsenical poisoning could be found. The writer, in company with the Assistant State Veterinarian, personally investigated this matter, and it was ascertained that these cattle, the day they were dipped, were driven a distance of some 30 to 35 miles. The cattle were worked too hard in one day, and most probably died from exhaustion.

In another instance several cows died on a ranch in San Luis Obispo County after dipping. Autopsy by a Federal inspector revealed in these cases well marked lesions of Texas fever, with no indications of arsenical poisoning.

Reports were received at this office during the past two fiscal years of tick infested cattle located in Monterey and San Benito counties, which territory is in the free area. Upon inspecting the cattle upon these ranches we found them to be infested with the common net tick (Dermacentor reticulatus), and to be entirely free of the southern cattle fever tick (Boophilus annulatus).

During the last fiscal year two prosecutions were instituted by the state for infraction of the state quarantine regulations. In both cases convictions were secured.

EPIZOOTIC CEREBRO-SPINAL MENINGITIS (SO-CALLED).

This affection was the cause of considerable loss among horses and mules in widely separated parts of the State during the past two years. Outbreaks were investigated by the State and Assistant State Veterinarian in Siskiyou, Contra Costa, Colusa, Merced, and San Diego counties. The disease was confined to one or two ranches in each of the counties mentioned.

From the suddenness of the outbreak and the number of animals affected this affection assumes the characteristics of a communicable disease, and in fact some authors consider it similar to the infectious cerebro-spinal meningitis of man. Fortunately the affection in horses and mules is not infectious in character, but is due to food that has become infested with poisonous moulds, and also at times possibly to contaminated water. The disease can easily be produced experimentally. In every instance we have found no difficulty in checking the further spread of this affection by proper hygienic measures.

GLANDERS.

The existence of this disease among horses and mules in various sections in California is a serious menace to our horse and mule industry as well as to public health. Several deaths in man, due to infection communicated by glandered horses, have been reported during the past two years. From time to time this department has investigated and destroyed horses and mules affected with glanders in a number of counties in the state. Unfortunately, no records were kept. However, we can safely say that the disease exists in many sections of the state. While every reported outbreak of this disease is investigated, and the diseased animals killed and the premises disinfected, in conformity with section 402*b* of the Penal Code, yet this procedure is only palliative, as only a small percentage of cases are reported to this office.

This disease has an economic importance to the stockmen, and it has also a sanitary aspect to the general public, as it is readily communicable to man and is often fatal.

The disease is so widely scattered in the State that only drastic and thoroughly systematic measures will check its further spread and exterminate it. Unfortunately, in many instances, owners of animals affected with the chronic form of this disease will hide its existence by various means. In many instances, also, the affected animals are able to work and are constantly spreading infection. It is only by systematic effort that this disease can be exterminated. This means a thorough ranch to ranch and stable inspection of all horse and mule stock in the state. To do this at present is out of the question, due to lack of facilities. This department should be provided with sufficient help and funds to carry out this work to a finish.

Glanders is similar to tuberculosis in cattle in one respect, inasmuch as an animal may be infected with this disease and exhibit no external manifestations. It is a popular fallacy that an animal affected with glanders should exhibit external symptoms, such as a typical nasal discharge, swelling of the sub-maxillary lymphatic glands, etc. On the contrary, we find many cases in which the lesions are located in the internal organs and exhibiting no characteristic external lesions. These are dangerous factors in the spread of the disease. Fortunately we have a means of diagnosing glanders where we have no external symptoms to guide us. The mallein test properly conducted by a competent operator is a reliable and accurate means of diagnosing occult cases of glanders in horses and mules.

While section 402*b* of the Penal Code makes it a misdemeanor for a person to have in his possession an animal affected with glanders or farcy, I believe this law should be amended so as to give explicit authority to the State Veterinarian to destroy animals affected with this disease. Legislation should also be enacted requiring veterinarians to report all cases of glanders to the county health officers, who in turn would be required to notify the State Veterinarian.

ANTHRAX.

This disease was the cause of serious losses to our livestock in a number of sections of the state during the past two years, as it has been for years past. It is practically impossible to eradicate this disease from an infected ranch by ordinary sanitary measures. The spore or seed of the organism that is the cause of this disease is the most resistant disease-producing organism with which the scientific world is familiar. As far as we know it will live for years in the soil, and for all practical purposes a ranch once infected will remain so indefinitely. On a number of California ranches anthrax appears regularly every year and is the cause of serious losses. The owners of some of the larger ranches are able to move their cattle from the infected fields early in the fall and bring them back late in the winter, and thereby prevent serious loss. The disease usually appears when the feed is short, probably due to the fact that infection exists close to the grass roots. However, on a number of the smaller ranches the livestock is allowed to run on the fields during the entire year, and on these places preventive vaccination is resorted to. Preventive vaccination against anthrax is not always successful. However, in many instances it reduces mortality.

In company with the livestock inspector of San Bernardino County the State and Assistant State Veterinarian investigated a serious outbreak of this disease on a large dairy ranch near the city of Redlands. The fact that anthrax can be communicated to man, and is often fatal, makes the existence of this disease on a dairy farm a very serious matter. Fortunately, the livestock inspector of San Bernardino County had been advised of the presence of this disease early enough to prevent the possibility of the extension of the same to consumers of milk by prohibiting its sale.

From the fact that anthrax usually makes its appearance during the fall months, reports of several outbreaks often reach this office at the same time. For this reason it is physically impossible for us to devote sufficient time to each outbreak. Very often it is necessary to handle an outbreak by correspondence. This is, of course, very unsatisfactory. Our instructions regarding the cremation of carcasses are not always followed out for the reason that there is no official on the ground to supervise the work. Where a carcass is not properly disposed of there is always the great danger of the extension of the infection to neighboring ranches.

SYMPTOMATIC ANTHRAX.

This disease, also called black leg, black quarter, etc., was in former years the cause of severe losses. Preventive vaccination has robbed black leg of its terrors, and is almost universally practiced by stockmen in this state. Where reliable vaccine is used and the operation conducted properly fatalities are reduced to a minimum.

A number of outbreaks of this disease among young cattle were reported to this department during the past two years, and which were immediately checked by following our instructions.

HOG CHOLERA.

Reports of this disease were received from Shasta, Tehama, Solano, Tulare, Kings, and Los Angeles counties, in each of which the losses were large. This disease is very infectious in character and the mortality is very high. Up to a short time ago it could only be combatted by the most rigid sanitary measures, such as separation of the healthy from the sick, cremation of carcasses, cleansing and disinfection, in conjunction with quarantines. The United States Department of Agriculture has made an exhaustive study of this disease with a view to determining the specific cause and, if possible, discover a preventive agent. That these experiments appear to have been successful to a certain degree has been shown in a report issued by the department in which the results of the experiments show quite clearly that a comparatively certain method of protecting hogs from this disease has been secured.

It has been proven that the contagion of hog cholera exists in the blood and other fluids of diseased animals, but this contagion is invisible under the microscope, and can also pass through the finest filter.

Hogs that have recovered from cholera (acquired immunes) and hogs that have lived through an outbreak without contracting the disease (natural immunes) are injected with suitable amounts of virulent blood from diseased hogs and their immunity is thus heightened (hyperimmunization). The blood serum of the immunes is then injected under the skin of the hogs which it is desired to protect. The method giving the best results is to inject simultaneously blood from diseased hogs with the immune serum.

In order to demonstrate the above method, the Chief of the Bureau of Animal Industry invited the officials in charge of animal sanitation in a number of states to a demonstration of this process in order that the various interested states might take up this work. The State Veterinarian of California, who was invited, was compelled to decline the invitation, on account of important work on hand in the state at that time. However, it is essential that this method of immunizing hogs against cholera be introduced into California at the earliest possible date.

TUBERCULOSIS.

During the past two years there has been considerable agitation in California with reference to the improvement of its milk supply. Reports to this office from the inspectors of the United States Bureau of Animal Industry, in charge of meat inspection at our large abattoirs, of condemnations of cattle for tuberculosis, as well as results of tuberculin tests made through this office and private veterinarians, lead us to conclude that this disease exists more or less generally among our dairy herds. On some of our beef ranges the disease also exists among cattle. It has long been presumed that the outdoor life of range cattle precluded the possibility of their contracting tuberculosis, but abattoir inspection has revealed the presence of this disease in a number of our range herds.

The percentage of tuberculosis in California hogs is also increasing alarmingly. Hogs appear to be particularly susceptible to this disease. It is not uncommon for a considerable number of hogs in one shipment to be condemned in the abattoir for tuberculosis. That hogs contract the disease from cattle is indisputable. It has been demonstrated that the commonest mode for the discharge of tubercle bacilli from the bodies of cows is with their feces. It has also been demonstrated that the sediment taken from cream separators often contains tubercle bacilli. Of course, in these cases the milk came from tuberculous cows. Hogs are fed on this separator milk, and if it is contaminated with tubercle bacilli they readily contract the disease.

While it is universally conceded that tuberculosis of man and cows are identical, differing only in certain morphological characteristics of the tubercle bacilli, and that it can be transmitted to humans through infected milk of cows, this disease has also an economic importance to the stock raiser. Ward and Haring, of the University of California, in their instructive and interesting bulletin entitled "Bovine Tuberculosis," say:

"The importance of bovine tuberculosis, as an economic problem in agriculture, has too frequently been clouded by a discussion of its public health aspects. The incentive for combatting this disease has too often come from the health officer. Many dairymen have gathered the impression that the general acceptance of the view that bovine tuberculosis is not a menace to public health would end their difficulties with tuberculosis. Tuberculosis shortens the life of cows and unquestionably reduces the efficiency of a herd as a machine for producing milk from feed. When its existence may be detected the market value of the animal is obliterated, and the reputation of the breeder of fine stock is injured by general knowledge of its existence in his herd."

The movement to exterminate bovine tuberculosis has already been started in several states, and if California is to do likewise this movement must be undertaken with a full appreciation of the magnitude of the problem. The dairy interests must be educated to the realization of the economic importance of this disease. Dairymen must be shown that it is unprofitable to harbor tuberculous cows in the herd. The nature, cause, and methods of eradication must be fully explained by competent veterinary education. The University of California, through the efforts of its veterinarians, Drs. A. R. Ward and C. M. Haring, as well as this department, have accomplished a little in this line through our limited facilities. However, a systematic plan of instruction should be carried out.

The improvement of our milk supply has not only for its object the eradication of tuberculosis, but also the subject of cleanliness in dairies. While the sanitation of dairies (eliminating the diseases of cattle) does not come under the supervision of the State Veterinarian, I can not forbear discussing it in this report. This branch of sanitary work is under the control of the State Dairy Bureau. Unfortunately, the bureau is not supplied with sufficient resources to properly control this very important work. Many of our dairies are maintained in a filthy condition and the products from them are inimical to public health. The all important matter of sufficient light, ventilation, and drainage in some of the dairies is utterly neglected. The matter of corral milking can not be too severely condemned.

The subject of dairy sanitation, in its relation to tuberculosis, cannot be overlooked. In order to cope with this disease, and finally exterminate it, it is essential that the environment of the cows should be made healthful. A ground work of sanitary dairies is the first essential, in conjunction with education, in the work of exterminating bovine tuberculosis. This can only be accomplished by adequate legislation and constant official supervision of the dairies.

INSPECTIONS.

During the past two years 17,512 cattle, comprising 315 separate inspections, were made from points in the provisionally quarantined area, and in the quarantined area during the open season, to points outside of the quarantined area in this State.

CONCLUSION.

Since the creation of the offices of State and Assistant State Veterinarian by the legislature of 1899 the demands on our services have constantly increased until at the present day we are unable to meet these demands. We find it necessary with present facilities to devote our energies to the economic problems of cattle tick and sheep scab eradication. This leaves us little time to take care of other very important infectious diseases of livestock. By scattering our efforts little would be accomplished in any one line.

The results of the work in cattle tick and sheep scab eradication show what can be accomplished in other lines if our facilities were adequate. For this reason I would respectfully recommend that this department be supplied with sufficient help to properly cope with the work on hand. The services of one more veterinarian and two field inspectors could be used to great advantage.

Respectfully submitted.

CHARLES KEANE,
State Veterinarian.

REGULATIONS ISSUED DURING THE FIFTY-NINTH FISCAL YEAR PROVIDING FOR THE EXTERMINATION OF SCABIES IN SHEEP.

PROCLAMATION.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA.
SACRAMENTO, CAL., March 2, 1908.

WHEREAS, The State Veterinarian of the State of California has ascertained that a contagious, communicable disease known as scabies exists generally among the sheep in the State of California, in consequence of which disease the sheep industry of said State is now suffering, and will continue to suffer, serious financial losses unless said disease of scabies in sheep is immediately checked; and

WHEREAS, In consequence of the large number of sheep in said State which are infected with said disease of scabies the secretary of the United States Department of Agriculture has placed in quarantine the entire State of California; and

WHEREAS, Under and by virtue of an Act of the Legislature of the State of California entitled "An Act to protect domestic livestock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this Act, and to provide and appropriation therefor," which became a law March 18, 1899 (Statutes and Amendments to the Codes of the State of California 1899, Chapter XCVI), and as amended March 20, 1905, and March 23, 1907 (Statutes and Amendments to the Codes of the State of California 1905, Chapter CCCLV, and Statutes and Amendments to the Codes of the State of California 1907, Chapter 506), the State Veterinarian of the State of California in order to eradicate and to prevent the further spreading or communication of said disease of scabies in sheep has, on this second day of March, 1908, made and established the following rules and regulations:

(*a*) All sheep in the State of California must be dipped under the supervision of the State Veterinarian, or his duly authorized agent, between March 15, 1908, and July 15, 1908, inclusive.

(*b*) Sheep affected with scabies, and other sheep exposed to said disease, must de dipped twice, with an interval between the dippings of not less than nine days nor more than twelve days. All other sheep in the State of California not so affected with scabies, or exposed thereto, must be dipped once.

(*c*) Dipping solutions must receive the sanction of the said State Veterinarian, or his duly authorized agent, before they will be officially recognized by said officers.

(*d*) All corrals, chutes, barns, feed lots, premises and other places in which sheep affected with said disease of scabies have been placed or located must be cleaned and disinfected in a manner prescribed by the said State Veterinarian, or his duly authorized agent; and

WHEREAS, The said State Veterinarian, by and with the approval of the undersigned as Governor of the State of California, has established the above rules, orders and regulations for the purposes aforesaid, it is hereby ordered that a violation of any or either of the above rules, orders and regulations shall be an offense and punishable as provided by the laws of the State of California:

Now, therefore, I, J. N. Gillett, as Governor of the State of California, by virtue of the authority vested in me by law, do hereby proclaim the above rules, orders and regulations prescribed by said State Veterinarian for the eradication and to prevent the spreading or communication of said disease of scabies in sheep to be in full force and effect, and binding rules, orders and regulations within the State of California, and that a violation thereof shall subject any and all persons so violating any or either of said rules, orders and regulations to the penalties provided for in section eight of that said Act of the Legislature of the State of California entitled "An Act to protect domestic livestock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this Act, and to provide an appropriation therefor."

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be hereunto affixed, this second day of March, A. D. 1908.

J. N. GILLETT,
Governor of the State of California.

[SEAL.]

By WARREN R. PORTER,
Lieutenant-Governor and Acting Governor
of the State of California.

Attest:
C. F. CURRY,
Secretary of State.

SOUTHERN CATTLE FEVER QUARANTINE REGULATIONS ISSUED DURING THE FIFTY-EIGHTH AND FIFTY-NINTH FISCAL YFARS.

PROCLAMATION.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA.
SACRAMENTO, July 15, 1906.

WHEREAS, The State Veterinarian of the State of California has ascertained that cattle located in that certain area of territory situated south and west of the quarantine line hereinafter described are liable to communicate an infectious and contagious disease, known as Texas, splenetic, or southern cattle fever, to cattle located north and east of said line, should said cattle located south and west be shipped, moved or transported, driven or grazed over the lands situated north and east of said line; and

WHEREAS, Under and by virtue of an Act of the Legislature of the State of California, entitled "An Act to amend section two of that certain act of the Legislature of the State of California, entitled 'An Act to protect domestic live stock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this Act, and to provide an appropriation therefor,'" which became a law March 18, 1899, approved March 20, 1905, the State Veterinarian of the State of California, in order to prevent the spreading or communication of said disease of Texas, splenetic or southern cattle fever in cattle, has, on this fifteenth day of July, 1906, made a quarantine line as follows:

Beginning on the Pacific coast where the northern boundary line of San Luis Obispo County connects with the Pacific Ocean; thence easterly along the northern boundary line of San Luis Obispo County to its junction with the western boundary of Kings County; thence northwesterly along the western boundary of Kings and Fresno counties to the northwestern corner of Fresno County; thence northeasterly along the southern boundary of Merced County, and the western, southern and eastern boundaries of those portions of the Chowchilla and Bliss ranches at present included in Madera County, and the southeastern corner of Merced County; thence continuing northeasterly along the northern boundary of Madera County to the northeast corner thereof; thence southerly and easterly along the eastern boundary lines of Madera, Fresno, and Tulare counties to the southeast corner of Tulare County; thence easterly along the southern boundary line of Inyo County to its intersection with the eastern boundary line of the State of California.

WHEREAS, The State Veterinarian has, on this fifteenth day of July, 1906, made and established the following rules and regulations as to the crossing of cattle over the said quarantine line:

From this fifteenth day of July, 1906, to the thirty-first day of October, 1906, inclusive, every person, company, corporation, their agents and servants, are hereby prohibited from driving, leading, moving, carrying or transporting, or from causing or permitting to be driven, led, moved, transported, carried or drifted over or across said quarantine line so established, any cattle originating or being south or west of the said quarantine line, and all railroad and steamship companies, and other transportation companies, their officers, agents and servants, are hereby prohibited from shipping or transporting or accepting for shipment or transportation, any cattle originating or being south or west of said quarantine line, or from shipping or transporting into the State of California any cattle originating or being in that area of territory in the United States south of the Federal quarantine line which has been or may be established by the United States Department of Agriculture, or any cattle infested with the Boophilus annulatus tick, except in accordance with the regulations of the United States Department of Agriculture, or except where said cattle are shipped and transported on railroad trains for immediate slaughter, and when so shipped or transported by railroad the following regulations must be observed:

On unloading said cattle at their destination separate pens shall be set apart to receive them, and no other cattle shall be admitted to said pens. The cars that have carried said stock shall be cleansed and disinfected before they are again used to transport, store or shelter animals or merchandise.

All cars carrying cattle from said quarantine area shall bear placards stating that said cars contain "Southern cattle," and each of the waybills of said shipment shall have a note on its face with a similar statement. Whenever any cattle have come from said quarantine area, and shall be reshipped from any point at which they have been reloaded to any other point of destination, the cars carrying said animals shall bear similar placards with like statements, and the waybills so stamped. At whatever point these cattle shall be unloaded they shall be placed in separate pens to which no other cattle shall be admitted.

The cars used to transport such animals, and the pens in which they are fed and watered, and the pens set apart for their reception at points of destination, shall be disinfected and cleaned in the following manner:

(*a*) Remove all litter and manure; this litter and manure may be disinfected by mixing it with lime or saturating it with a five (5) per cent solution of 100 per cent carbolic acid, or, if not disinfected, it must be stored where no cattle can come in contact with it during the period from February 1, 1906, to October 31, 1906, inclusive.

(*b*) Wash the cars and feeding and watering troughs with water until clean.

(*c*) Saturate the entire interior surface of the cars, including the inner surface of the car doors, and the fencing, troughs, chutes, and floors of the pens with a mixture made of one and a half pounds of lime and one-quarter pound of 100 per cent carbolic acid to each gallon of water, or with a solution made by dissolving four (4) ounces of chloride of lime to each gallon of water.

It is further ordered that a violation of any or either of the above rules and regulations shall be an offense and punishable as provided by the laws of the State of California;

Now, therefore, I, George C. Pardee, as Governor of the State of California, by virtue of the authority vested in me by law, do hereby proclaim the above boundary of such quarantine within the State of California, and further hereby proclaim the above rules, orders, and regulations prescribed by the State Veterinarian for the maintenance and enforcement of such quarantine to be legal and binding rules and regulations within said state, and I do further proclaim that said rules, orders, and regulations shall be maintained and enforced within the State of California, and that a violation thereof shall subject all persons so violating any of said rules, orders or regulations to the penalties provided for in section eight of the said act of the Legislature entitled "An Act to protect domestic live stock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this act, and to provide an appropriation therefor."

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be hereunto affixed, this sixteenth day of July, A. D. 1906.

(Signed) GEO. C. PARDEE,
Governor of the State of California.

Attest:
C. F. CURRY,
Secretary of State.
[SEAL.]

AMENDMENT TO PROCLAMATION.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA,
SACRAMENTO, July 15, 1906.

In consideration of the action of the Boards of Supervisors of the counties of Kern, Tulare, Kings, San Luis Obispo, Fresno, and Madera, in appointing a "County Livestock Inspector," and placing under strict quarantine all areas in said counties known to be infested with the Boophilus annulatus tick, the transmitter of Texas, splenetic or southern cattle fever, cattle originating in the above mentioned counties can be moved to points in the State of California north and above the said quarantine line, provided they are first inspected by the State Veterinarian, or his duly authorized agent, and are accompanied by a certificate showing said animals to be free from contagious and infectious diseases.

It is hereby ordered that, during the continuance of the quarantine line as set forth in the proclamation of July 15, 1906, no cattle originating in the quarantine area as described in said proclamation shall be moved or allowed to move into the counties of Kern, Tulare, Kings, San Luis Obispo, Fresno and Madera.

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be affixed this sixteenth day of July, 1906.

(Signed) GEO. C. PARDEE,
Governor of the State of California.

Attest:
C. F. CURRY,
Secretary of State.
[SEAL.]

PROCLAMATION.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA,
SACRAMENTO, CAL., February 1, 1907.

WHEREAS, The State Veterinarian of the State of California has ascertained that cattle located in that certain area of territory situated south and west of the quarantine line hereinafter described are liable to communicate an infectious disease known as Texas, splenetic or southern cattle fever, to cattle located north and east of said line, should said cattle located south and west be shipped, moved or transported, driven or grazed over the lands situated north and east of said line; and

WHEREAS, Under and by virtue of an Act of the Legislature of the State of California, entitled "An Act to amend section two of that certain act of the Legislature of the State of California, entitled 'An Act to protect domestic livestock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this act, and to provide an appropriation therefor,'" which became a law March 18, 1899, approved March 20, 1905, the State Veterinarian of the State of California, in order to prevent the spreading or communication of said disease of Texas, splenetic or southern cattle fever in cattle, has, on this first day of February, 1907, made a quarantine line as follows:

Beginning on the Pacific coast where the northern boundary line of San Luis Obispo County connects with the Pacific Ocean; thence easterly along the northern boundary line of San Luis Obispo County to its junction with the western boundary of Kings County; thence northwesterly along the western boundary of Kings and Fresno counties to the northwestern corner of Fresno County; thence northeasterly along the southern boundary of Merced County, and the western, southern and eastern boundaries of those portions of the Chowchilla and Bliss ranches at present included in Madera County; thence continuing easterly along the southern boundary of Merced County to the right of way of the main line of the Southern Pacific Railroad Company; thence southeasterly along the right of way of the main line of the Southern Pacific Railroad Company to the northwestern corner of Tulare County; thence northerly and easterly along the northern boundary line of Tulare County to the northeast corner thereof; thence southerly and easterly along the eastern boundary line of Tulare County to the southeast corner thereof; thence easterly along the southern boundary line of Inyo County to its intersection with the eastern boundary line of the State of California.

Whereas, The State Veterinarian has, on the first day of February, 1907, made and established the following rules and regulations as to the crossing of cattle over said quarantine line:

From this first day of February, 1907, to the thirty-first day of October, 1907, inclusive, every person, company, corporation, their agents and servants, are hereby prohibited from driving, leading, moving, carrying or transporting, or from causing or permitting to be driven, led, moved, transported, carried or drifted over or across said quarantine line so established, any cattle originating or being south or west of the said quarantine line, and all railroad and steamship companies, and other transportation companies, their officers, agents and servants, are hereby prohibited from shipping or transporting or accepting for shipment or transportation, any cattle originating or being south or west of said quarantine line, or from shipping or transporting into the State of California any cattle originating or being in that area of territory in the United States south of the Federal quarantine line which has been or may be established by the United States Department of Agriculture, or any cattle infested with the Boophilus annulatus tick, except in accordance with the regulations of the United States Department of Agriculture, or except where said cattle are shipped and transported on railroad trains for immediate slaughter, and when so shipped or transported by railroad the following regulations must be observed:

On unloading said cattle at their destination, or for food and rest en route to same, separate pens must be set apart to receive them, and no other cattle shall be admitted to said pens. The cars that have carried said stock shall be cleansed and disinfected before they are again used to transport, store or shelter animals or merchandise.

All cars carrying cattle from said quarantine area shall bear placards stating that said cars contain "Southern cattle," and each of the waybills of said shipments shall have a note on its face with a similar statement. Whenever any cattle have come from said quarantine area, and shall be reshipped from any point at which they have been reloaded to any other point of destination, the cars carrying said animals shall bear similar placards with like statements, and the waybills so stamped. At whatever point these cattle shall be unloaded they shall be placed in separate pens to which no other cattle shall be admitted.

The cars used to transport such animals, and the pens in which they are fed and watered, and the pens set apart for their reception at point of destination, shall be cleansed and disinfected in the following manner:

(*a*) Remove all litter and manure; this litter and manure may be disinfected by mixing it with lime or saturating it with a five (5) per cent solution of 100 per cent carbolic acid, or, if not disinfected it must be stored where no cattle can come in contact with it during the period from February 1, 1907, to October 31, 1907, inclusive.

(*b*) Wash the cars and feeding and watering troughs with water until clean.

(*c*) Saturate the entire inner surface of the cars, including the inner surface of the car doors, and the fencing, troughs, chutes, and floors of the pens with a mixture made of one and a half pounds of lime and one-quarter pound of 100 per cent carbolic acid to each gallon of water; or with a solution made by dissolving four (4) ounces of chloride of lime to each gallon of water.

It is further ordered that a violation of any or either of the above rules and regulations shall be an offense and punishable as provided by the laws of the State of California;

Now, therefore, I, J. N. Gillett, as Governor of the State of California, by virtue of the authority vested in me by law, do hereby proclaim the above boundary of such quarantine within the State of California, and further hereby proclaim the above rules, orders, and regulations prescribed by the State Veterinarian for the maintenance and enforcement of such quarantine to be legal and binding rules and regulations within said state, and I do further proclaim that said rules, orders, and regulations shall be maintained and enforced within the State of California, and that a violation thereof shall subject all persons so violating any of said rules, orders, or regulations to the penalties provided for in Section eight of the said act of the Legislature entitled "An Act to protect domestic live stock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this act, and to provide an appropriation therefor."

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be hereunto affixed, this first day of February, A. D. 1907.

J. N. GILLETT,
Governor of the State of California.

Attest:
C. F. CURRY,
Secretary of State.

[SEAL.]

AMENDMENT TO PROCLAMATION.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA.
SACRAMENTO, February 1, 1907.

In consideration of the action of the Boards of Supervisors of the counties of Kern, Tulare, Kings, San Luis Obispo, and Santa Barbara, in appointing a County Livestock Inspector, and placing under strict quarantine all areas in said counties known to be infested with the Boophilus annulatus tick, the transmitter of Texas, splenetic or southern cattle fever, cattle originating in the above mentioned counties can be moved to points in the State of California north and above the said quarantine line, provided they are first inspected by the State Veterinarian, or his duly authorized agent, and are accompanied by a certificate showing said cattle to be free from contagious and infectious diseases and the Boophilus annulatus tick.

In consideration of the action of the Boards of Supervisors of the counties of Madera and Fresno, in appointing a County Livestock Inspector, and placing under strict quarantine all areas in said counties situated west of the right of way of the main line of the Southern Pacific Railroad Company known to be infested with the Boophilus annulatus tick, cattle originating in those portions of the above mentioned counties can be moved to points in the State of California north and above the said quarantine line, provided they are first inspected by the State Veterinarian, or his duly authorized agent, and are accompanied by a certificate showing said animals to be free from contagious and infectious diseases and the Boophilus annulatus tick.

It is hereby ordered that, during the continuance of the quarantine line as set forth in the proclamation of February 1, 1907, no cattle originating in the quarantine area as described in said proclamation shall be moved or allowed to move into the counties of Kern, Tulare, Kings, San Luis Obispo, Santa Barbara, Fresno and Madera.

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be affixed this fifteenth day of April, A. D. 1907.

J. N. GILLETT.
Governor of the State of California.

Attest:
C. F. CURRY,
Secretary of State.

[SEAL.]

PROCLAMATION.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA.
SACRAMENTO, CAL., August 1, 1907.

WHEREAS, The State Veterinarian of the State of California has ascertained that cattle located in that certain area of territory situated south and west of the quarantine line hereinafter described are liable to communicate an infectious disease known as Texas, splenetic or southern cattle fever, to cattle located north and east of said line, should said cattle located south and west be shipped, moved or transported, driven or grazed over the lands situated north and east of said line; and

WHEREAS, Under and by virtue of an Act of the Legislature of the State of California, entitled "An Act to protect domestic live stock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this act, and to provide an appropriation therefor," which became a law March 18, 1899, amended March 20, 1905, approved March 23, 1907, the State Veterinarian of the State of California, in order to prevent the spreading or communication of said disease of Texas, splenetic or southern cattle fever in cattle, has, on this first day of August, 1907, made a quarantine line as follows:

Beginning on the Pacific coast where the northern boundary of San Luis Obispo County connects with the Pacific Ocean; thence easterly along the northern boundary of San Luis Obispo County to the northwestern corner of Kern County; thence southeasterly, easterly, and northerly following the western, southern, and eastern boundaries of Kern County to the northeast corner of said county; thence easterly along the northern boundary of San Bernardino County to the one hundred and sixteenth meridian west longitude; thence south following the one hundred and sixteenth meridian west longitude to the southern boundary of San Bernardino County; thence easterly along the southern boundary of San Bernardino County to the eastern boundary of the State of California.

WHEREAS, The State Veterinarian has, on the first day of August, 1907, made and established the following rules and regulations as to the crossing of cattle over said quarantine line:

From this first day of August, 1907, to the thirty-first day of October, 1907, inclusive, every person, company, corporation, their agents and servants, are hereby prohibited from driving, leading, moving, carrying or transporting, or from causing or permitting to be driven, led, moved, transported, carried or drifted over or across said quarantine line so established, any cattle originating or being south or west of the said quarantine line, and all railroad and steamship companies, and other transportation companies, their officers, agents and servants, are hereby prohibited from shipping or transporting or accepting for shipment or transportation, any cattle originating or being south or west of said quarantine line, or from shipping or transporting into the State of California any cattle originating or being in that area or territory in the United States sourth of the Federal quarantine line which has been or may be established by the United States Department of Agriculture, or any cattle infested with the Boophilus annulatus tick, except in accordance with the regulations of the United States Department of Agriculture, or except where said cattle are shipped and transported on railroad trains for immediate slaughter, and when so shipped or transported by railroad the following regulations must be observed:

On unloading said cattle at their destination, or for food and rest en route to same, separate pens must be set apart to receive them, and no other cattle shall be admitted to said pens. The cars that have carried said stock shall be cleansed and disinfected before they are again used to transport, store or shelter animals or merchandise.

All cars carrying cattle from said quarantine area shall bear placards stating that said cars contain "Southern cattle," and each of the waybills of said shipments shall have a note on its face with a similar statement. Whenever any cattle have come from said quarantine area, and shall be reshipped from any point at which they have been reloaded to any other point of destination, the cars carrying said animals shall bear similar placards with like statements, and the waybills so stamped. At whatever point these cattle shall be unloaded they shall be placed in separate pens to which no other cattle shall be admitted.

The cars used to transport such animals, and the pens in which they are fed and watered, and the pens set apart for their reception at point of destination, shall be cleansed and disinfected in the following manner:

(*a*) Remove all litter and manure; this litter and manure may be disinfected by mixing it with lime or saturating it with a five (5) per cent solution of 100 per cent carbolic acid, or, if not disinfected it must be stored where no cattle can come in contact with it during the period from August 1, 1907, to June 1, 1908, inclusive.

(*b*) Wash the cars and feeding and watering troughs with water until clean.

(*c*) Saturate the entire inner surface of the cars, including the inner surface of the car doors, and the fencing, troughs, chutes, and floors of the pens with a mixture made of one and a half pounds of lime and one-quarter pound of 100 per cent carbolic acid to each gallon of water; or with a solution made by dissolving four (4) ounces of chloride of lime to each gallon of water.

It is further ordered that a violation of any or either of the above rules and regulations shall be an offense and punishable as provided by the laws of the State of California;

Now, therefore, I, J. N. Gillett, as Governor of the State of California, by virtue of the authority vested in me by law, do hereby proclaim the above boundary of such quarantine within the State of California, and further hereby proclaim the above rules, orders, and regulations prescribed by the State Veterinarian for the maintenance and enforcement of such quarantine to be legal and binding rules and regulations within said state, and I do further proclaim that said rules, orders, and regulations shall be maintained and enforced within the State of California, and that a violation thereof shall subject all persons so violating any of said rules, orders, or regulations to the penalties provided for in section eight of the said act of the Legislature, entitled "An Act to protect domestic livestock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this act, and to provide an appropriation therefor."

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be hereunto affixed, this first day of August, A. D. 1907.

J. N. GILLETT,
Governor of the State of California.

Attest:
C. F. CURRY,
Secretary of State.

[SEAL.]

AMENDMENT TO PROCLAMATION.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA,
SACRAMENTO, August 1, 1907.

In consideration of the action of the Boards of Supervisors of the counties of San Luis Obispo, Santa Barbara and Los Angeles, in appointing a County Livestock Inspector, and placing under strict quarantine all areas in said counties known to be infested with the Boophilus annulatus tick, the transmitter of Texas, splenetic or southern cattle fever, cattle originating in the above mentioned counties can be moved to points in the State of California north and above the said quarantine line, provided they are first inspected by the State Veterinarian, or his duly authorized agent, and are accompanied by a certificate showing said animals to be free from contagious and infectious diseases and the Boophilus annulatus tick.

In consideration of the action of the Boards of Supervisors of the counties of Madera and Fresno, in appointing a County Livestock Inspector, and placing under a strict quarantine all areas in said counties situated west of the right of way of the main line of the Southern Pacific Railroad Company known to be infested with the Boophilus annulatus tick, cattle originating in those portions of the above mentioned counties can be moved to points in the State of California north and above the said quarantine line, provided they are first inspected by the State Veterinarian, or his duly authorized agent, and are accompanied by a certificate showing said animals to be free from contagious and infectious diseases and the Boophilus annulatus tick.

In consideration of the action of the Board of Supervisors of the county of San Bernardino, in appointing a County Livestock Inspector, and placing under strict quarantine all areas in said county situated west of the one hundred and sixteenth meridian west longitude, known to be infested with the Boophilus annulatus tick, the transmitter of Texas, splenetic or southern cattle fever, cattle originating in the above mentioned part of San Bernardino County may be moved to points in the State of California, north and above the said quarantine line, provided they are first inspected by the State Veterinarian or his duly authorized agent, and are accompanied by a certificate showing said animals to be free from contagious and infectious diseases and the Boophilus annulatus tick.

It is hereby ordered that, during the continuance of the quarantine line as set forth in the proclamation of August 1, 1907, no cattle originating in the quarantine area as described in said proclamation shall be moved or allowed to move into the counties of San Luis Obispo, Santa Barbara, Los Angeles, Fresno, Madera and San Bernardino.

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be affixed this first day of August, A. D. 1907.

J. N. GILLETT,
Governor of the State of California.

Attest:
C. F. CURRY,
Secretary of State.
[SEAL.]

PROCLAMATION.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA.
SACRAMENTO, CAL., February 1, 1908.

WHEREAS, The State Veterinarian of the State of California has ascertained that cattle located in that certain area of territory situated south and west of the quarantine line hereinafter described are liable to communicate an infectious disease known as Texas, splenetic, or southern cattle fever, to cattle located north and east of said line, should said cattle located south and west be shipped, moved or transported, driven or grazed over the lands situated north and east of said line; and,

WHEREAS, Under and by virtue of an Act of the Legislature of the State of California, entitled "An Act to protect domestic livestock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this act, and to provide an appropriation therefor," which became a law March 18, 1899 (Statutes and Amendments to the Codes of the State of California, 1899, Chapter XCVI), and as amended March 23, 1907 (Statutes and Amendments to the Codes of the State of California, 1907, Chapter 506), the State Veterinarian of the State of California, in order to prevent the spreading or communication of said disease of Texas, splenetic, or southern cattle fever in cattle, has, on this first day of February, 1908, made a quarantine line as follows:

Beginning on the Pacific coast where the northern boundary of San Luis Obispo County connects with the Pacific Ocean; thence easterly along the northern boundary of San Luis Obispo County to the northwestern corner of Kern County; thence southeasterly and easterly, and northerly following the western, southern, and eastern boundaries of Kern County to the northeast corner of said county; thence easterly along the northern boundary of San Bernardino County to the one hundred and sixteenth meridian west longitude; thence south following the one hundred and sixteenth meridian west longitude to the southern border of San Bernardino County; thence easterly along the southern boundary of San Bernardino County to the eastern boundary of the State of California.

WHEREAS, The State Veterinarian has, on this first day of February, 1908, made and established the following rules and regulations as to the crossing of cattle over said quarantine line:

From this first day of February, 1908, to the thirty-first day of October, 1908, inclusive, every person, company, corporation, their agents and servants, are hereby prohibited from driving, leading, moving, carrying, or transporting, or from causing or permitting to be driven, led, moved, transported, carried, or drifted over or across said quarantine line so established, any cattle originating or being south or west of the said quarantine line, and all railroad and steamship companies, and other transportation companies, their officers, agents and servants, are hereby prohibited from shipping or transporting, or accepting for shipment or transportation, any cattle originating or being south or west of said quarantine line, or from shipping or transporting into the State of California any cattle originating or being in that area of territory in the United States south of the Federal quarantine line which has been or may be established by the United States Department of Agriculture, or any cattle infested with the Boophilus annulatus tick, except in accordance with the regulations of the United States Department of Agriculture, or except where said cattle are shipped and transported on railroad trains for immediate slaughter, and when so shipped or transported by railroad the following regulations must be observed:

On unloading said cattle at their destination, or for food and rest en route to same, separate pens must be set apart to receive them, and no other cattle shall be admitted to said pens. The cars that have carried said stock shall be cleansed and disinfected before they are again used to transport, store, or shelter animals or merchandise.

All cars carrying cattle from said quarantine area shall bear placards stating that said cars contain "Southern cattle," and each of the waybills of said shipments shall have a note on its face with a similar statement. Whenever any cattle have come from said quarantine area, and shall be reshipped from any point at which they have been reloaded to any other point of destination, the cars carrying said animals shall bear similar placards with like statements, and the waybills so stamped. At whatever point these cattle shall be unloaded they shall be placed in separate pens to which no other cattle shall be admitted.

The cars used to transport such animals, and the pens in which they are fed and watered, and the pens set apart for their reception at point of destination, shall be cleaned and disinfected in the following manner:

(*a*) Remove all litter and manure; this litter and manure may be disinfected by mixing it with lime or saturating it with a five (5) per cent solution of 100 per cent carbolic acid; or, if not disinfected, it must be stored where no cattle can come in contact with it during the period from February 1, 1908, to October 31, 1908, inclusive.

(*b*) Wash the cars and feeding and watering troughs with water until clean.

(*c*) Saturate the entire inner surface of the cars, including the inner surface of the car doors, and the fencing, troughs, chutes, and floors of the pens with a mixture made of one and a half gallons of lime and one-quarter pound of 100 per cent carbolic acid to each gallon of water; or with a solution made by dissolving four (4) ounces of chloride of lime to each gallon of water.

It is further ordered that a violation of any or either of the above rules and regulations shall be an offense, and punishable as provided by the laws of the State of California.

Now, therefore, I, J. N. Gillett, as Governor of the State of California, by virtue of the authority vested in me by law, do hereby proclaim the above boundary of such quarantine within the State of California, and further hereby proclaim the above rules, orders, and regulations prescribed by the State Veterinarian for the maintenance and enforcement of such quarantine to be legal and binding rules and regulations within said state, and I do further proclaim that said rules, orders, and regulations shall be maintained and enforced within the State of California, and that a violation thereof shall subject all persons so violating any of said rules, orders, or regulations to the penalties provided for in section eight of that said act of the legislature entitled "An act to protect domestic livestock from contagious and infectious diseases, to provide for the appointment and duties of officials to carry into effect the provisions of this act, and to provide an appropriation therefor."

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be hereunto affixed, this first day of February, A. D. 1908.

(Signed) J. N. GILLETT,
Governor of the State of California.

Attest:
(Signed) C. F. CURRY,
[SEAL.] Secretary of State.

AMENDMENT No. 1 TO PROCLAMATION OF FEBRUARY 1, 1908.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA.
SACRAMENTO, February 1, 1908.

In consideration of the action of the Boards of Supervisors of San Luis Obispo, Santa Barbara, Ventura, Los Angeles, and Riverside counties, in appointing County Livestock Inspectors, and placing under strict quarantine all areas in said counties known to be infested with the Boophilus annulatus tick, the transmitter of Texas, splenetic, or southern cattle fever, cattle originating in the above mentioned counties may be moved to points in the State of California north and above the said quarantine line, provided they are first inspected by the State Veterinarian, or his duly authorized agent, and are accompanied by a certificate showing said cattle to be free from contagious and infectious diseases and the Boophilus annulatus tick.

In consideration of the action of the Board of Supervisors of San Bernardino County in appointing a County Livestock Inspector, and placing under strict quarantine all areas in said county situated west of the one hundred and sixteenth meridian west longitude, known to be infested with the Boophilus annulatus tick, the transmitter of Texas, splenetic or southern cattle fever, cattle originating in the above mentioned part of San Bernardino County may be moved to points in the State of California, north and above the said quarantine line, provided they are first inspected by the State Veterinarian, or his duly authorized agent, and are accompanied by a certificate showing said animals to be free from contagious and infectious diseases and the Boophilus annulatus tick.

It is hereby ordered, that during the continuance of the quarantine line as set forth in the proclamation of February 1, 1908, no cattle originating in the quarantine area as described in said proclamation shall be moved or allowed to move into the counties of San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Riverside, and San Bernardino.

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be affixed this first day of February, A. D. 1908.

(Signed) J. N. GILLETT,
Governor of the State of California.

Attest:
(Signed) C. F. CURRY,
[SEAL.] Secretary of State.

AMENDMENT No. 2 TO PROCLAMATION OF FEBRUARY 1, 1908.

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA.

WHEREAS, The State Veterinarian of the State of California has ascertained that certain cattle located in that part of Fresno County situated west of the main line of the Southern Pacific Railroad Company are infested with Boophilus annulatus tick, the transmitter of Texas, splenetic, or southern cattle fever, and are liable to communicate this disease of Texas, splenetic, or southern cattle fever to cattle located in the State of California outside of this part of Fresno County, should said cattle located in that part of Fresno County situated west of the main line of the Southern Pacific Railroad Company be shipped, moved, or transported, driven, or grazed over the lands in the State of California situated outside of said part of Fresno County; therefore,

It is hereby ordered, that cattle located in that part of Fresno County situated west of the main line of the Southern Pacific Railroad must not be moved or allowed to move outside of said part of Fresno County to any part of the State of California, unless said cattle have first been inspected by the State Veterinarian, or his duly authorized agent, and are accompanied by a certificate issued by such inspector stating that said cattle are free from contagious and infectious diseases, and the Boophilus annulatus tick.

It is further ordered that a violation of any or either of the above rules and regulations shall be an offense, and punishable as provided by the laws of the State of California, as set forth in the proclamation of February 1, 1908.

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of this State to be hereunto affixed, this first day of February, A. D. 1908.

(Signed) J. N. GILLETT,
Governor of the State of California.

Attest:
(Signed) C. F. CURRY,
[SEAL.] Secretary of State.

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BIENNIAL REPORT

OF THE

Board of State Harbor Commissioners

FOR THE

TWO FISCAL YEARS COMMENCING JULY 1, 1904, AND ENDING
JUNE 30, 1906.

SACRAMENTO
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING
1907

BOARD OF STATE HARBOR COMMISSIONERS.

CHAS. H. SPEAR, *President*,	Commissioner.
HENRY J. CROCKER,	Commissioner.
J. D. MACKENZIE,	Commissioner.

JOHN M. FOY,	Secretary.
JAMES BYRNE, JR.,	Assistant Secretary.
LOTT D. NORTON,	Chief Engineer.
W. H. DAVIS,	Attorney.

OFFICE:

Union Depot and Ferry House, San Francisco.

BIENNIAL REPORT

OF THE

BOARD OF STATE HARBOR COMMISSIONERS.

San Francisco, Cal., December 28, 1906.

To Hon. George C. Pardee, *Governor of California,*
Sacramento, Cal.

Sir: As required by law, the Board of State Harbor Commissioners for the harbor and port of San Francisco respectfully submits the following report for the two fiscal years commencing July 1, 1904, and ending June 30, 1906, embracing in detail all financial transactions of this department and work done during the period named.

Statements of receipts and disbursements, and other subjects are classified under exhibits, as follows:

Exhibit A—Receipts and disbursements for the two (2) fiscal years ending June 30, 1906.

Exhibit B—Itemized statement of receipts and disbursements for the two (2) fiscal years ending June 30, 1906.

Exhibit C—Summary of receipts and disbursements, 1904–1906.

Exhibit D—Comparative statement of receipts and disbursements, 1863–1906.

Exhibit E—Statement of San Francisco Harbor Improvement Fund (State Treasurer, custodian) for the two fiscal years ending June 30, 1906.

Exhibit F—Statement of San Francisco Harbor Improvement Fund, November 4, 1863, to June 30, 1906.

Exhibit G—Statement of San Francisco Depot Sinking Fund and San Francisco Seawall Sinking Fund, June 30, 1906.

Exhibit H—Statement of Deferred Payment Drafts account for the two fiscal years ending June 30, 1906.

Exhibit I—Showing length and cost of seawall.

Exhibit J—Belt Railroad revenue and expense for the two fiscal years ending June 30, 1906.

Exhibit K—Work under way at date of last biennial report and since completed.

Exhibit L—Work contracted for and completed within the two years from June 30, 1904, to June 30, 1906.

Exhibit M—Work contracted for since June 30, 1904, but not yet completed.

Exhibit N—Statement of cost of dredging.

Exhibit O—Attorney's report.

Exhibit P—Expert Accountant's report.

CHARLES H. SPEAR, President,

J. D. MACKENZIE,

HENRY J. CROCKER,

Board of State Harbor Commissioners.

EXHIBIT A.

Receipts and Disbursements for the Two Fiscal Years ending June 30, 1906.

RECEIPTS.

Source.	1904-05.	1905-06.	Total.
Fisherman Wharf	$5,089 75	$4,743 25	$9,833 00
Secs. "A," "B", 1 Seawall, and Powell St. Wh'rf	15,774 86	16,712 48	32,487 34
Section 2, Seawall Wharf	5,270 67	5,411 82	10,682 49
Sec. 3, Seawall Wh'f, & Lomb'd St. Wh'f (Pier 27)	13,926 54	15,076 73	29,003 27
Lombard Street Car Ferry Slips, Freight Depots, and tolls	55,362 53	54,056 64	109,419 17
Greenwich Street Wharf No. 2 (Pier 25)	10,616 17	42,660 68	53,276 85
Greenwich Street Wharf No. 1 (Pier 23)	17.095 78	16,720 85	33,816 63
Filbert Street Wharf (Pier 21)	13,597 25	14,623 74	28,220 99
Union Street Wharf No. 2 (Pier 19)	13,780 29	14,796 28	28,576 57
Union Street Wharf No. 1 (Pier 17)	8,439 53	10,292 56	18,732 09
Green Street Wharf (Pier 15)	12,354 38	12,226 70	24,581 08
Vallejo Street Wharf (Pier 13)	8,417 48	3,470 10	11.887 58
Broadway Wharf No. 2 (Pier 11)	20,435 94	23,541 72	43,977 66
Broadway Wharf No. 1 (Pier 9)	27,193 84	26,748 10	53,941 94
Pacific Street Wharf (Pier 7)	17,617 69	18,827 58	36,445 27
Jackson Street Wharf (Pier 5)	19,606 85	28,009 59	47,616 44
Washington Street Wharf (Pier 3)	13,126 18	12,942 06	26.068 24
Clay Street Wharf (Pier 1)	3,223 30	1,950 05	5,173 35
Union Depot and Ferry House, Ferry Slips 1, 2, 3, 4, 5, 6, 7, 8, tolls, and P. O. Building	138,481 69	124,960 43	263,442 12
Mission Street Wharf No. 1 (Pier 2)	18,958 26	19,466 55	38,424 81
Mission Street Wharf No. 2 (Pier 4)	25,216 70	20,477 05	45,693 75
Howard Street Wharf No. 1 (Pier 6)	17,491 87	20,088 10	37,579 97
Howard Street Wharf No. 2 (Pier 8)	13.466 61	13,222 98	26,689 59
Howard Street Wharf No. 3 (Pier 10)	9.369 85	10.018 75	19,388 60
Folsom Street Wharf No. 1 (Pier 12)	18,000 00	18,000 00	36,000 00
Folsom Street Wharf No. 2 (Pier 14)	17,009 85	20,186 27	37,196 12
Harrison Street Wharf (Pier 16)	7,841 22	8,149 60	15,990 82
Steuart Street Wharf (Pier 20)	17,423 82	17,181 42	34,605 24
Spear Street Wharf (Pier 24)	12,134 37	14,257 12	26,391 49
Main Street Car Ferry Slip, and tolls	23,924 35	23,988 33	47,912 68
Main Street Wharf (Pier 28)	9,027 83	6,033 96	15,061 79
Beale Street Wharf (Pier 32)	16,018 97	17,199 07	33,218 04
Fremont Street Wharf (Pier 34)	5,161 87	5,800 66	10,962 53
Pacific Mail Wharf (Pier 40)	30,000 00	30,000 00	60,000 00
Southern Pacific Car Ferry Slip, and tolls	92,953 41	97,371 62	190,325 03
Third Street Wharf	7,146 32	8,015 08	15,161 40
Berry Street Wharf	15,726 53	26,927 32	42,653 85
Channel Street Wharf	12,413 38	11,711 26	24,124 64
Center Street Wharf	8,875 74	9,671 98	18.547 72
Santa Fé Car Ferry Slip, and tolls	2.221 27	2,294 07	4,515 34
Revenue from Seawall lots	9,296 65	9,253 10	18,549 75
Sale of old material	2,894 03	2,923 65	5,817 68
China Basin	1,000 00	2,000 00	3,000 00
Central Basin	1,809 80	2,254 80	4,064 60
Belt Railroad revenue	79,673 75	77,787 25	157,461 00
Tugs and Dredgers (sale of old material)	1,002 30	250 00	1,252 30
Wharfage, damages, sales, etc.	5,552 12	13,067 83	18,619 95
U. S. Customs Department (rent and dockage)	2,905 00	3,540 00	6,445 00
P. O. Station "D" & Ferry Slip No. 8 (lighting)	4,292 60	1,861 49	6,154 09
Piers 42 and 44 (*rent in advance)	*371,673 00	5,000 00	376,673 00
Belt Railroad (sale of old material)	132 50	219 69	352 19
Fees account	150 00	------------	150 00
Fire loss account (1905)	2,594 30	------------	2,594 30
Legal expense	1,035 81	------------	1,035 81
	$1,283,804 80	$965,990 36	$2,249,795 16
Draft returned and canceled	279 04	------------	279 04
Deferred payment drafts issued	261,188 98	99,789 67	360,978 65
S. F. H'bor Imp. F'd, am't drafts on State Treas.	771,246 05	872,339 83	1,643,585 88
S. F. Harbor Imp. F'd to S. F. Depot Sink'g F'd	55,572 00	55,572 00	111,144 00
S. F. Harbor Improvement Fund, deferred payment drafts paid by Controller	135,878 42	161,459 12	297,337 54
S. F. H'bor Imp. F'd to S. F. Seawall Sink'g F'd	------------	5,727 78	5,727 78
State of California—Act Special Session, 1906	------------	100,000 00	100,000 00
Totals	$2,507,969 29	$2,260,878 76	$4,768,848 05

EXHIBIT A—*Continued.*

DISBURSEMENTS.

		1904–05		1905–06	Total.
Administration account—					
Salaries of Commissioners	*a*	$9,600 00	*b*	$9,600 00	$19,200 00
Salaries of Chief Engineer and Assistants	*a*	8,460 00	*b*	8,682 50	17,142 50
Salaries of Chief Wharfinger and Assistants	*a*	6,300 00	*b*	6,300 00	12,600 00
Salary of Attorney	*a*	2,400 00	*b*	2,400 00	4,800 00
Salaries of Watchmen	*a*	4,380 00	*b*	4,766 20	9,146 20
Collection of revenue—					
Salaries of Secretaries and Clerks	*a*	13,500 00	*b*	13,675 00	27,175 00
Salaries of Wharfingers	*a*	23,854 85	*b*	23,853 60	47,708 45
Salaries of Collectors	*a*	15,600 00	*b*	15,683 90	31,283 90
Expense account	*a*	11,952 67	*b*	9,692 72	21,645 39
Urgent repairs	*c*	63,136 34	*d*	49,375 51	112,511 85
Repairs (contract)	*c*	158,727 79	*d*	97,915 62	256,643 41
Pile driving	*c*	29,386 84	*d*	34,167 79	63,554 63
Cleaning wharves, bulkheads and streets	*a*	32,860 21	*b*	31,759 37	64,619 58
Wharf offices and furniture	*g*	119 95			119 95
Legal expenses	*a*	3,969 50	*b*	2,616 00	6,585 50
Fire account	*g*	5,475 97	*h*	5,661 60	11,137 57
Dredger No. 1	*i*	39,013 32	*j*	12,849 49	51,862 81
Dredger No. 2	*i*	16,682 20	*j*	11,365 86	28,048 06
Dredger No. 3	*i*	26,923 35	*j*	16,381 13	43,304 48
Tug "Gov. Markham"	*i*	14,858 61	*j*	11,172 22	26,030 83
Tug "Gov. Irwin"	*i*	38,392 60	*j*	10,317 42	48,710 02
Construction account	*c*	283,894 33	*d*	515,015 31	798,909 64
Seawall account	*k*	149,022 10	*l*	1,631 77	150,653 87
Dockage refunded	*g*	290 05	*h*	185 05	475 10
Tolls refunded	*g*	175 93	*h*	153 34	329 27
Wharfage refunded	*g*	70 52	*h*	3 90	74 42
Rent refunded	*g*	33 45	*h*	75 00	108 45
Switching refunded			*h*	22 50	22 50
Belt railroad equipment	*e*	300 00			300 00
Wharfage, damages, sales, etc.	*g*	417 79	*h*	1,555 23	1,973 02
Belt Railroad maintenance	*e*	24,567 23	*f*	23,602 17	48,169 40
Belt Railroad operating	*e*	46,194 70	*f*	43,221 22	89,415 92
Electric lighting and supplies	*a*	30,953 07	*b*	22,795 66	53,748 73
Union Depot and Ferry House, slips 1 to 8, etc.	*a*	34,058 00	*b*	25,944 78	60,002 78
Earthquake and fire account			*d*	9,063 15	9,063 15
		$1,095,571 37		$1,021,505 01	$2,117,076 38
Deferred payment drafts paid		135,878 42		161,459 12	297,337 54
S. F. Harbor Improvement Fund, amount remitted to State Treasurer		1,220,668 46		916,614 85	2,137,283 31
S. F. Harbor Improvement Fund, draft returned and canceled		279 04			279 04
S. F. Depot Sinking Fund, transfer from S. F. Harbor Improvement Fund		55,572 00		55,572 00	111,144 00
S. F. Seawall Sinking Fund, transfer from S. F. Harbor Improvement Fund				5,727 78	5,727 78
S. F. Harbor Improvement Fund, transfer from State of California				100,000 00	100,000 00
Totals		$2,507,969 29		$2,260,878 76	$4,768,848 05

a, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, *j*, *k*, *l*, see Exhibit "D."

EXHIBIT B.

Itemized Statement of Receipts and Disbursements for the Two Fiscal Years ending June 30, 1906.

RECEIPTS.

Month.	From Dockage, Tolls, Wharfage, Rents Belt R. R., etc.	Deferred Payment Drafts.	Drafts Refused and Canceled.	Total.
1904—July	$71,527 11	$42,005 67		$113,532 78
August	72,190 35			72,190 35
September	82,884 01			82,884 01
October	81,838 28	15,277 44		97,115 72
November	447,881 67	31,936 50		479,818 17
December	81,583 14			81,583 14
1905—January	73,654 12			73,654 12
February	68,843 28			68,843 28
March	73,339 31			73,339 31
April	78,935 63	112,190 97		191,126 60
May	72,454 78	59,778 40		132,233 18
June	78,673 12		$279 04	78,952 16
Total 1904-05	$1,283,804 80	$261,188 98	$279 04	$1,545,272 82
1905—July	$75,431 36			$75,431 36
August	76,330 32			76,330 32
September	108,600 25			108,600 25
October	85,896 01			85,896 01
November	81,704 58			81,704 58
December	82,432 99			82,432 99
1906—January	79,535 26			79,535 26
February	75,667 08	99,789 67		175,456 75
March	78,225 91			78,225 91
April	77,059 07			77,059 07
May	72,462 01			72,462 01
June	72,645 52			72,645 52
Total 1905-06	$965,990 36	$99,789 67		$1,065,780 03
Total 1904-06	$2,249,795 16	$360,978 65	$279 04	$2,611,052 85
Transfers to San Francisco Depot Sinking Fund (Exhibit E)				111,144 00
Transfers to San Francisco Seawall Sinking Fund (Exhibit E)				5,727 78
From State of California (account of special session, 1906)				100,000 00
Deferred Payment Drafts paid by Controller				297,337 54
Drafts drawn on State Controller				1,643,585 88
Grand total				$4,768,848 05

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905.

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
July 1	State Controller	1118	S. F. Depot Sinking Fund	$4,631 00
9	Employés	1119-34	Payroll for June	27,275 60
11	James H. O'Brien	1135	Teams and carts	325 00
14	Robert Greig	1136	Slate roof, Union Ferry Depot	995 00
14	Healy, Tibbitts & Co.	1137	Repairing slips Nos. 2 and 3	280 58
14	Healy, Tibbitts & Co.	1138	Constructing freight slip	4,790 48
22	H. S. Crocker Co.	1139	Stationery	46 45
22	City Front Stables	1140	Keeping horse	52 50
22	Langley & Michaels Co.	1141	Disinfectants	20 17
22	Whittier-Coburn Co.	1142	Oil	58 80
22	Harry Unna Co.	1143	Brooms, brushes, etc.	75 67
22	Hammond Lumber Co.	1144	Piles	384 12
22	Pacific Coast Rubber Co.	1145	Roofing, etc.	267 00
22	Getz Bros. & Co.	1146	Soap	9 10
22	Olsen & Cook Co.	1147	Chandlery	7 45
22	H. M. Nagle	1148	Brooms	17 00
22	Rowlands & Laughton	1149	Repairs	20 67
22	J. D. Spreckels & Bros.	1150	Cement	13 98
22	R. S. Chapman	1151	Hose	187 50
22	Brooks-Follis Co.	1152	Electric supplies	42 67
22	T. J. Crowley	1153	Shoeing horses	10 00
22	Western Repair and Supply Co.	1154	Chandlery	247 23
22	Baker & Hamilton	1155	Hardware	628 66
22	James Wilder Co.	1156	Towing	15 00
22	R. D. Chandler	1157	Coal	708 94
22	Merchants' Exchange	1158	Reporting	25 00
22	Pacific Hardware and Steel Co.	1159	Hardware	162 52
22	Hickman & Masterson	1160	Lumber	4,015 11
22	Bancroft-Whitney Co.	1161	Law books	28 00
22	Evening Post	1162	Advertising	120 00
22	R. Dunsmuir's Sons Co.	1163	Coal	259 72
22	H. R. Rood & Co.	1164	Coating piles	507 50
22	The Guide Publ'hing Co.	1165	Guides	11 00
22	Yates & Co.	1166	Paints, oil, etc.	615 25
22	J. A. Snook & Co.	1167	Hardware	197 48
22	The Pacific Coast Co.	1168	Coal	768 40
22	Cunningham, Curtiss & Welch	1169	Stationery	38 04
22	The Marine Exchange	1170	Reporting	25 00
22	H. B. Schindler Co.	1171	Repairs, sprinklers	24 50
22	Joshua Hendy Machine Works	1172	Repairs	13 45
22	Betts Spring Co.	1173	Repairs	20 00
22	Risdon Iron and Locomotive Works	1174	Repairs	226 58
22	Spring Valley Water Co.	1175	Water	286 55
22	Mutual Elect'c Light Co.	1176	Lights	1,591 29
22	J. A. Snook & Co.	1177	Hardware	153 55
22	Gray Bros.	1178	Constructing seawall	1,592 32
22	Julian B. Harries	1179	Examining accounts	37 50
22	Edward B. Hughes	1180	Printing brief	28 05
22	Robert Greig	1181	Slate roof, Union Depot	995 00
22	Healy, Tibbitts & Co.	1182	Repairing ferry slips	765 12
22	Robert Greig	1183	Slate roof (D. P. 229)	1,194 00
22	Robert Greig	1184	Slate roof (D. P. 230)	1,194 00
22	Robert Greig	1185	Slate roof (D. P. 231)	1,194 00
22	Robert Greig	1186	Slate roof (D. P. 232)	1,194 00
22	Robert Greig	1187	Slate roof (D. P. 233)	1,194 00
22	Robert Greig	1188	Slate roof (D. P. 234)	1,194 00
22	Robert Greig	1189	Slate roof (D. P. 235)	1,194 00
22	Robert Greig	1190	Slate roof (D. P. 237)	1,194 00
22	Robert Greig	1191	Slate roof (D. P. 238)	1,194 00
22	Robert Greig	1192	Slate roof (D. P. 239)	1,194 00

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
July 22	Robert Greig	1193	Slate roof (D. P. 240)	$1,194 00
22	Robert Greig	1194	Slate roof (D. P. 241)	1,194 00
22	Robert Greig	1195	Slate roof (D. P. 242)	1,194 00
22	Robert Greig	1196	Slate roof (D. P. 243)	1,194 00
22	Robert Greig	1197	Slate roof (D. P. 244)	1,194 00
22	Robert Greig	1198	Slate roof (D. P. 245)	1,194 00
22	Robert Greig	1199	Slate roof (D. P. 246)	1,194 00
22	Robert Greig	1200	Slate roof (D. P. 247)	1,194 00
22	Robert Greig	1201	Slate roof (D. P. 248)	1,194 00
22	Robert Greig	1202	Slate roof (D. P. 249)	1,194 00
22	Healy, Tibbitts & Co.	1203	Repairing slips Nos. 1, 3, 4, 6 and 7 (D. P. 251)	3,020 94
22	Healy, Tibbitts & Co.	1204	Repairing slips Nos. 1, 3, 4, 6 and 7 (D. P. 252)	3,020 94
22	Healy, Tibbitts & Co.	1205	Repairing slips Nos. 1, 3, 4, 6 and 7 (D. P. 253)	3,020 94
22	Healy, Tibbitts & Co.	1206	Repairing slips Nos. 1, 3, 4, 6 and 7 (D. P. 254)	3,020 95
22	Healy, Tibbitts & Co.	1207	Repairing slips Nos. 1, 3, 4, 6 and 7 (D. P. 255)	3,020 95
22	Healy, Tibbitts & Co.	1208	Repairing slips Nos. 1, 3, 4, 6 and 7 (D. P. 256)	3,020 95
22	Healy, Tibbitts & Co.	1209	Repairing dolphin	163 30
27	Harry Bunkers	1210	Brooms	42 50
29	E. J. Creeley	1211	Veterinary services	20 00
29	Flinn & Treacy	1212	Gravel	61 00
29	Henry Fautz	1213	Keys	75
29	H. R. Patterson	1214	Teaming	11 23
29	G. H. Fuller Desk Co.	1215	Repairing chair	4 50
29	S. F. Typewriter Exchange	1216	Ribbon	1 00
29	Industrial Home for Blind	1217	Brooms	22 80
29	Thos. Crowley & Bros.	1218	Towing piles	41 00
29	W. T. Garratt & Co.	1219	Repairing box and rail	3 25
30	H. T. Holmes Lime Co.	1220	Fire clay	1 25
30	P. J. Halligan	1221	Call, Chronicle, and Examiner	13 50
30	J. Anderson & Son	1222	Repairing locks and keys	15 90
31	State Controller	1223	Remittances	67,321 28
	Total			$163,346 93
Aug. 1	State Controller	1224	S. F. Depot Sinking Fund	$4,631 00
5	C. B. Olmstead	1225	Transcribing	111 00
5	Healy, Tibbitts & Co.	1226	Freight slip, Central Basin	7,984 13
10	Robert Wakefield	1226½	Greenwich St. Wharf No. 2 (D. P. 110)	3,164 92
10	City Street Imp. Co.	1227½	Howard St. Wharf No. 2, rebuilding (D. P. 127)	3,269 01
10	Employés	1227–43	Payroll	28,555 25
15	Gray Bros.	1244	Rock	16 50
15	Gray Bros.	1245	Constructing seawall	2,723 93
15	Robert Greig	1246	Roofing upper deck landing	2,145 00
18	Palmer & Watkin	1247	Cleaning windows	85 00
19	J. Anderson & Son	1248	Repairing locks and keys	26 00
19	James H. O'Brien	1249	Teams and carts	312 50
20	California Mill Co.	1250	Mill work	441 80
22	Gray Bros.	1251	Rock	24 00
25	George F. Buswell	1252	Frictions	25 00
25	Wm. J. Brady	1253	Repairs, tug and dredger	38 01
25	John Breuner Co.	1254	Furniture	45 60
25	James Byrne, Jr.	1255	Petty cash expense	219 26
25	Baker & Hamilton	1256	Hardware	720 35
25	Boesch Lamp Co.	1257	Repairs	10 25
25	Betts Spring Co.	1258	Repairs	14 50

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
Aug. 25	Frank Bartels	1259	Rollers	$24 00
25	Brooks-Follis Elec. Corp.	1260	Electrical goods	11 60
25	City Front Stables	1261	Keeping horse	52 50
25	R. D. Chandler	1262	Coal	751 48
25	B. Dallerup & Howsen	1263	Repairs	998 62
25	R. Dunsmuir's Sons Co.	1264	Coal	169 74
25	Evening Post	1265	Advertising	190 00
25	Getz Bros. & Co.	1266	Soap	20 88
25	Garlock Packing Co.	1267	Sandpaper, etc.	24 00
25	W. T. Garratt & Co.	1268	Repairs	31 45
25	Hickman & Masterson	1269	Lumber	3,616 99
25	Guide Publishing Co.	1270	Guides	11 00
25	Frank Greig	1271	Sawdust	5 00
25	Heynemann, Marshall & Co.	1272	Desks, etc.	93 80
25	Hammond Lumber Co.	1273	Piles	922 08
25	Joshua Hendy Machine Works	1274	Repairs	45 56
25	Langley & Michaels Co.	1275	Disinfectants	20 18
25	Leary Bros.	1276	Keeping horse	35 00
25	Murray Brothers	1277	Repairs	48 25
25	Muir Brothers	1278	Repairs	340 79
25	J. Metcalfe	1279	Lloyds' Register	24 00
25	Marine Exchange	1280	Reporting	25 00
25	Merchants' Exchange	1281	Reporting	25 00
25	Magnesia Asbestos Supply Co.	1282	Repairs	16 00
25	Mutual Elec. Light Co.	1283	Lights	1,708 03
25	H. M. Nagle	1284	Brooms	16 50
25	Pac. States Tel. & Tel. Co.	1285	Telephones	348 35
25	Pacific Coast Co.	1286	Coal	1,006 88
25	Plant Supply Co.	1287	Supplies, Dredger No. 3	8 08
25	Pacific Coast Rubber Co.	1288	Packing, etc.	111 43
25	Pacific Hardware and Steel Co.	1289	Hardware	31 95
25	Risdon Iron and Locomotive Works	1290	Repairs, tugs and dredgers	690 33
25	Southern Pacific Co.	1291	Freight and repairs	353 19
25	H. M. Sessions & Co.	1292	Testing meters	64 00
25	H. B. Schindler Co.	1293	Repairs	17 75
25	Spring Valley Water Co.	1294	Water	292 80
25	Jas. A. Snook & Co.	1295	Hardware	661 19
25	Tribune Publishing Co.	1296	Tonnage books	450 00
25	Town Talk Printing Co.	1297	Printing	57 50
25	E. W. Tucker Co.	1298	Repairs	39 24
25	Harry Unna Co.	1299	Brooms, etc.	79 75
25	Valvoline Oil Co.	1300	Oil	33 80
25	West Coast Wire and Iron Works	1301	Wire screens	46 25
25	Western Fuel Co.	1302	Repairs, coal, etc.	729 48
25	Whittier-Coburn Co.	1303	Oil	71 75
25	Western Repairs and Supply Co.	1304	Chandlery	82 84
25	Williams-Belser Co.	1305	Basalt blocks	900 00
25	Yates & Co.	1306	Paints, oil, etc.	427 26
26	Flinn & Treacy	1307	Gravel	59 00
26	H. R. Patterson	1308	Teaming	71 09
26	Nathan, Dohrmann & Co.	1309	Jardinieres	7 10
26	Mercantile Towel Co.	1310	Towel service	2 00
26	J. R. Lafontaine	1311	Prints	12 27
26	Charles C. Venn	1312	Whitewashing	30 00
26	Charles Waltz	1313	Repairs	10 00
27	James Mathews	1314	Washing for fire house	10 50
27	H. Fautz	1315	Keys	1 50
27	Smith-Rice Co.	1316	Spar	25 00

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
Aug. 27	Payot, Upham & Co.	1317	Tables	$5 00
27	Hodge Draying Co.	1318	Teaming	15 00
27	Thos. Crowley & Bros.	1319	Towing piles	34 50
29	Olsen & Cook	1320	Banner	75
29	P. T. Brown	1321	Blocks	5 00
30	J. J. Haviside Co.	1322	Repairs	4 50
31	Charles A. Warren	1323	Sand	50 00
31	State Treasurer	1324	Remittance	67,441 59
	Total			$138,079 08
Sept. 1	State Controller	1325	S. F. Depot Sinking Fund	$4,631 00
2	Robert Greig	1326	Slate roof	2,475 00
7	Robert Greig	1327	Repairing roof	35 00
8	Employés	1328-41	Payroll	27,927 55
8	Robert Wakefield	1341½	Constructing Slip A (D. P. 212)	2,825 00
12	Gray Bros.	1342	Constructing seawall	2,656 69
19	H. R. Rood & Co.	1342½	Coating piles (D. P. 226)	1,340 00
22	Hickman & Masterson	1343	Lumber	2,951 50
22	J. H. Bruce	1343½	Constructing scows (D. P. 144)	2,662 33
22	James H. O'Brien	1344	Teams and carts	337 50
26	California Mill Co.	1345	Mill work	123 72
28	G. F. Buswell	1346	Frictions	60 00
28	Brooks-Follis Elec. Corp.	1347	Electrical supplies	148 90
28	Baker & Hamilton	1348	Hardware	372 34
28	R. D. Chandler	1349	Coal	790 25
28	H. S. Crocker Co.	1350	Stationery and printing	163 10
28	Callahan Paint Co.	1351	Painting tug "Gov. Irwin"	71 60
28	T. J. Crowley	1352	Shoeing horses	12 50
28	Cunningham, Curtiss & Welch	1353	Printing, etc.	114 59
28	City Front Stables	1354	Keeping horse	52 80
28	Mutual Elec. Light Co.	1355	Lights	1,782 60
28	Spring Valley Water Co.	1356	Water	302 30
28	James A. Snook & Co.	1357	Hardware	771 12
28	Risdon Iron and Locomotive Works	1358	Repairs	432 44
28	Benj. Dallerup	1359	Repairs	289 52
28	National Bank of D. O. Mills & Co.	1360	Exchange	142 54
28	Pacific Coast Co.	1361	Coal	907 22
28	Hammond Lumber Co.	1362	Piles	763 97
28	Thos. Day Co.	1363	Electrical goods	19 50
28	Evening Post	1364	Advertising	55 00
28	Guide Publishing Co.	1365	Guides	11 00
28	Garlock Packing Co.	1366	Waste	12 00
28	E. M. Graney	1367	Horseshoeing	12 00
28	Milton Heynemann, Marshall & Co.	1368	Stationery	43 10
28	Leary Bros.	1369	Keeping horse	57 65
28	Langley & Michaels	1370	Disinfectants	19 98
28	Marine Exchange	1371	Reporting	25 00
28	Merchants' Exchange	1372	Reporting	25 00
28	H. M. Nagle	1373	Brooms, etc.	10 50
28	B. P. Oliver	1374	Rent of office	35 00
28	Pacific Coast Rubber Co.	1375	Canvas, etc.	132 18
28	Pac. States Tel. & Tel. Co.	1376	Telephones	172 00
28	Plant Supply Co.	1377	Plug cock, etc.	11 50
28	Pacific Hardware and Steel Co.	1378	Hardware	65 66
28	J. A. Roebling's Sons Co.	1379	Steel rope	121 62
28	Sternfeld Leather Co.	1380	Toilet soap	12 00
28	Sessions & Wagner	1381	Testing meters	32 00
28	Southern Pacific Co.	1382	Repairs	165 26
28	H. B. Schindler & Co.	1383	Repairs to sprinklers	185 75

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
Sep. 28	Harry Unna Co.	1384	Brooms	$79 20
28	Vulcan Iron Works	1385	Cylinder head	40 00
28	Whittier-Coburn Co.	1386	Oil	45 80
28	Western Repair and Supply Co.	1387	Chandlery	198 52
28	Flinn & Treacy	1388	Gravel	102 00
28	Yates & Co.	1389	Paints, oils, etc.	275 62
28	H. R. Patterson	1390	Teaming	16 54
28	N. Clark & Sons	1391	Sewer pipe	18 75
28	G. Graham	1392	Oats	8 40
28	H. Fautz	1393	Repairs to keys	2 75
28	J. C. Sala	1394	Steel tape	10 50
28	C. H. Hallahay	1395	Window cleaner	8 00
28	Thos. Crowley & Bros. Co.	1396	Towing	30 50
28	Pacific Towel Supply Co.	1397	Towel service	6 00
28	James Mathews	1398	Washing for fire house	3 50
28	Holmes Lime Co.	1399	Fire clay	1 50
29	S. F. Towel Co.	1400	Towel service	7 00
30	Western Union Tel Co.	1401	Rental of clocks	27 00
30	Dundon Bridge & Con. Co.	1401½	Repairing slip No. 3 (D. P. 138)	1,092 57
30	Healy, Tibbitts & Co.	1402	Constructing freight slip	6,387 30
30	State Treasurer	1403	Remittance	77,960 73
	Total			$142,688 96
Oct. 1	State Controller	1404	S. F. Depot Sinking Fund	$4,631 00
3	Joe Gleadell	1405	Pasturage	8 00
4	Mercantile Towel Co.	1406	Towel service	1 00
5	Smith-Rice Co.	1407	Spars	75 00
6	Gray Bros.	1408	Rock	2 50
6	Gray Bros.	1409	Constructing seawall	2,412 90
7	James Cunningham	1410	Salvage on piles	5 00
7	Vermont Marble Co.	1411	Cutting marble	1 00
10	Employés	1412-26	Payroll	26,174 10
21	Hickman & Masterson	1427	Lumber	3,370 40
21	B. Dallerup & Howson	1428	Repairs to dredgers	4,048 50
21	Southern Pacific Co.	1429	Creosoting piles (D. P. 257)	763 87
21	Southern Pacific Co.	1430	Creosoting piles (D. P. 258)	763 87
21	Southern Pacific Co.	1431	Creosoting piles (D. P. 259)	763 87
21	Southern Pacific Co.	1432	Creosoting piles (D. P. 260)	763 87
21	Southern Pacific Co.	1433	Creosoting piles (D. P. 261)	763 87
21	Southern Pacific Co.	1434	Creosoting piles (D. P. 262)	763 87
21	Southern Pacific Co.	1435	Creosoting piles (D. P. 263)	763 87
21	Southern Pacific Co.	1436	Creosoting piles (D. P. 264)	763 87
21	Southern Pacific Co.	1437	Creosoting piles (D. P. 265)	763 87
21	Southern Pacific Co.	1438	Creosoting piles (D. P. 266)	763 87
21	Southern Pacific Co.	1439	Creosoting piles (D. P. 267)	763 87
21	Southern Pacific Co.	1440	Creosoting piles (D. P. 268)	763 87
21	Southern Pacific Co.	1441	Creosoting piles (D. P. 269)	763 87
21	Southern Pacific Co.	1442	Creosoting piles (D. P. 270)	763 87
21	Southern Pacific Co.	1443	Creosoting piles (D. P. 271)	763 87
21	Southern Pacific Co.	1444	Creosoting piles (D. P. 272)	763 87
21	Southern Pacific Co.	1445	Creosoting piles (D. P. 273)	763 88
21	Southern Pacific Co.	1446	Creosoting piles (D. P. 274)	763 88
21	Southern Pacific Co.	1447	Creosoting piles (D. P. 275)	763 88
21	Southern Pacific Co.	1448	Creosoting piles (D. P. 276)	763 88
26	Mutual Electric Light Co.	1449	Electric lighting	1,811 20
26	H. R. Rood & Co.	1450	Creosoting piles	1,600 40
26	R. D. Chandler	1451	Coal	756 84
26	Jas. A. Snook & Co.	1452	Hardware	951 38
26	Risdon Iron and Locomotive Works	1453	Repairs tug "Gov. Markham"	2,112 58
26	Western Fuel Co.	1454	Coal	570 57

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No	On Account of.	Amount.
1904				
Oct. 26	Baker & Hamilton	1455	Hardware	$271 77
26	Spring Valley Water Co.	1456	Water	327 75
26	Callahan Paint Co.	1457	Painting tug and scow	262 05
26	Muir Bros.	1458	Repairs tugs and dredgers	178 64
26	H. S. Crocker Co.	1459	Stationery	105 65
26	Evening Post	1460	Advertising	105 00
26	Pac. States Tel. & Tel. Co.	1461	Telephones	172 25
26	L. E. White Lumber Co.	1462	Ties	200 00
26	Hammond Lumber Co.	1463	Piles	620 88
26	Western Repair and Supply Co.	1464	Chandlery	162 14
26	Whittier-Coburn Co.	1465	Oil	111 57
26	Pacific Coast Co.	1466	Coal	379 03
26	Cunningham, Curtiss & Welch	1467	Stationery	101 24
26	Harry Unna Co.	1468	Brushes and brooms	103 33
26	Pacific Rolling Mill Co.	1469	Beans	63 30
26	Yates & Co.	1470	Paints, oil, and glass	856 71
26	James H. O'Brien	1471	Teams and carts	300 00
27	S. F. Typewriter Exchange	1472	Supplies	1 00
27	Thos. Crowley & Bros.	1473	Towing	53 50
27	Flinn & Treacy	1474	Gravel	121 00
27	P. J. Halligan	1475	Newspapers	13 50
29	H. R. Patterson	1476	Drayage	34 81
29	Traffic Publishing Co.	1477	Bishop's Guides	2 50
29	Holmes Lime Co.	1478	Fire clay	11 46
29	Rowlands & Laughton	1479	Blacksmith	2 50
29	James Mathews	1480	Washing	3 50
29	Hodge Draying Co.	1481	Drayage	12 00
29	Charles Waltz	1482	Cleaning lock	2 50
31	F. H. Masow	1483	Shed on Broadway Wharf No. 1 (D. P. 194)	3,499 17
31	Hyde Construction Co.	1484	Construction Broadway Wharf No. 1 (D. P. 156)	4,188 50
31	Robert Wakefield	1485	Constructing Pier No. 19 (D. P. 39)	3,089 45
31	James A. McMahon	1486	Shed on Greenwich Street Wharf No. 2 (D. P. 204)	1,841 88
31	Robert Wakefield	1487	Constructing Pier No. 21 (D. P. 66)	3,234 42
31	Robert Greig	1488	Slate roof, Union Depot (D. P. 229)	1,194 00
31	Healy, Tibbitts & Co.	1489	Repairing Slips Nos. 1, 3, 4, 6, and 7 (D. P. 151)	3,020 94
31	Robert Wakefield	1490	Construction of Ferry Slips Nos. 1 and 2 (D. P. 13)	3,649 75
31	Robert Wakefield	1491	Greenwich St. Wh'f No. 1 (D. P. 84)	3,221 74
31	S. F. Dry Dock Co.	1492	Constructing dry docks (D. P. 172)	1,560 30
31	H. Huddleston & Co.	1493	Glasses	2 50
31	State Treasurer	1494	Remittance	76,832 65
	Totals			$173,724 69
Nov. 1	State Controller	1495	S. F. Depot Sinking Fund	$4,631 00
2	California Mill Co.	1496	Lumber	40 44
2	Olsen, Cook & Co.	1497	Repairs	90
2	J. Anderson & Sons	1498	Repairing locks	16 25
3	Gray Bros.	1499	Gravel	10 75
3	Gray Bros.	1500	Constructing seawall	1,646 30
4	James A. McMahon	1501	Repairing wharves	1,238 95
4	Healy, Tibbitts & Co.	1502	Driving piles	1,051 68
4	Healy, Tibbitts & Co.	1503	Constructing slips	1,596 82
7	Robert Wakefield	1504	Const'g Gr'wich St. Wh'f (D. P. 111)	3,164 92
7	Healy, Tibbitts & Co.	1505	Const'g freight slip (D. P. 277)	1,596 82
7	Healy, Tibbitts & Co.	1506	Const'ng freight slip (D. P. 278)	1,596 82
7	Healy, Tibbitts & Co.	1507	Const'ng freight slip (D. P. 279)	1,596 82
7	Healy, Tibbitts & Co.	1508	Const'ng freight slip (D. P. 280)	1,596 82

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904–1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
Nov. 7	Healy, Tibbitts & Co.	1509	Const'ng freight slip (D. P. 281)	$1,596 82
7	Healy, Tibbitts & Co.	1510	Const'ng freight slip (D. P. 282)	1,596 82
7	Healy, Tibbitts & Co.	1511	Const'ng freight slip (D. P. 283)	1,596 82
7	Healy, Tibbitts & Co.	1512	Const'ng freight slip (D. P. 284)	1,596 82
7	Healy, Tibbitts & Co.	1513	Const'ng freight slip (D. P. 285)	1,596 82
7	Healy, Tibbitts & Co.	1514	Const'ng freight slip (D. P. 286)	1,596 82
7	Healy, Tibbitts & Co.	1515	Const'ng freight slip (D. P. 287)	1,596 83
7	Healy, Tibbitts & Co.	1516	Const'ng freight slip (D. P. 288)	1,596 83
7	Healy, Tibbitts & Co.	1517	Const'ng freight slip (D. P. 289)	1,596 83
7	Healy, Tibbitts & Co.	1518	Const'ng freight slip (D. P. 290)	1,596 83
7	Healy, Tibbitts & Co.	1519	Const'ng freight slip (D. P. 291)	1,596 83
7	Healy, Tibbitts & Co.	1520	Const'ng freight slip (D. P. 292)	1,596 83
7	Healy, Tibbitts & Co.	1521	Const'ng freight slip (D. P. 293)	1,596 83
7	Healy, Tibbitts & Co.	1522	Const'ng freight slip (D. P. 294)	1,596 83
7	Healy, Tibbitts & Co.	1523	Const'ng freight slip (D. P. 295)	1,596 83
7	Healy, Tibbitts & Co.	1524	Const'ng freight slip (D. P. 296)	1,596 83
10	Employés	1525–38	Payroll	26,804 80
17	Risdon Iron and Locomotive Works	1539	Repairs	4,101 14
17	Hickman & Masterson	1540	Lumber	5,651 76
18	Dallerup & Howson	1541	Repairs to dredger	9,523 83
21	James H. O'Brien	1542	Teams	325 00
23	Julian B. Harries	1543	Experting accounts	112 50
23	James Byrne, Jr.	1544	Petty cash expenses	311 67
23	Bancroft-Whitney Co.	1545	Law books	36 50
23	Betts Spring Co.	1546	Repairs	33 00
23	Boesch Lamp Co.	1547	Repairs	11 25
23	Brooks-Follis Elect. Co.	1548	Lamps	46 25
23	Baker & Hamilton	1549	Hardware	1,358 45
23	Callahan Paint Co.	1550	Painting	364 30
23	Cunningham, Curtiss & Welch	1551	Stationery	82 20
23	Cordes Furniture Co.	1552	Furniture	37 15
23	City Front Stables	1553	Keeping horse	107 90
23	Chicago Chemical Co.	1554	Disinfectant	20 00
23	California N. W. Ry.	1555	Damages	8 65
23	H. S. Crocker Co.	1556	Stationery	71 20
23	Dunham, Carrigan, Hayden Co.	1557	Hardware	7 80
23	Evening Post	1558	Advertising	165 00
23	Eagle Paint and Varnish Co.	1559	Paint, etc.	31 91
23	Getz Bros.	1560	Soap, etc.	50 23
23	Frank Greig	1561	Sawdust	15 00
23	W. T. Garratt & Co.	1562	Repairs	32 70
23	Guide Publishing Co.	1563	Guides	22 00
23	Garlock Packing Co.	1564	Packing	27 42
23	Hammond Lumber Co.	1565	Lumber	2,683 37
23	Healy, Tibbitts & Co.	1566	Piles, etc.	685 29
23	Joshua Hendy Machine Works	1567	Repairs	55 60
23	Henshaw, Bulkley & Co.	1568	Drill, etc.	840 36
23	Illinois Steel Co.	1569	Rails	1,542 28
23	Langley & Michaels	1570	Disinfectants	19 98
23	Leary Bros.	1571	Keeping horse	50 00
23	F. H. LaFaille & Co.	1572	Paints, etc.	69 85
23	Merchants' Exchange	1573	Reporting	50 00
23	Marine Exchange	1574	Reporting	50 00
23	Milton Heynemann, Marshall & Co.	1575	Stationery	5 00
23	Midvale Steel Co.	1576	Tires	126 00
23	Muir Bros.	1577	Repairs	8 56
23	Mutual Elec. Light Co.	1578	Lights	1,917 32
23	H. M. Nagle	1579	Brooms	15 00
23	B. P. Oliver	1580	Rent	70 00

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
Nov. 23	J. O'Kane	1581	Repairs	$14 50
23	Pacific Refining and Roofing Co.	1582	Coating roof	310 00
23	Pernau Press	1583	Printing	55 50
23	Pacific Hardware and Steel Co.	1584	Hardware	302 60
23	Pacific Coast Co.	1585	Coal	42 35
23	Plant Supply Co.	1586	Coverings, etc.	104 82
23	Pac. States Tel. & Tel. Co.	1587	Telephones	171 45
23	Pacific Coast Rubber Co.	1588	Matting, etc.	527 02
23	H. B. Schindler	1589	Repairs	38 50
23	San Francisco Sawdust and Sand Co.	1590	Sawdust	5 00
23	Levi Strauss & Co.	1591	Toweling, etc.	17 31
23	J. D. Spreckels & Bros. Co.	1592	Cement	19 85
23	J. A. Snook & Co.	1593	Hardware	578 08
23	Spring Valley Water Co.	1594	Water	290 05
23	J. A. Roebling's Sons Co.	1595	Steel rope	30 77
23	Southern Pacific Co.	1596	Freight, etc.	251 02
23	Valvoline Oil Co.	1597	Oil	76 43
23	Harry Unna Co.	1598	Lamps, etc.	410 44
23	Western Fuel Co.	1599	Coal	428 29
23	Western Repair and Supply Co.	1600	Chandlery	324 59
23	James Wilder Co.	1601	Towing piles	35 00
23	Whittier-Coburn Co.	1602	Oil	33 80
26	Yates & Co.	1603	Oil and glass	511 58
28	James Mathews	1604	Washing	3 50
28	Rowlands & Laughton	1605	Repairs	2 50
28	P. H. Murphy	1606	Repairs	6 62
28	Henry Fautz	1607	Keys	2 50
28	Gray Bros.	1608	Rock	2 75
28	Woodin & Little	1609	Hoops and staves	65 00
28	E. B. Heinrich	1610	Electric fog bell movement	73 50
28	California Mill Co.	1611	Mill work	88 25
29	H. R. Patterson	1612	Drayage	53 96
29	Frank Gallagher	1613	Constructing shed	2,165 25
29	San José Brick Co.	1614	Bricks	16 50
29	Mercantile Towel Co.	1615	Towels	2 00
29	J. R. Lafontaine	1616	Blue prints	48 94
29	Murray Bros.	1617	Repairs	1 80
29	S. F. Typewriter Exchange	1618	Ribbon	1 00
29	J. J. Haviside Sons Co.	1619	Repairs	15 96
29	Thos. Crowley & Bros.	1620	Towing	129 00
29	Rowlands & Laughton	1621	Repairs	2 65
29	Moise-Klinkner Co.	1622	Numbering machine	9 00
29	Allen's Press Clipping Bureau	1623	Clippings	4 00
29	J. Anderson & Son	1624	Repairs	10 75
29	Cowell Lime and Cement Co.	1625	Lime and plaster	4 00
29	State Treasurer	1626	Remittance	442,697 82
	Total			$552,868 93
Dec. 2	State Controller	1627	S. F. Depot Sinking Fund	$4,631 00
3	James A. McMahon	1628	Repairing wharves	1,518 20
3	Conklin Bros.	1629	Cleaning carpets	3 50
9	Employés	1630–44	Payroll	26,250 55
9	Wheaton & Kalloch	1645	Legal expenses	2,006 55
9	Gray Bros.	1646	Constructing seawall	3,935 50
9	Holmes Lime Co.	1647	Cement	749 36
9	Robert Wakefield	1648	Constructing slip A (D. P. 213)	2,825 00

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
Dec. 9	Dundon Bridge & Con. Co.	1649	Repairing slip No. 3 (D. P. 139)	$1,092 57
17	Gray Bros.	1650	Rock	738 72
19	H. R. Rood & Co.	1651	Coating piles	1,340 00
19	J. H. Bruce	1652	Constructing scows (D. P. 145)	2,662 34
23	Risdon Iron and Locomotive Works	1653	Repairs	4,781 43
23	Healy, Tibbitts & Co.	1654	Repairing Second St. wharf	4,198 20
23	Pacific Construction Co.	1655	Dolphins 3-4, 4-5	4,483 38
23	Hickman & Masterson	1656	Lumber	1,933 11
23	South Side Public Weighing Scale Co.	1657	Weighing	20 05
24	California Mill Co.	1658	Mill work	102 15
24	Yates & Co.	1659	Paints and oils	201 23
24	J. C. Sala	1660	Repairs	2 50
24	J. Anderson & Son	1661	Repairs	26 45
24	Thos. Crowley & Bros.	1662	Towing	102 50
24	James Mathews	1663	Washing	3 50
28	James H. O'Brien	1664	Carts and teams	312 50
30	Annie, Fox & Millie Tow Boat Co.	1665	Towing	7 50
30	Baker & Hamilton	1666	Hardware	526 87
30	J. Browell	1667	Chimneys	10 00
30	Boesch Lamp Co.	1668	Lamp	7 25
30	Brooks-Follis Elec. Corp.	1669	Motor	186 85
30	Bates Fire Door Co.	1670	Locomotive door	300 00
30	Betts Spring Co.	1671	Repairs	26 50
30	H. S. Crocker Co.	1672	Stationery	182 75
30	City Front Stables	1673	Keeping horse	54 00
30	R. D. Chandler	1674	Coal	1,275 69
30	Cunningham, Curtiss & Welch	1675	Stationery	75 57
30	Eagle Paint and Varnish Co.	1676	Paints, etc.	61 93
30	Evening Post	1677	Advertising	290 00
30	Guide Publishing Co.	1678	Guides	11 00
30	Getz Bros. & Co.	1679	Soap	3 00
30	W. T. Garratt & Co.	1680	Repairs	8 75
30	Hammond Lumber Co.	1681	Piles	1,737 84
30	L. P. Harvey	1682	Rent of tug	145 00
30	Henshaw, Bulkley & Co.	1683	Repairs	4 90
30	Joshua Hendy Machine Works	1684	Repairs	5 55
30	Leary Bros.	1685	Keeping horse	27 50
30	Langley & Michaels	1686	Disinfectants	36 48
30	Merchants' Exchange	1687	Reporting	25 00
30	Marine Exchange	1688	Reporting	25 00
30	Muir Bros.	1689	Repairs	35 00
30	Mutual Elec. Light Co.	1690	Electric lighting	1,991 17
30	Novelty Sign Co.	1691	Repairs	15 05
30	National Bank of D. O. Mills & Co.	1692	Exchange	471 37
30	Pacific Hardware and Steel Co.	1693	Hardware	147 41
30	Pioneer Sawdust and Sand Co.	1694	Sawdust	12 50
30	Pac. States Tel. & Tel. Co.	1695	Telephones	173 00
30	Rowlands & Laughton	1696	Repairs	37 94
30	James A. Snook & Co.	1697	Hardware	510 45
30	J. D. Spreckels & Bros. Co.	1698	Cement	14 28
30	Shainwald, Buckbee & Co.	1699	Rent	35 00
30	S. F. Dry Dock Co.	1700	Docking	300 80
30	Southern Pacific Co.	1701	Freight	116 23

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1904				
Dec. 30	Spring Valley Water Co.	1702	Water	$282 60
30	Harry Unna Co.	1703	Waste	17 59
30	Warren Imp. Co.	1704	Sand	308 75
30	Western Repair and Supply Co.	1705	Chandlery	171 40
30	Whittier-Coburn Co.	1706	Oil	85 67
30	Western Fuel Co.	1707	Coal	964 42
30	State Treasurer	1708	Remittance	76,540 04
	Total			$151,185 89
1905				
Jan. 3	State Controller	1709	S. F. Depot Sinking Fund	$4,631 00
3	N. J. Stone	1710	Carbon paper	8 00
3	F. H. Masow	1711	Shed, Broadway Wharf No. 1 (D. P. 195)	3,499 17
5	Dundon Bridge and Construction Co.	1712	Repairs	2,030 96
5	Williams, Dimond & Co.	1713	Injectors	123 72
6	James A. McMahon	1714	Repairs	1,429 00
6	Gray Bros.	1715	Seawall	1,951 86
6	Pacific Shipyard and Ways Co.	1716	Repairs	2,497 25
6	Callahan Paint Co.	1717	Painting, Dredger No. 1	533 19
6	H. R. Rood & Co.	1718	Coating piles	1,590 00
6	Pacific Coast Rubber Co.	1719	Packing	207 90
6	Frank Gallagher	1720	Constructing shed	721 75
6	Frank Gallagher	1721	Foundation	60 11
6	J. C. Williamson	1722	Metal polish	17 50
6	Gray Bros.	1723	Rock	24 75
9	Hyde Construction Co.	1724	Broadway Wharf No. 1 (D. P. 157)	4,188 50
9	Robert Wakefield	1725	Pier No. 19 (D. P. 40)	3,089 45
10	Employés	1726-42	Payroll	27,291 15
10	M. V. Vanderhoof	1743	Expense	10 00
16	F. Mundt	1744	Drayage	2 50
16	Moise-Klinkner Co.	1745	Badges	29 00
16	Henry R. Patterson	1746	Drayage	70 00
16	S F. Typewriter Exch'ge	1747	Ribbon	1 00
16	Mercantile Towel Supply Co.	1748	Towels	1 00
16	P. H. Murphy	1749	Metal roofing	79 50
16	Crane Co	1750	Valve	3 50
16	Murray Bros.	1751	Repairs	1 50
16	Pacific Construction Co.	1752	Repairs	2,977 07
16	Cowell Lime and Cement Co.	1753	Fire clay	4 25
16	J. T. Quigley	1754	Cleaning carpets	31 20
16	Henry Fautz	1755	Repairs	2 00
17	Wm. J. Brady	1756	Repairs	1 75
17	James A. McMahon	1757	Shed on Greenwich Street Wharf No. 2 (D. P. 205)	1,841 88
17	S. D. Leclair	1758	Repairing Broadway Wharf No. 2 (D. P. 200)	3,143 20
17	Robert Wakefield	1759	Constructing Pier No. 21 (D. P. 67)	3,234 42
18	Industrial Home for Adult Blind	1760	Brooms	22 80
20	California Mill Co.	1761	Millwork	249 40
20	Yates & Co.	1762	Paints and oils	324 50
20	J. Anderson & Son	1763	Locks, etc.	16 50
21	N. Clark & Sons	1764	Sewer pipe	15 25
21	J. C. Sala	1765	Repairs	28 00
21	James H. O'Brien	1766	Teaming	325 00
23	James Mathews	1767	Washing	3 50
23	Hickman & Masterson	1768	Lumber	1,829 86
23	Hickman & Masterson	1769	Lumber	943 28
23	Western Fuel Co.	1770	Coal	1,423 50

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Jan. 23	Southern Pacific Co.	1771	Repairs	$1,362 53
23	Mutual Elec. Light Co.	1772	Electric lighting	2,735 85
23	Smith-Rice Co.	1773	Repairs	1,830 80
23	Hammond Lumber Co.	1774	Repairs	3,042 87
23	H. R. Rood & Co.	1775	Creosoting	916 00
23	R. D. Chandler	1776	Coal	633 09
23	James A. Snook & Co.	1777	Hardware	583 86
23	Annie, Fox and Millie Tow Boat Co.	1778	Towing	725 00
23	James Byrne, Jr.	1779	Expense	405 60
23	Dallerup & Howson	1780	Repairs	13,731 78
23	Risdon Iron and Locomotive Works	1781	Repairs	6,900 56
23	T. K. Stuart	1782	Salvage	2 50
23	Robert Greig	1783	Slate roof (D. P. 230)	1,194 00
23	Healy, Tibbitts & Co.	1784	Repairing Slips Nos. 1, 3, 4, 6, and 7 (D. P. 252)	3,020 94
23	Robert Wakefield	1785	Constructing Slips Nos. 1 and 2 (D. P. 14)	3,649 75
23	Robert Wakefield	1786	Greenwich St. Wh'f No. 1 (D. P. 85)	3,221 74
23	H. R. Patterson	1787	Drayage	22 85
27	F. Mundt	1788	Drayage	4 50
27	Hodge Draying Co.	1789	Drayage	30 00
27	J. Carter	1790	Inspecting wharves	2 50
27	S. F. Towel Co.	1791	Towels	7 00
27	Thos. Crowley & Bros.	1792	Towing	137 50
27	H. Fautz	1793	Repairs	3 25
27	Call, Chronicle and Examiner	1794	Newspapers	13 50
27	P. L. Jones & Co.	1795	Repairs	5 50
27	P. H. Murphy & Co.	1796	Repairs	5 62
27	Cal. State Board of Trade	1797	Damages	63 55
27	Baker & Hamilton	1798	Hardware	186 85
27	Betts Spring Co.	1799	Springs	17 00
27	City Front Stables	1800	Horse hire	52 50
27	Evening Post	1801	Advertising	50 00
27	Eagle Paint and Varnish Co.	1802	Paints	66 98
27	E. M. Graney	1803	Horseshoeing	10 00
27	Guide Publishing Co.	1804	Guides	11 00
27	Garlock Packing Co.	1805	Waste	12 80
27	Getz Bros. & Co.	1806	Soap	13 38
27	Gray Bros.	1807	Rock	83 75
27	Julian B. Harries	1808	Experting	37 50
30	L. P. Harvey	1809	Rent of tug	60 00
30	Henshaw, Bulkley & Co.	1810	Repairs	14 70
30	Ideal Door Check Spring Co.	1811	Door check	10 00
30	Langley & Michaels	1812	Disinfectants	20 48
30	Marine Exchange	1813	Reporting	25 00
30	Merchants' Exchange	1814	Reporting	25 00
30	Murray Bros.	1815	Repairs	29 75
30	J. O'Kane	1816	Repairs	7 75
30	Pacific Hardware and Steel Co.	1817	Hardware	107 47
30	Plant Supply Co.	1818	Repairs	31 20
30	Pacific Coast Rubber Co.	1819	Packing, etc.	289 49
30	Pac. States Tel. & Tel. Co.	1820	Telephones	172 20
30	Rowlands & Laughton	1821	Repairs	236 26
30	J. A. Roebling's Sons Co.	1822	Repairs	5 70
30	H. B. Schindler Co.	1823	Repairs	21 50
30	Shainwald, Buckbee & Co.	1824	Rent	35 00
30	Spring Valley Water Co.	1825	Water	280 45
30	Harry Unna Co.	1826	Sponges, etc.	41 73

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Jan. 30	Valvoline Oil Co.	1827	Oil	$35 10
30	Whittier-Coburn Co.	1828	Oil	42 64
30	Western Repair and Supply Co.	1829	Chandlery	39 01
30	Pacific Shipyard and Ways Co.	1830	Repairs	135 49
30	S. F. Typewriter Exch'ge	1831	Repairs	50
30	Southern Pacific Co.	1832	Coating piles (D. P. 257)	763 87
30	Pacific Towel Supply Co.	1833	Towels	3 00
30	Bay City Engineering and Supply Co.	1834	Repairs	6 02
30	G. Graham	1835	Oats	10 71
30	State Treasurer	1836	Remittance	68,213 97
	Total			$185,969 01
Feb. 1	State Controller	1837	S. F. Depot Sinking Fund	$4,631 00
2	James A. McMahon	1838	Repairs	931 88
2	Gray Bros.	1839	Rock	2,632 18
2	Gray Bros.	1840	Seawall	361 74
2	Holmes Lime Co.	1841	Cement	839 72
2	S. F. Dry Dock Co.	1842	Constructing dry docks (D. P. 173)	1,560 30
4	Flinn & Treacy	1843	Repairs	347 00
7	Robert Wakefield	1844	Gr'nwich St. Wh'f No. 2 (D. P. 112)	3,164 92
7	Healy, Tibbitts & Co.	1845	S. F. Frgt. Slip Cent'l B (D. P. 277)	1,596 82
10	Employés	1846-61	Payroll	26,592 75
16	J. O. McGeehan	1862	Salvage	1 00
16	M. V. Vanderhoof	1863	Expense	5 20
18	J. Anderson & Son	1864	Repairs	21 40
18	James Mathews	1865	Washing	3 50
18	Yates & Co.	1866	Paints and oils	219 10
18	California Mill Co.	1867	Mill work	120 30
20	James H. O'Brien	1868	Teams	312 50
21	J. R. Lafontaine	1869	Blue prints	15 10
23	Hickman & Masterson	1870	Lumber	1,850 17
23	Flinn & Treacy	1871	Paving streets	1,428 24
23	Annie, Fox and Millie Tow Boat Co.	1872	Towing	870 00
23	Brooks-Follis Elec. Corp	1873	Supplies	989 79
23	Baker & Hamilton	1874	Hardware	513 66
23	Betts Spring Co.	1875	Repairs	25 00
23	Boesch Lamp Co.	1876	Repairs	5 25
23	City Front Stables	1877	Keeping horses	76 40
23	H. S. Crocker Co.	1878	Stationery	82 78
23	R. D. Chandler	1879	Coal	630 55
23	T. J. Crowley	1880	Shoeing horses	15 00
23	Cunningham, Curtiss & Welch	1881	Stationery	108 11
23	Evening Post	1882	Advertising	55 00
23	Eagle Paint and Var. Co.	1883	Paints	69 00
23	Getz Bros. & Co.	1884	Soap, etc.	26 50
23	Guide Publishing Co.	1885	Guides	11 00
23	Joshua Hendy Machine Works	1886	Repairs	6 45
23	H[illegible]kman & Masterson	1887	Lumber	425 93
23	Hammond Lumber Co.	1888	Piles	1,908 19
23	Leary Bros.	1889	Keeping horses	27 00
23	Merrill & Co.	1890	Slate roof	359 00
23	W. J. Martin	1891	Cleaner	15 00
23	Marine Exchange	1892	Reporting	25 00
23	Merchants' Exchange	1893	Reporting	25 00
23	Mutual Elec. Light Co.	1894	Electric lighting	2,154 00
23	Muir Bros.	1895	Repairs	621 60
23	Pacific Hardware and Steel Co.	1896	Hardware	173 68

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904–1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Feb. 23	Pioneer Sawdust and Sand Depot	1897	Sawdust	$12 50
23	Pacific Coast Rubber Co.	1898	Roofing	53 30
23	Risdon Iron and Locomotive Works	1899	Repairs	5,005 06
23	Rowlands & Laughton	1900	Repairs	15 52
23	Spring Valley Wat. Wks.	1901	Water	268 05
23	Shainwald, Buckbee & Co.	1902	Rent	35 00
23	S. F. Roofing Co.	1903	Repairs	57 00
23	H. B. Schindler	1904	Repairs	46 50
23	J. A. Snook & Co.	1905	Supplies	820 61
23	Harry Unna Co.	1906	Brushes, etc.	385 55
23	Vulcan Iron Works	1907	Repairs	470 05
23	Western Repair and Supply Co.	1908	Chandlery	206 82
23	Warren Improvem't Co.	1909	Rock	27 50
23	Whittier-Coburn Co.	1910	Oil	73 30
23	Western Fuel Co.	1911	Coal	1,522 47
23	Jim Wilder Launch Co.	1912	Towing	15 00
23	Payroll	1913	Chief Wharfinger and Collector	350 00
23	Flinn & Treacy	1914	Gravel	65 00
23	Cowell Lime and Cement Co.	1915	Lime	1 50
23	W. F. Thompson	1916	Repairs	39 60
25	F. Mundt	1917	Teaming	3 50
25	Mercantile Towel Co.	1918	Towels	2 00
25	Thos. Crowley & Bros.	1919	Towing	76 00
25	S.F.Typewriter Exch'ge	1920	Ribbon	1 00
25	H. R. Patterson	1921	Drayage	24 00
25	F. Fautz	1922	Keys	50
25	Healy, Tibbitts & Co.	1923	Construction, Jackson St. Wh'rf.	5,152 50
25	Pacific Construction Co.	1924	Construction, retaining wall	5,977 84
25	S. F. Timber Preserving Company	1925	Creosoting	2,492 91
28	Haslett Warehouse Co.	1926	Weighing	7 51
28	State Treasurer	1927	Remittance	63,751 82
	Total			$142,813 62
Mar. 1	State Controller	1928	S. F. Depot Sinking Fund	$4,631 00
4	Dundon Bridge and Con. Company	1929	Repairs	1,252 64
4	Jas. A. McMahon	1930	Repairs	1,044 60
4	Gray Bros.	1931	Constructing seawall	3,036 79
4	Gray Bros.	1932	Rock	40 25
10	Employés	1933-46	Payroll	25,556 75
10	Robert Wakefield	1947	Constructing slip "A" (D. P. 214)	2,825 00
10	Thomson Bridge Co.	1948	Repairs	1,487 50
10	Dundon Bridge and Con. Company	1949	Repairing slip No. 3 (D. P. 140)	1,092 57
17	Yates & Co.	1950	Paints	283 37
17	Thos. Crowley & Bros.	1951	Towing	104 50
17	J. C. Sala	1952	Repairs	60
17	J. H. O'Brien	1953	Carts and teams	283 00
17	H. R. Rood & Co.	1954	Coating piles	1,340 00
18	James Mathews	1955	Washing	3 50
20	Healy, Tibbitts & Co.	1956	Construction	1,717 20
20	H. R. Rood & Co.	1957	Coating piles	7,620 30
20	Hickman & Masterson	1958	Lumber	2,098 16
20	Hickman & Masterson	1959	Lumber	2,073 22
20	Flinn & Treacy	1960	Paving	1,584 90
20	Annie, Fox and Millie Towboat Co.	1961	Towing	265 00
20	Brooks-Follis Electric Corp.	1962	Supplies	89 00

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Mar. 20	G. F. Bushnell	1963	Frictions	$44 50
20	Betts Spring Co.	1964	Repairs	34 50
20	Baker & Hamilton	1965	Hardware	537 76
20	Boesch Lamp Co.	1966	Repairs	20 00
20	Bancroft-Whitney Co.	1967	Law books	9 30
20	H. S. Crocker Co.	1968	Stationery	99 47
20	N. Clark & Son	1969	Sewer pipe	37 50
20	R. D. Chandler	1970	Coal	575 00
20	City Front Stables	1971	Keeping horses	81 75
20	Cunningham, Curtiss & Welch	1972	Stationery	40 95
20	Evening Post	1973	Advertising	55 00
20	Eagle Paint and Var. Co.	1974	Paints, etc.	79 45
20	Flinn & Treacy	1975	Catch basin	158 00
20	Guide Publishing Co.	1976	Guides	11 00
20	W. T. Garratt & Co.	1977	Repairs	20 25
20	Golden State and Miners' Iron Works	1978	Repairs	56 07
20	Gets Bros. & Co.	1979	Soap	11 00
20	Hammond Lumber Co.	1980	Piles	1,984 71
20	Langley & Michaels	1981	Disinfectants	19 87
20	Merchants' Exchange	1982	Reporting	25 00
20	Marine Exchange	1983	Reporting	25 00
20	McCormick Bros.	1984	Grate bars	70 40
20	Muir Bros.	1985	Repairs	111 69
20	Mutual Elec. Light Co.	1986	Electric lighting	1,815 63
20	P. Noble	1987	Fish plates	402 75
20	H. M. Nagle	1988	Brooms	7 50
20	Pacific Hardware and Steel Co.	1989	Hardware	120 21
20	Pacific Coast Rubber Co.	1990	Packing, etc.	112 47
20	Pac. States Tel. & Tel. Co.	1991	Telephones	193 90
20	Plant Supply Co.	1992	Gauge glasses	19 10
20	Pacific Shipyard and Ways Co.	1993	Spuds	291 50
20	Risdon Iron and Locomotive Works	1994	Repairs	3,814 00
20	Rowlands & Laughton	1995	Repairs	29 03
20	S. F. Dry Dock Co.	1996	Docking tug	126 70
20	Shainwald, Buckbee & Co.	1997	Rent	35 00
20	Studebaker Bros. Co.	1998	Sweeper	275 00
20	Spring Valley Water Co.	1999	Water	265 50
20	James A. Snook & Co.	2000	Hardware	743 62
20	Southern Pacific Co.	1	Repairs	265 92
20	Harry Unna Co.	2	Brooms, etc.	38 35
20	Valvoline Oil Co.	3	Oil	38 45
20	Vulcan Iron Works	4	Repairs	54 37
20	Western Fuel Co	5	Coal	1,334 32
20	Whittier-Coburn Co.	6	Paints and oils	47 48
20	Western Repair and Supply Co.	7	Chandlery	52 80
20	W. H. Davis	8	Legal expenses	150 00
20	J. H. Bruce	9	Constructing mud scows (D. P. 146)	2,662 34
20	H. R. Patterson	10	Drayage	5 00
22	Mercantile Towel Co.	11	Towels	1 00
22	Henry Fautz	12	Repairs	2 25
22	F. Mundt	13	Drayage	7 00
22	H. B. Schindler Co.	14	Repairs	75
22	Cowell Lime and Cement Co.	15	Brick	5 50
22	S. F. Typewriter Exch'ge	16	Ribbon	1 00
23	Hodge Draying Co.	17	Drayage	5 00
27	J. Hendy Machine Wks.	18	Repairs	2 15
28	J. R. Lafontaine	19	Blue prints	1 87

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Mar. 28	Healy, Tibbitts & Co.	20	Construction	$3,711 75
30	E. P. Colgan, Controller	21	Advertising Seawall Act	11,724 30
30	Healy, Tibbitts & Co.	22	Construction	1,049 55
30	Dundon Bridge & Con. Company	23	Repairs	1,388 48
30	R. Marquard	24	Damages	129 50
31	J. Anderson & Son	25	Repairs	5 25
31	M. V. Vanderhoof	26	Expense	9 80
31	State Treasurer	27	Remittances	67,716 87
	Total			$161,201 28
Apr. 1	State Controller	28	S. F. Depot Sinking Fund	$4,631 00
1	F. H. Masow	29	Shed on Broadway Wharf No. 1 (D. P. 196)	3,499 16
10	Employés	30-45	Payroll	27,490 85
10	Robert Wakefield	46	Constructing Pier No. 19 (D. P. 41)	3,089 45
10	Hyde Construction Co.	47	Construction Broadway Wharf No. 1 (D. P. 158)	4,188 50
14	James A. McMahon	48	Repairs	795 90
14	Gray Bros.	49	Rock	2,483 05
14	Healy, Tibbitts & Co.	50	Construction Jackson St. Wharf	3,711 75
14	West Coast Wire and Iron Works	51	Wire fence	389 00
14	Thomson Bridge Co.	52	Slip, Central Basin	1,487 50
14	Gray Bros.	53	Rock	5 50
17	J. R. Hanify	54	Damages	260 70
17	James A. McMahon	55	Shed, Greenwich St. Wharf No. 2 (D. P. 206)	1,841 87
17	Robert Wakefield	56	Constructing Pier No. 21 (D. P. 68)	3,234 42
17	Hickman & Masterson	57	Lumber	1,743 86
17	H. R. Rood & Co.	58	Coating piles	2,540 10
17	Healy, Tibbitts & Co.	59	Addition Howard St. Wharf No. 1	2,290 00
17	Healy, Tibbitts & Co.	60	Constructing scow pile-driver	1,514 81
17	Draft	61	Spoiled	....
17	Healy, Tibbitts & Co.	62	Howard St. Wharf No. 1	457 88
17	Hickman & Masterson	63	Lumber	279 37
21	Pacific Shipyard and Ways Co.	64	Repairing tug "Gov. Irwin"	13,817 22
24	James Mathews	65	Washing	3 50
24	S. F. Dry Dock Co.	66	Constructing dry docks (D. P. 174)	1,560 30
24	Robert Greig	67	Slate roof (D. P. 231)	1,194 00
24	Robert Wakefield	68	Constructing slips Nos. 1 and 2 (D. P. 15)	3,649 75
24	Robert Wakefield	69	Greenwich St. Wharf No. 1 (D. P. 86)	3,221 74
25	Healy, Tibbitts & Co.	70	Repairing spring line (D. P. 253)	3,020 94
25	Southern Pacific Co.	71	Creosoting piles (D. P. 258)	763 87
26	J. C. Sala	72	Repairs	75
27	J. H. O'Brien	73	Carts and teams	337 50
27	Gray Bros.	74	Seawall bet. King and Channel sts. (D. P. 297)	5,609 54
27	Gray Bros.	75	Seawall bet. King and Channel sts. (D. P. 298)	5,609 54
27	Gray Bros.	76	Seawall bet. King and Channel sts. (D. P. 299)	5,609 54
27	Gray Bros.	77	Seawall bet. King and Channel sts. (D. P. 300)	5,609 55
27	Gray Bros.	78	Seawall bet. King and Channel sts. (D. P. 301)	5,609 55
27	Gray Bros.	79	Seawall bet. King and Channel sts. (D. P. 302)	5,609 55
27	Gray Bros.	80	Seawall bet. King and Channel sts. (D. P. 303)	5,609 55
27	Gray Bros.	81	Seawall bet. King and Channel sts. (D. P. 304)	5,609 55

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of	Amount.
1905				
Apr. 27	Gray Bros.	82	Seawall bet. King and Channel sts. (D. P. 305)	$5,609 55
27	Gray Bros.	83	Seawall bet. King and Channel sts. (D. P. 306)	5,609 55
27	Gray Bros.	84	Seawall bet. King and Channel sts. (D. P. 307)	5,609 55
27	Gray Bros.	85	Seawall bet. King and Channel sts. (D. P. 308)	5,609 55
27	Gray Bros.	86	Seawall bet. King and Channel sts. (D. P. 309)	5,609 55
27	Gray Bros.	87	Seawall bet. King and Channel sts. (D. P. 310)	5,609 55
27	Gray Bros.	88	Seawall bet. King and Channel sts. (D. P. 311)	5,609 55
27	Gray Bros.	89	Seawall bet. King and Channel sts. (D. P. 312)	5,609 55
27	Gray Bros.	90	Seawall bet. King and Channel sts. (D. P. 313)	5,609 55
27	Gray Bros.	91	Seawall bet. King and Channel sts. (D. P. 314)	5,609 55
27	Gray Bros.	92	Seawall bet. King and Channel sts. (D. P. 315)	5,609 55
27	Gray Bros.	93	Seawall bet. King and Channel sts. (D. P. 316)	5,609 55
27	Gray Bros.	94	Constructing seawall	2,305 75
27	Frank Gallagher	95	Constructing shed	1,027 50
27	Frank Mundt	96	Hauling	12 00
28	Mercantile Towel Co.	97	Towels	1 00
28	S.F. Typewriter Exch'ge	98	Ribbon	1 00
28	J. O'Kane	99	Repairs	3 00
28	Pacific Towel Supply Co.	100	Towel service	3 00
28	Call, Chronicle, and Examiner	101	Newspapers	13 50
28	George F. Buswell	102	Frictions	60 00
28	Baker & Hamilton	103	Hardware	292 36
28	Cunningham, Curtiss & Welch	104	Stationery	207 97
28	R. D. Chandler	105	Coal	716 15
28	City Street Imp. Co.	106	Repairing, etc.	190 70
28	Chicago Chemical Co.	107	Boiler compound	104 60
28	City Front Stables	108	Keeping horses	77 50
28	H. S. Crocker Co.	109	Stationery	404 40
28	Dept. State Printing	110	Printing reports	647 50
28	Eagle Paint and Varnish Company	111	Paints, etc.	74 13
28	Flinn & Treacy	112	Gravel	195 00
28	Guide Publishing Co.	113	Guides	11 00
28	W. T. Garratt & Co.	114	Repairs	15 00
28	Getz Bros. & Co.	115	Soap, etc.	15 00
28	Hammond Lumber Co.	116	Piles	2,149 11
28	J. Hammond & Co.	117	Draw bars	6 00
28	Julian B. Harries	118	Experting	37 50
28	Joshua Hendy Machine Works	119	Repairs	16 62
28	Marine Exchange	120	Reporting	25 00
28	Merchants' Exchange	121	Reporting	25 00
28	Murray Bros.	122	Gates	14 45
28	Muir Bros.	123	Repairs	164 09
28	Mutual Elec. Light Co.	124	Lighting	1,924 25
28	H. M. Nagle	125	Brooms	9 00
28	North Shore R. R. Co.	126	Damages	27 59
28	Pacific Hardware and Steel Co.	127	Hardware	82 22
28	Plant Supply Co.	128	Repairs	203 50
28	Pacific Coast Rubber Co.	129	Packing	110 17

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904–1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Apr. 28	Pac. States Tel. & Tel. Co.	130	Telephones	$367 95
28	Risdon Iron and Locomotive Works	131	Repairs	1,638 03
28	Rowlands & Laughton	132	Repairs	256 28
28	J. M. Litchfield & Co.	133	Buttons	27 00
28	Langley & Michaels Co.	134	Disinfectant	21 91
28	Shainwald, Buckbee & Co.	135	Rent	35 00
28	James A. Snook & Co.	136	Hardware	579 45
28	Southern Pacific Co.	137	Repairs, etc.	279 04
28	Levi Strauss & Co.	138	Towels	15 00
28	H. B. Schindler	139	Repairs	6 25
28	Spring Valley Water Co.	140	Water	346 90
28	Harry Unna Co.	141	Waste, etc.	18 75
28	Vulcan Iron Works	142	Repairs	18 20
28	Western Fuel Co.	143	Coal	1,284 71
28	Western Repair and Supply Co.	144	Chandlery	41 20
28	Whittier-Coburn Co.	145	Oils	67 05
28	Warren Improv'nt Co.	146	Rock, etc.	273 00
28	Western Union Tel. Co.	147	Rent, clock	15 00
28	M. V. Vanderhoof	148	Expenses	5 40
29	State Treasurer	149	Remittances	72,984 73
	Total			$295,148 62
May 1	State Controller	150	S. F. Depot Sinking Fund	$4,631 00
2	Michael Fleming	151	Injuries	45 00
2	Hodge Draying Co.	152	Drayage	1 31
4	Healy, Tibbitts & Co.	153	Freight slip in Central Basin (D. P. 278)	1,596 82
10	Employés	154-169	Payroll	27,380 95
11	Robert Wakefield	170	Greenwich St. Wh'f No. 2 (D. P. 113)	3,164 92
11	Industrial Home for Adult Blind	171	Brooms	22 80
11	Thomson Bridge Co.	172	Slip, Central Basin	1,487 50
13	James A. McMahon	173	Repairs	1,508 20
13	Healy, Tibbitts & Co.	174	Second Street Wharf	1,749 25
13	Dundon Bridge and Construction Co.	175	Repairs	1,557 36
13	Healy, Tibbitts & Co.	176	Piers Nos. 42 and 44	37,088 21
13	Healy, Tibbitts & Co.	177	Scow pile-driver	504 94
13	Western Iron Works	178	Staircase	3,680 25
13	Wright & Polk	179	Architect fees	298 70
20	A. F. Wiggins	180	Painting flagpole	20 00
22	Thos. Crowley & Bros.	181	Towing	86 50
22	H. R. Patterson	182	Drayage	143 85
22	James Mathews	183	Washing	3 50
22	Baker & Hamilton	184	Hardware	284 51
22	Brooks-Follis Electric Corp.	185	Electric supplies	41 20
22	Boesch Lamp Co.	186	Repairs	3 75
22	Bancroft-Whitney Co.	187	Law books	5 25
22	Betts Spring Co.	188	Repairs	39 00
22	City Front Stables	189	Keeping horses	79 10
22	R. D. Chandler	190	Coal	711 69
22	T. J. Crowley	191	Shoeing horses	10 00
22	Eagle Paint and Varnish Co.	192	Oil	86 40
22	Evening Post	193	Advertising	55 00
22	Flinn & Treacy	194	Repairs	239 00
22	Guide Publishing Co.	195	Guides	11 00
22	Getz Bros.	196	Soap and lye	8 38
22	Hickman & Masterson	197	Lumber	2,190 63
22	Healy, Tibbitts & Co.	198	Addition to Pier No. 5	2,474 50

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
May 22	Hickman & Masterson	199	Lumber	$3,704 28
22	Hammond Lumber Co.	200	Piles	3,858 68
22	J. Hammond & Co.	201	Couplers	37 50
22	Holbrook, Merrill & Stetson	202	Drinking fountain	12 10
22	J. Hendy Machine Wks.	203	Repairs	12 75
22	Fred Miller	204	Shed between Piers No. 9 and 11	1,638 75
22	Marine Exchange	205	Reporting	25 00
22	Merchants' Exchange	206	Reporting	25 00
22	Mutual Elect'c Light Co.	207	Lights	1,673 08
22	Nat. Bank D. O. Mills & Co.	208	Exchange	138 45
22	H. M. Nagle	209	Brooms	7 50
22	E. F. Niehaus & Co.	210	Iron bark	38 03
22	Pacific Coast Rubber Co.	211	Packing	125 24
22	Pacific Hardware and Steel Co.	212	Hardware	179 88
22	Plant Supply Co.	213	Glasses	8 16
22	Rowlands & Laughton	214	Repairs	81 29
22	S. F. Timber Preserving Company	215	Preserving piles	1,643 63
22	Shainwald, Buckbee & Company	216	Rent	35 00
23	S. F. Sawdust & Sand Co.	217	Sawdust	10 00
23	Spring Valley Water Co.	218	Water	302 45
23	J. A. Snook & Co.	219	Hardware	998 27
23	Thomas Day Co.	220	Fixtures	50 00
23	Harry Unna Co.	221	Dusters, etc.	91 22
23	Valvoline Oil Co.	222	Oil	37 48
23	Western Repair and Supply Co.	223	Chandlery	108 31
23	Western Fuel Co.	224	Coal	1,034 27
23	Williams & Bilser	225	Basalt blocks	270 00
23	Whittier-Coburn Co.	226	Oil	91 81
23	James H. O'Brien	227	Teams, etc.	312 50
23	Pacific Construction Co.	228	Constructing dolphins	4,483 38
25	Pacific Construction Co.	229	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 317)	2,988 92
25	Pacific Construction Co.	230	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 318)	2,988 92
25	Pacific Construction Co.	231	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 319)	2,988 92
25	Pacific Construction Co.	232	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 320)	2,988 92
25	Pacific Construction Co.	233	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 321)	2,988 92
25	Pacific Construction Co.	234	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 322)	2,988 92
25	Pacific Construction Co.	235	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 323)	2,988 92
25	Pacific Construction Co.	236	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 324)	2,988 92
25	Pacific Construction Co.	237	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 325)	2,988 92
25	Pacific Construction Co.	238	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 326)	2,988 92
25	Pacific Construction Co.	239	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 327)	2,988 92
25	Pacific Construction Co.	240	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 328)	2,988 92
25	Pacific Construction Co.	241	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 329)	2,988 92
25	Pacific Construction Co.	242	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 330)	2,988 92
25	Pacific Construction Co.	243	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 331)	2,988 92

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
May 25	Pacific Construction Co.	244	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 332)	$2,988 92
25	Pacific Construction Co.	245	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 333)	2,988 92
25	Pacific Construction Co.	246	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 334)	2,988 92
25	Pacific Construction Co.	247	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 335)	2,988 92
25	Pacific Construction Co.	248	Constructing dolphins bet. slips 3, 4, 5, 6 (D. P. 336)	2,988 92
25	Hannah Bros.	249	Shed on Pier No. 5	1,341 90
25	Holmes Lime Co.	250	Cement dolphins	1,688 36
31	M. V. Vanderhoof	251	Expense	5 20
31	State Treasurer	252	Remittances	66,530 02
	Total			$241,588 36
June 1	State Controller	253	S. F. Depot Sinking Fund	$4,631 00
2	James A. McMahon	254	Repairs	1,817 40
9	Employés	255-269	Payroll	28,170 30
9	Robert Wakefield	270	Constructing Slip A (D. P. 215)	2,825 00
10	A. Winslow	271	Painting smokestack	10 00
12	F. Mundt	272	Drayage	14 95
12	Healy, Tibbitts & Co.	273	Vallejo St. Wharf	2,295 76
12	Wheaton & Kalloch	274	Legal expense	1,500 00
12	Murray Bros.	275	Engine, scow pile-driver	1,365 00
12	Frank Gallagher	276	Shed between Piers 25-27	342 50
12	Pacific Construction Co.	277	Cutting I beams	104 50
12	Healy, Tibbitts & Co.	278	Piers Nos. 42 and 44	24,725 48
16	Healy, Tibbitts & Co.	279	Scow pile-driver No. 2	573 25
16	Hannah Bros.	280	Shed, Jackson St. wharf	1,174 16
16	James A. McMahon	281	Repairs	359 60
16	Western Iron Works	282	Staircase	1,226 75
16	Hickman & Masterson	283	Lumber	2,206 20
16	Hickman & Masterson	284	Lumber	458 70
19	Thomson Bridge Co.	285	Slip, Central Basin	1,487 50
21	Wm. Ernst	286	Repairs	4 50
22	Holmes Lime Co.	287	Drayage on cement	3 25
22	F. Mundt	288	Drayage	13 50
22	Wing Fung & Co.	289	Bale reeds	13 00
22	Mercantile Towel Service	290	Towel service	2 00
22	Henry Fautz	291	Repairs	2 50
22	Thos. Kelly & Sons	292	Team hire	8 00
22	S. F. Towel Co.	293	Towel service	7 00
22	J. C. Sala	294	Repairs	12 00
22	James H. O'Brien	295	Teams and carts	325 00
22	N. Clark & Sons	296	Sewer pipe	3 00
22	Hodge Draying Co.	297	Drayage	30 80
23	S. F. Typewriter Exch'ge	298	Ribbon	1 00
23	Haslett Warehouse Co.	299	Weighing cement	14 44
23	E. B. Lovejoy	300	Carving	2 50
23	Brooks-Follis Electric Corp.	301	Wire, etc.	122 50
23	Bancroft-Whitney Co.	302	Law books	8 80
23	Baker & Hamilton	303	Hardware	390 01
23	John H. Burns	304	Skiffs	71 71
23	James Byrne, Jr.	305	Petty cash expenses	253 10
23	George F. Buswell	306	Repairs	4 25
23	Bates Spring Co.	307	Repairs	10 00
23	A. Carlisle & Co.	308	Stationery	190 35
23	H. Cowell Lime and Cement Co.	309	Brick	10 50
23	City Front Stables	310	Horse keeping	86 75
23	R. D. Chandler	311	Coal	701 60
23	Cunningham, Curtiss & Welch	312	Stationery	88 50

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1904-1905—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
June 23	Dunham, Carrigan & Hayden	313	Chain	$17 22
23	Geo. E. Dow Pumping Engine Co.	314	Repairs	17 40
23	Eagle Paint & Var. Co.	315	Paints, etc.	135 80
23	Flinn & Treacy	316	Gravel	65 00
23	E. M. Graney	317	Shoeing horses	10 00
23	Golden State and Miners' Iron Works	318	Repairs	13 25
23	J. Hendy Machine W'ks	319	Brake shoes	19 35
23	Hammond Lumber Co.	320	Piles	1,157 47
23	Merchants' Exchange	321	Reporting	25 00
23	Marine Exchange	322	Reporting	25 00
23	W. J. Martin	323	Cleaning fluid	15 00
23	Murray Bros.	324	Shafts, etc.	283 95
23	Murray Bros.	325	Steam gauge	2 10
23	Muir Bros.	326	Repairs	420 74
23	Mutual Elec. Light Co.	327	Lights	1,716 69
23	Pacific Coast Rubber Co.	328	Packing, etc.	85 89
23	Pacific Hardware and Steel Co.	329	Hardware	93 20
23	Pac States Tel. & Tel. Co.	330	Telephones	364 10
23	Plant Supply Co.	331	Waste, etc.	37 92
23	Risdon Iron and Locotive Works	332	Repairs	50 80
23	Rowlands & Laughton	333	Repairs	21 31
23	J A. Roebling's Sons Co	334	Sockets	5 70
23	Shainwald, Buckbee & Co.	335	Rent	35 00
23	J. A. Snook & Co.	336	Hardware	543 33
23	Studebaker Bros. Co.	337	Sprinkling wagon	490 00
23	H. B. Schindler Co.	338	Repairs	36 25
23	Spring Valley Water Co.	339	Water	327 55
23	Southern Pacific Co.	340	Repairs, etc.	279 04
23	Southern Pacific Co.	341	Repairs	160 88
23	Harry Unna Co.	342	Brushes, etc.	17 00
23	Valvoline Oil Co.	343	Oil	33 80
23	United States Laundry	344	Washing	75 90
23	Western Repair and Supply Co.	345	Chandlery	52 34
23	Warren Imp. Co.	346	Sand	50 00
23	Whittier-Coburn Co.	347	Oil	68 14
23	Western Fuel Co.	348	Coal	924 45
23	Guide Publishing Co.	349	Guides	11 00
23	Getz Bros. & Co.	350	Soap, etc.	16 88
23	Frank Gallagher	351	Leader pipe	9 95
23	Hannah Bros.	352	Shed, Jackson Street Wharf	838 69
23	Chas. Waltz	353	Repairing safe	1 50
26	J. R. LaFontaine	354	Blue prints	2 89
26	James Mathews	355	Washing	3 50
30	Henry R. Patterson	356	Drayage	67 36
30	State Treasurer	357	Remittance	72,676 94
				$159,074 88
30	S. F. Harbor Improvement Fund (Journal, p. 33), Draft No. 1999 returned and canceled			279 04
	Total			$159,353 92
	Total for year			$2,507,969 29

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906.

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
July 1	State Controller	358	S. F. Depot Sinking Fund	$4,631 00
1	F. H. Masow	359	Shed on Broadway Wharf No. 1 (D. P. 197)	3,499 16
7	Fred Miller	360	Building on bulkhead between Piers Nos. 9-11	546 25
10	Employés	361-75	Payroll	28,200 25
10	Robert Wakefield	376	Constructing Pier No. 19 (D. P. 42)	3,089 45
10	Hyde Construction Co.	377	Constructing Broadway Wharf No. 1 (D. P. 159)	4,188 50
14	California Mill Co.	378	Mill work	206 19
14	T. Crowley & Bros.	379	Towing	220 50
14	Holmes Lime Co.	380	Cement-dolphins	1,092 48
14	James A. McMahon	381	Shed on Greenwich St. Wharf No. 2 (D. P. 207)	1,841 87
15	S. D. LeClair	382	Repairing Broadway Wharf No. 2 (D. P. 201)	3,143 20
18	Yates & Co.	383	Paints and oils	379 01
18	Robert Wakefield	384	Constructing Pier No. 21 (D. P. 69)	3,234 42
21	James H. O'Brien	385	Teams and carts	325 00
21	Holmes Lime Co.	386	Cement	5,929 26
21	Healy, Tibbitts & Co.	387	Constructing Piers Nos. 42-44	24,725 47
21	Hickman & Masterson	388	Lumber	2,090 63
21	Hickman & Masterson	389	Lumber	416 08
21	Mutual Elec. Light Co.	390	Lights	1,639 50
21	Guide Publishing Co.	391	Guides	11 00
21	Julian B. Harries	392	Experting books	37 50
21	Merchants' Exchange	393	Reporting	25 00
21	Marine Exchange	394	Reporting	25 00
21	Pioneer Sawdust and Sand Co.	395	Sawdust	12 50
21	Shainwald, Buckbee & Co.	396	Rent	35 00
21	R. D. Chandler	397	Coal	711 57
21	Western Fuel Co.	398	Coal	807 15
21	H. B. Schindler Co.	399	Repairs	29 75
21	Spring Valley Water Co.	400	Water	283 00
21	Southern Pacific Co.	401	Repairs	196 01
21	Baker & Hamilton	402	Hardware	234 62
22	Thos. Crowley & Bros.	403	Towing	76 00
22	S. F. Dry Dock Co.	404	Constructing dry docks (D. P. 175)	1,560 30
22	Robert Greig	405	Slate roof (D. P. 232)	1,194 00
22	Healy, Tibbitts & Co.	406	Repairing spring line (D. P. 254)	3,020 95
22	Smith-Rice Co.	407	Spars	75 00
22	O. F. Palmer	408	Cleaning windows	60 50
22	F. Mundt	409	Drayage	8 50
24	J. C. Sala	410	Repairs	6 50
24	James Mathews	411	Washing	3 50
24	Call, Chronicle, and Examiner	412	Newspapers	13 50
25	Henry Fautz	413	Repairs	1 00
25	Cowell Lime and Cement Co.	414	Plaster	2 50
25	Pacific Towel Supply Co.	415	Towel service	3 00
25	Robert Wakefield	416	Construction of slips Nos. 1-2 (D. P. 16)	3,649 75
25	Robert Wakefield	417	Greenwich St. Wh'rf No. 1 (D.P. 87)	3,221 74
26	Henry R. Patterson	418	Drayage	31 12
26	Bancroft-Whitney Co.	419	Law books	9 00
26	City Front Stables	420	Keeping horses	82 25
26	Cunningham, Curtiss & Welch	421	Stationery, etc.	36 50
26	Crocker-Langley Directory	422	Directories	10 00
26	G. E. Dow Pumping Engine Co.	423	Repairs	32 50

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
July 26	Eagle Paint and Varnish Co.	424	Paints, etc.	$72 90
26	Flinn & Treacy	425	Basalt blocks	400 00
26	Golden Gate and Miners' Iron Works	426	Repairs	73 76
26	Hammond Lumber Co.	427	Piles	1,474 06
26	Hockwald Chemical Co.	428	Disinfectant	82 50
26	G. M. Josselyn & Co.	429	Flags	4 00
26	Murray Bros.	430	Repairs	35 35
26	Noppel Pump Co.	431	Pump	12 50
26	Western Repair and Supply Co.	432	Chandlery	117 17
26	Payne's Bolt Works	433	Bolts	71 70
26	Pacific Coast Rubber Co.	434	Packing	55 86
26	Pacific Hardware and Steel Co.	435	Hardware	112 87
26	Plant Supply Co.	436	Packing	6 60
26	Risdon Iron and Locomotive Works	437	Repairs	358 59
26	J. A. Snook & Co.	438	Chandlery, etc.	627 03
26	Harry Unna Co.	439	Brushes, etc.	45 38
26	U. S. Laundry Ass'n	440	Washing	9 95
26	Valvoline Oil Co.	441	Oils	16 00
26	Whittier-Coburn Co.	442	Oil	73 93
26	Warren Improvem't Co.	443	Sand	115 00
26	A. Carlisle & Co.	444	Stationery	227 75
26	Hyde-Harjes Co.	445	Springs	125 00
26	Callahan Paint Co.	446	Repairing tug "Gov. Irwin"	953 01
26	Moore & Scott Iron Works	447	Repairs	280 05
26	Holmes Lime Co.	448	Cement	48 07
26	S. O. Pasquinucci	449	Repairing pile-driver	515 00
26	S.F. Typewriter Exch'ge	450	Repairs	7 00
26	Southern Pacific Co.	451	Creosoting piles (D. P. 259)	763 87
28	Cornell & Co.	452	Repairs	9 30
28	Hannah Bros.	453	Shed, Jackson street	1,118 25
28	Gray Bros.	454	Constructing seawall (D. P. 297)	5,609 54
31	C. Masoero	455	Veterinary services	5 00
31	M. V. Vanderhoof	456	Expense	10 40
31	State Treasurer	457	Remittance	69,864 69
	Total			$188,206 51
Aug. 1	State Controller	458	S. F. Depot Sinking Fund	$4,631 00
3	P. H. Pendergast	459	Inspector	65 00
3	Magic Metal Polish Co.	460	Polish	17 50
3	J. Anderson & Son	461	Repairs	2 75
3	Healy, Tibbitts & Co.	462	Slip in Central Basin (D. P. 279)	1,596 82
3	Healy, Tibbitts & Co.	463	Pier No. 13	4,591 52
3	Eureka Boiler Works	464	Repairs	2 75
3	Healy, Tibbitts & Co.	465	Repairs	250 00
4	California Mill Co.	466	Mill work	420 51
9	Yates & Co.	467	Paints and oils	1,053 47
10	Employés	468-82	Payroll	26,358 15
10	Robert Wakefield	483	Greenwich Street Wharf No. 2	3,164 92
14	Healy, Tibbitts & Co.	484	Constructing Second St. Trestle	1,500 00
14	H. S. Crocker Co.	485	Printing bonds	1,000 00
14	Healy, Tibbitts & Co.	486	Piers Nos. 42 and 44	49,450 95
14	Holmes Lime Co.	487	Cement	6,442 63
14	Hickman & Masterson	488	Lumber	1,579 09
14	Lorain Steel Co.	489	Steel rails	1,293 39
14	Hickman & Masterson	490	Lumber	655 36
19	James H. O'Brien	491	Teams	300 00
24	Mutual Elec. Light Co.	492	Lights	1,726 80
24	Pac. States Tel. & Tel. Co.	493	Telephones	372 47

EXHIBIT B.—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Aug. 24	J. Metcalfe	494	Registers	$24 00
24	Flinn & Treacy	495	Gravel	65 00
24	Boesch Lamp Co.	496	Repairs	4 25
24	Baker & Hamilton	497	Hardware	247 64
24	City Front Stables	498	Keeping horses	89 60
24	R. D. Chandler	499	Coal	707 12
24	Falkenan Assaying Co.	500	Examining paint	25 00
24	W. F. Garratt & Co.	501	Repairs	33 30
24	Guide Publishing Co.	502	Guides	11 00
24	Getz Bros. & Co.	503	Soap, etc.	24 38
24	J. Hendy Machine Wks.	504	Repairs	5 10
24	Hammond Lumber Co.	505	Piles	2,168 21
24	J. J. Haviside & Co.	506	Repairs	130 00
24	Marine Exchange	507	Reporting	25 00
24	Merchants' Exchange	508	Reporting	25 00
24	Murray Bros.	509	Repairs	63 40
24	C. C. Moore & Co.	510	Repairs	42 90
24	Muir Bros.	511	Repairs	26 87
24	Moore & Scott Iron Wks.	512	Repairs	145 75
24	H. M. Nagle	513	Brooms	7 50
24	Pacific Hardware and Steel Co.	514	Hardware	204 87
24	Plant Supply Co.	515	Packing	22 75
24	Pacific Coast Rubber Co.	516	Hose, etc.	24 31
24	J. A. Snook & Co.	517	Hardware	564 46
24	Shainwald, Buckbee & Co.	518	Rent	35 00
24	Spring Valley Water Co.	519	Water	334 80
24	George H. Tay & Co.	520	Tin	206 25
24	Harry Unna Co.	521	Brooms, etc.	120 45
24	U. S. Laundry Ass'n	522	Washing	2 95
24	Whittier-Coburn Co.	523	Oil	14 84
24	L. E. White Lumber Co.	524	Railroad ties	202 40
24	Western Fuel Co.	525	Coal	840 20
24	Western Repair and Supply Co.	526	Chandlery	74 76
24	Woodin & Little	527	Tank	41 50
24	Pacific Construction Co.	528	Constructing dolphins (D.P. 317)	2,988 92
26	H. R. Patterson	529	Drayage	37 89
26	T. Crowley & Bros.	530	Towing	80 00
26	Charles Waltz	531	Cleaning safe lock	1 50
26	Henry Fautz	532	Repairs	1 00
26	Haslett Warehouse Co.	533	Weighing cement	6 42
28	L. P. McCarthy	534	Statistician and Economist	3 50
28	Mercantile Towel Co.	535	Washing	2 00
28	J. R. LaFontaine	536	Blue prints	3 81
28	Yates & Co.	537	Paints and oil	23 39
28	J. C. Sala	538	Repairs	1 85
28	Industrial Home for Adult Blind	539	Brooms	22 80
28	H. Cowell Lime and Cement Co.	540	Brick, etc.	1 55
28	G. Graham	541	Oats	13 14
30	M. V. Vanderhoof	542	Expense	5 20
31	State Treasurer	543	Remittance	71,374 54
	Total			$187,603 15
Sept. 1	State Controller	544	S. F. Depot Sinking Fund	$4,631 00
10	Employés	545–60	Payroll	28,539 10
13	Gray Bros.	561	Rock	10 50
13	Robert Wakefield	562	Constructing ferry slip "A" (D. P. 216)	2,825 00
15	Vermont Marble Co.	563	Repairs in Nave	108 75
15	Pacific Refining and Roofing Co.	564	Roofs on sheds, slips No. 3–4	380 25

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Sept. 15	Western Fuel Co.	565	Repairs Folsom St. Wharf No. 2	$2,500 00
15	Holmes Lime Co.	566	Cement for Piers Nos. 42-44	8,111 88
15	Healy, Tibbits & Co.	567	Constructing Pier No. 13	4,591 52
15	Healy - Tibbitts Construction Co.	568	Repairs to Lombard St. slips	1,438 93
22	James Mathews	569	Washing	7 00
23	Healy, Tibbitts & Co.	570	Constructing Piers No. 42-44	37,088 21
23	California Mill Co.	571	Mill work	184 44
23	Yates & Co.	572	Paints and oils	164 39
23	Hickman & Masterson	573	Lumber	2,412 79
23	Hickman & Masterson	574	Lumber	496 58
26	James Byrne, Jr.	575	Petty expenses	275 64
26	Brooks-Follis Electric Corp.	576	Electrical goods	5 45
26	M. H. Barry	577	Collector	41 95
26	Baker & Hamilton	578	Hardware	625 49
26	Bellingham Bay Imp. Co.	579	Lumber	206 90
26	Boesch Lamp Co.	580	Repairs	7 75
26	A. Carlisle & Co.	581	Stationery	174 21
26	Cunningham, Curtiss & Welch	582	Stationery	100 15
26	City Front Stables	583	Keeping horses	87 50
26	T. J. Crowley	584	Shoeing horses	7 50
26	R. D. Chandler	585	Coal	903 88
26	Abner Doble & Co.	586	Steel	22 97
26	Evening Post	587	Advertising	130 00
26	Eagle Paint and Var. Co.	588	Paints	77 50
26	Flinn & Treacy	589	Basalt blocks	557 70
26	Guide Publishing Co.	590	Guides	11 00
26	W. T. Garratt & Co.	591	Repairs	5 45
26	E. M. Graney	592	Shoeing horses	10 00
26	Getz Bros. & Co.	593	Soap, etc.	16 88
26	Hammond Lumber Co.	594	Lumber	3,272 44
26	Langley & Michaels	595	Soap	15 12
26	Merchants' Exchange	596	Reporting	25 00
26	Marine Exchange	597	Reporting	25 00
26	Midvale Steel Co.	598	Railroad ties	126 00
26	Moore & Scott Iron Works	599	Repairs	179 80
26	Muir Bros.	600	Repairs	379 82
26	Mutual Elec. Light Co.	601	Electric lighting	1,776 58
26	H. M. Nagle	602	Brooms	13 50
26	Pioneer Sawdust and Sand Co.	603	Sawdust	12 50
26	Pacific Coast Rubber Co.	604	Hose, etc.	125 29
26	Pacific Hardware and Steel Co.	605	Hardware	177 12
26	Pac States Tel. & Tel Co.	606	Telephones	191 70
26	Pacific Shipyards and Ways Co.	607	Repairs	347 66
26	H. R. Rood & Co.	608	Creosoting piles	1,964 00
26	Rowlands & Laughton	609	Repairs	261 95
26	Eugene Sullivan	610	Collector	41 95
26	Shainwald, Buckbee & Co.	611	Rent	35 00
26	J. A. Snook & Co.	612	Hardware	760 97
26	Spring Valley Water Co.	613	Water	353 60
26	Harry Unna Co.	614	Waste, etc.	20 46
26	U. S. Laundry Ass'n	615	Washing	4 30
26	Warren Imp. Co.	616	Sand	51 00
26	Western Repair and Supply Co.	617	Chandlery	279 40
26	Western Fuel Co.	618	Coal	816 78
26	Whittier-Coburn Co.	619	Paints, etc.	82 13

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Sept. 26	James H. O'Brien	620	Teams and carts	$337 50
26	Haslett Warehouse Co.	621	Weighing cement	10 99
26	F. Mundt	622	Teaming	6 00
27	Thos. Crowley & Bros.	623	Towing	107 50
27	H. R. Patterson	624	Teaming	58 72
27	J. C. Sala	625	Repairs	5 75
27	S. F. Typewriter Exch'ge	626	Ribbon	1 00
28	P. Nickelmann	627	Harness	40 00
28	Western Union Tel. Co.	628	Rent of clock	3 00
28	S. O. Pasquinucci	629	Repair of skiff	15 00
28	S. F. Towel Co.	630	Towel service	7 00
28	Mercantile Towel Supply and Laundry Co.	631	Towel service	1 00
28	Cal. Artistic Metal and Wire Co.	632	Bolts, etc.	7 00
28	J. E. Taylor	633	Brooms	8 00
30	M. V. Vanderhoof	634	Expense	5 40
30	State Treasurer	635	Remittance	104,090 16
	Total			$212,801 35
Oct. 2	State Controller	636	S. F. Depot Sinking Fund	$4,631 00
3	L. Brundage	637	Teaming	131 95
10	Employés	638–53	Payroll	27,394 75
10	Robert Wakefield	654	Constructing Pier No. 19 (D. P. 43)	3,089 45
10	Hyde Construction Co.	655	Constructing Broadway Wharf No. 1 (D. P. 160)	4,188 50
17	Robert Wakefield	656	Constructing Pier No. 21 (D. P. 70)	3,234 42
20	James Mathews	657	Washing	3 50
21	Vermont Marble Co.	658	Repairs	36 25
21	Pacific Refining and Roofing Co.	659	Covering roof	126 75
21	Healy, Tibbitts & Co.	660	Constructing Piers Nos. 42–44	12,362 74
21	Healy-Tibbitts Con. Co.	661	Repairing dolphins	479 65
21	Holmes Lime Co.	662	Cement Piers Nos. 42–44	5,344 92
21	Darby Laydon	663	Repairs to Slip No. 7	879 70
21	Hickman & Masterson	664	Lumber	2,104 61
21	Hickman & Masterson	665	Lumber	295 33
21	James A. McMahon	666	Shed on Greenwich Street Wharf No. 2 (D. P. 208)	1,841 87
21	California Mill Co.	667	Mill work	29 72
21	Yates & Co.	668	Paints and oil	261 09
21	James H. O'Brien	669	Teams	300 00
25	Baker & Hamilton	670	Hardware	713 11
25	Brooks-Follis Elec. Co.	671	Supplies	67 64
25	A. Carlisle & Co.	672	Stationery	183 67
25	City Front Stables	673	Keeping horses	86 25
25	R. D. Chandler	674	Coal	825 25
25	H. Cowell Lime and Cement Co.	675	Cement	72 50
25	Cunningham, Curtiss & Welch	676	Stationery	13 50
25	Chas. F. Doe & Co.	677	Lumber	877 76
25	Geo. E. Dow Pumping Engine Co.	678	Repairs	8 10
25	Eagle Paint and Var. Co.	679	Paint	40 00
25	Guide Publishing Co.	680	Guides	11 00
25	Hammond Lumber Co.	681	Piles	1,511 14
25	Julian B. Harries	682	Experting books	37 50
25	Merchants' Exchange	683	Reporting	25 00
25	Marine Exchange	684	Reporting	25 00
25	Murray Bros.	685	Repairs	138 45
25	Mutual Elec. Light Co.	686	Electric lighting	1,540 28
25	H. M. Nagle	687	Brooms	7 50
25	Plant Supply Co.	688	Waste	27 84

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Oct. 25	Pac. States Tel. & Tel. Co.	689	Telephones	$188 85
25	Pacific Hardware and Steel Co.	690	Hardware	50 60
25	Pacific Coast Rubber Co.	691	Packing, etc.	88 26
25	Pacific Shipyards and Ways Co.	692	Repairs	3,715 18
25	Southern Pacific Co.	693	Repairs	1,095 98
25	Shainwald, Buckbee & Co.	694	Rent	35 00
25	Spring Valley Water Co.	695	Water	338 50
25	J. A. Snook & Co.	696	Hardware	510 74
25	H. B. Schindler & Co.	697	Repairs	350 50
25	Valvoline Oil Co.	698	Oil	33 15
25	U. S. Laundry Ass'n	699	Washing	3 55
25	Harry Unna Co.	700	Brushes	173 95
25	Western Repair and Supply Co.	701	Chandlery	128 55
25	Whittier-Coburn Co.	702	Oil	9 35
25	Warren Imp. Co.	703	Sand	93 00
25	West Coast Wire and Iron Works	704	Partitions	272 50
25	Western Fuel Co.	705	Coal	667 51
25	Risdon Iron and Locomotive Works	706	Repairs	7 50
25	S. F. Dry Dock Co.	707	Constructing dry docks (D. P. 176)	1,560 30
25	Southern Pacific Co.	708	Creosoting piles for slip (D. P. 260)	763 87
25	Robert Greig	709	Slate roof, Union Depot	1,194 00
25	Robert Wakefield	710	Greenwich St. Wharf No. 1 (D. P. 88)	3,221 74
25	Call, Cronicle, and Examiner	711	Newspapers	13 50
25	F. Mundt	712	Teaming	5 00
26	Pacific Towel Supply Co.	713	Towel service	3 00
26	G. W. & Jas. Dickie	714	Examining beams	30 00
26	T. Crowley & Bros. Co.	715	Towing	62 50
26	P. L. Jones & Co.	716	Repairs	17 25
26	H. R. Patterson	717	Teaming	63 59
26	De Lano Bros.	718	Repairs	3 35
26	F. W. Brooks & Co.	719	Liquid stone	8 00
27	H. Fautz	720	Keys	1 75
28	Gray Bros.	721	Constructing seawall	5,609 54
30	Haslett Warehouse Co.	722	Weighing	13 11
30	M. E. Arnerich	723	Wharfinger	52 40
30	Healy, Tibbitts & Co.	724	Spring line of slips 1, 3, 4, 6, and 7 (D. P. 255)	3,020 95
31	State Treasurer	725	Remittance	81,747 75
	Total			$178,101 96
Nov. 1	State Controller	726	S. F. Depot Sinking Fund	$4,631 00
6	Robert Wakefield	727	Greenwich St. Wharf No. 2 (D. P. 115)	3,164 92
8	Darby Laydon	728	Repairs to Slip No. 7	692 00
10	Employés	729-42	Payroll	28,107 00
11	Healy, Tibbitts & Co.	743	Constructing Vallejo St. Wharf	5,739 40
11	Holmes Lime Co.	744	Cement for Piers Nos. 42-44	2,778 31
11	H. C. Holmes & Carl Uhlig	745	Use of patent	2,500 00
11	Wheaton & Kalloch	746	Legal expenses	1,500 00
15	Wm. Barlow	747	Piles	17 50
17	Frank Butz	748	Salvage	15 00
17	J. H. O'Brien	749	Teams and carts	325 00
17	James Mathews	750	Washing	3 50
18	Yates & Co.	751	Paints, etc.	348 06
21	Magic Metal Polish Co.	752	Polish	17 50

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905–1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Nov. 21	J. Anderson & Son	753	Repairs	$3 60
21	Hickman & Masterson	754	Lumber	2,485 55
21	Healy, Tibbitts & Co.	755	Constructing freight ferry slip (D. P. 280)	1,596 82
23	Bishop's A B C Guide	756	Guides	2 50
23	Hickman & Masterson	757	Lumber	550 26
23	Baker & Hamilton	758	Hardware	415 16
23	Brooks-Follis Electric Corp	759	Electric supplies	20 35
23	R. D. Chandler	760	Coal	871 90
23	Cunningham, Curtiss & Welch	761	Toilet paper	15 00
23	City Front Stables	762	Keeping horses	89 50
23	Chas. F. Doe & Co.	763	Lumber	721 23
23	Evening Post	764	Advertising	50 00
23	Eagle Paint and Varnish Co.	765	Paints, etc.	74 22
23	Geo. H. Fuller Desk Co.	766	Setters	48 55
23	Guide Publishing Co.	767	Guides	11 00
23	Getz Bros. Co.	768	Soap	27 13
23	Hammond Lumber Co.	769	Piles	1,914 17
23	J. Hendy Machine Wks.	770	Repairs	473 03
23	Marine Exchange	771	Reporting	25 00
23	Merchants' Exchange	772	Reporting	25 00
23	J. R. McGuffick & Co.	773	Oil	40 03
23	Mutual Elec. Light Co.	774	Electric lighting	1,565 72
23	H. M. Nagle	775	Brooms	7 50
23	Pacific Hardware and Steel Co.	776	Hardware	183 89
23	Pacific Coast Rubber Co.	777	Packing, etc.	82 45
23	Plant Supply Co.	778	Waste, etc.	33 52
23	Pacific Shipyards and Ways Co.	779	Repairs	252 05
23	Pac. States Tel. & Tel. Co.	780	Telephones	183 10
23	J. A. Roebling's Sons Co.	781	Wire rope	54 82
23	Rowlands & Laughton	782	Repairs	12 53
23	Shainwald, Buckbee & Co.	783	Rent	35 00
23	J. A. Snook & Co.	784	Hardware	737 35
23	Southern Pacific Co.	785	Repairs	47 95
23	Spring Valley Water Co.	786	Water	382 45
23	George H. Tay Co.	787	Tin	165 50
23	Harry Unna Co.	788	Brushes	34 40
23	U. S. Laundry Ass'n	789	Washing	4 25
23	Whittier-Coburn Co.	790	Oil	65 71
23	Western Fuel Co.	791	Coal	898 86
23	Warren Improvem't Co.	792	Sand	55 00
23	Western Repair and Supply Co.	793	Chandlery	78 13
23	Healy, Tibbitts & Co.	794	Piers Nos. 42 and 44	12,362 74
23	F. Mundt	795	Teaming	6 00
24	Crane Company	796	Hinges	1 63
24	Buffalo Machine Works	797	Repairs	10 00
24	H. Fautz	798	Repairs	50
24	Haslett Warehouse Co.	799	Weighing	17 11
24	Payne's Bolt Works	800	Bolts	4 00
24	Thos. Crowley & Bros.	801	Towing	53 50
24	J. R. LaFontaine	802	Blue prints	4 03
24	Henry R. Patterson	803	Teaming	87 13
24	Bancroft-Whitney Co.	804	Law books	2 30
24	Robert Wakefield	805	Addition to Pier No. 25	5,372 32
24	Healy, Tibbitts & Co.	806	Extras, Piers Nos. 42 and 44	500 00
24	B. Gheffoli & Co.	807	Repairs	21 30
24	California Mill Co.	808	Mill work	101 78
25	Frank E. Smith & Co.	809	Repairs	6 00

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905–1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Nov. 25	Pacific Construction Co.	810	Construction of dolphins	$2,988 92
29	M. V. Vanderhoof	811	Expense	10 20
29	State Treasurer	812	Remittance	77,014 34
	Total			$162,743 17
Dec. 1	State Controller	813	S. F. Depot Sinking Fund	$4,631 00
9	Employés	814–29	Payroll	27,433 25
12	H. C. Holmes and Carl Uhlig	830	Use of patent	2,500 00
12	Robert Wakefield	831	Constructing Slip "A" (D. P. 217)	2,825 00
15	Holmes Lime Co.	832	Cement, Piers Nos. 42 and 44	9,535 66
22	James Mathews	833	Washing	3 50
27	Edward Desmond	834	Salvage on piles	3 00
28	J. H. O'Brien	835	Teams and carts	312 50
28	Robert Wakefield	836	Constructing Greenwich St. Wharf No. 2	5,372 33
28	Holmes Lime Co.	837	Cement, Greenwich St. Wharf No. 2	1,802 91
28	Hickman & Masterson	838	Lumber	4,182 47
28	George F. Buswell	839	Frictions	60 00
28	Hickman & Masterson	840	Lumber	538 43
28	Baker & Hamilton	841	Hardware	487 86
28	J. Browell	842	Chimney	10 50
28	Brooks-Follis Electric Corp	843	Electric supplies	80 72
28	Cunningham, Curtiss & Welch	844	Stationery, etc.	115 90
28	Callahan Paint Co.	845	Painting tug "Gov. Markham"	68 95
28	Christenson Lumber Co.	846	Poles	130 00
28	City Front Stables	847	Keeping horses	92 40
28	Chicago Chemical Co.	848	Boiler compound	100 00
28	A. Carlisle & Co.	849	Stationery	260 60
28	R. D. Chandler	850	Coal	827 69
28	H. Cowell Lime and Cement Co.	851	Brick, etc.	17 88
28	Evening Post	852	Advertising	55 00
28	Flinn & Treacy	853	Basalt, etc.	522 70
28	Getz Bros. & Co.	854	Soap	14 00
28	W. F. Garratt & Co.	855	Repairs	29 25
28	Guide Publishing Co.	856	Guides	11 00
28	Hammond Lumber Co.	857	Piles	1,508 61
28	J. Hendy Machine Wks.	858	Repairs	7 30
28	J. R. McGuffick & Co.	859	Oil, etc.	39 68
28	Marine Exchange	860	Reporting	25 00
28	Merchants' Exchange	861	Reporting	25 00
28	Murray Bros.	862	Repairs	21 00
28	Moore & Scott Iron Wks.	863	Repairs	533 75
28	Mutual Elec. Light Co.	864	Electric lights	1,645 17
28	H. M. Nagle	865	Brooms	6 00
28	Olsen-Cook Co.	866	Locker	10 00
28	Plant Supply Co.	867	Hose, etc.	120 37
28	Pacific Hardware and Steel Co.	868	Hardware	82 44
28	Pioneer Sawdust and Sand Depot	869	Sawdust	12 50
28	Pac. States Tel & Tel Co.	870	Telephones	200 75
28	J. A. Roebling's Sons Co.	871	Steel rope	68 18
28	Shainwald, Buckbee & Co.	872	Rent	35 00
28	J. A. Snook & Co.	873	Hardware	737 12
28	Spring Valley Water Co.	874	Water	370 60
28	Southern Pacific Co.	875	Repairs	113 62
28	H. B. Schindler & Co.	876	Repairs	126 00
28	U. S. Laundry Ass'n	877	Washing	4 00

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1905				
Dec. 28	Valvoline Oil Co.	878	Oil	$37 15
28	Harry Unna Co.	879	Brushes	27 89
28	Western Fuel Co.	880	Coal	904 47
28	Whittier-Coburn Co.	881	Oil	109 80
28	Western Repair and Supply Co.	882	Chandlery	254 97
28	James Byrne, Jr.	883	Petty cash	278 96
28	Burroughs' Adding Machine Co.	884	Adding machine	375 00
28	Dunham, Carrigan & Hayden Co.	885	Chains	34 05
28	Pacific States Rubber Co.	886	Packing	132 67
28	Eagle Paint and Varnish Co.	887	Lead, etc.	40 00
28	P. H. Murphy	888	Repairs	492 00
29	F. Mundt	889	Teaming	8 50
29	H. Fautz	890	Repairs	2 50
29	Haslett Warehouse Co.	891	Weighing	14 90
30	Mercantile Towel Co.	892	Towel service	3 00
30	M. V. Vanderhoof	893	Expense	5 20
30	State Treasurer	894	Remittance	78,747 74
	Total			$149,185 39
1906				
Jan. 2	State Controller	895	S. F. Depot Sinking Fund	$4.631 00
4	Healy, Tibbitts & Co.	896	Constructing Piers Nos. 42 and 44	19,780 38
5	Industrial Home for Adult Blind	897	Brooms	22 80
8	Healy, Tibbitts & Co.	898	Constructing Vallejo St. Wharf	2,295 76
8	H. C. Holmes and Carl Uhlig	899	Use of patent	2,500 00
9	Robert Wakefield	900	Constructing Pier No. 19 (D. P. 44)	3,089 45
9	Hyde Construction Co.	901	Constructing Broadway Wharf No. 1 (D. P. 161)	4,188 50
10	Employés	902-16	Payroll	27,319 95
13	Yates & Co.	917	Paints and oils	325 30
15	James A. McMahon	918	Constructing shed (D. P. 209)	1,841 87
16	Robert Wakefield	919	Constructing Pier No. 21 (D. P. 71)	3,234 42
19	Hickman & Masterson	920	Lumber	4,521 09
19	Hickman & Masterson	921	Lumber	208 18
19	James Mathews	922	Washing	3 50
22	James H. O'Brien	923	Teams and carts	312 50
22	California Mill Co.	924	Mill work	197 61
22	Healy, Tibbitts & Co.	925	Spring line and clusters, Slips 1, 3, 4, 6, 7 (D. P. 256)	3,020 95
23	Thos. Crowley & Bros.	926	Towing	166 00
23	Henry R. Patterson	927	Teaming	87 39
24	J. Browell	928	Chimneys	97 50
24	Geo. F. Buswell	929	Frictions	25 00
24	Baker & Hamilton	930	Hardware	636 15
24	City Front Stables	931	Keeping horses	89 00
24	R. D. Chandler	932	Coal	665 30
24	Guide Publishing Co.	933	Guides	11 00
24	W. F. Garratt & Co.	934	Repairs	7 10
24	E. M. Graney	935	Shoeing horses	10 00
24	Holbrook, Merrill & Stetson	936	Stoves	5 50
24	Hammond Lumber Co.	937	Piles	1,348 88
24	J. Hendy Machine W'ks	938	Repairs	161 09
24	Merchants' Exchange	939	Reporting	25 00
24	Marine Exchange	940	Reporting	25 00
24	J. R. McGuffick & Co.	941	Gasoline	5 00
24	Moore & Scott Iron W'ks	942	Repairs	989 87
24	Mutual Elec. Light Co.	943	Electric lighting	1,668 13
24	H. M. Nagle	944	Brooms	15 00

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1906				
Jan. 24	Nat. Bank D. O. Mills & Co.	945	Exchange	$450 04
24	S. O. Pasquinucci	946	Repairing scow	140 00
24	Pac. States Tel. & Tel. Co.	947	Telephones	192 45
24	Plant Supply Co.	948	Hose, etc.	58 71
24	Pacific Hardware and Steel Co.	949	Hardware	130 46
24	Pacific Coast Rubber Co.	950	Packing	104 99
24	Pacific Shipyards and Ways Co.	951	Repairs tug "Gov. Markham"	314 91
24	J. A. Roebling's Sons Co.	952	Wire rope	14 22
24	Rowlands & Laughton	953	Repairs	44 86
24	Shainwald, Buckbee & Co.	954	Rent	35 00
24	Southern Pacific Co.	955	Repairs	93 17
24	Levi Strauss & Co.	956	Towels	18 00
24	S. F. Dry Dock Co.	957	Docking tug "Gov. Markham"	60 00
24	James A. Snook & Co.	958	Hardware	500 12
24	Spring Valley Water Co.	959	Water	401 15
24	E. W. Tucker & Co.	960	Packing rings	51 00
24	George H. Tay Co.	961	Tin	83 00
24	J. H. Twigg & Sons Co.	962	Boat	90 00
24	Valvoline Oil Co.	963	Oil	4 00
24	Western Repairs and Supply Co.	964	Chandlery	107 86
24	Western Fuel Co.	965	Coal	1,287 68
24	Whittier-Coburn Co.	966	Oil	72 75
24	Warren Imp. Co.	967	Sand	95 00
24	Robert Wakefield	968	Repairs	50 29
24	S. F. Dry Dock Co.	969	Constructing dry docks (D. P. 177)	1,560 30
24	Robert Greig	970	Slate roof, Ferry Building (D. P. 234)	1,194 00
24	Robert Wakefield	971	Constructing Greenwich St. Wharf No. 1 (D. P. 89)	3,221 74
25	Robert Wakefield	972	Constructing Pier No. 25	7,163 10
25	James A. McMahon Co.	973	Repairing dolphins	720 16
25	Holmes Lime Co.	974	Cement, Pier No. 25	600 97
25	Carnegie Steel Co.	975	Steel rails	1,427 11
26	J. C. Sala	976	Repairs	9 25
26	Yates & Co.	977	Paints and oils	374 44
27	J. Anderson & Son	978	Keys and repairs	55 85
27	Robert Wakefield	979	Driving piles	399 00
27	Smith, Rice & Co.	980	Spars	50 00
29	Pac. Towel Supply Co.	981	Towel service	3 00
30	Gray Bros.	982	Constructing seawall (D. P. 299)	5,609 54
30	Southern Pacific Co.	983	Creosoting piles (D. P. 261)	763 87
31	M. V. Vanderhoof	984	Expense	5 20
31	Call, Chronicle, and Examiner	985	P. J. Halligan	13 50
31	State Treasurer	986	Remittances	74,440 77
	Total			$185,542 63
Feb. 1	State Controller	987	S. F. Depot Sinking Fund	$4,631 00
1	H. R. Rood & Co.	988	Creosoting piles	4,933 14
2	Pacific Shipyards and Ways Co.	989	Repairs	775 91
2	Moore & Scott Iron Wks.	990	Repairs	1,867 97
2	Healy, Tibbitts & Co.	991	S. P. freight slip, Central Basin (D. P. 281)	1,596 82
6	Rudolph Herman Co.	992	Creosoting piles	10 00
6	Robert Wakefield	993	Constructing Pier No. 25 (D. P. 116)	3,164 92
8	Western Fuel Co.	994	Cement, Vallejo Street Wharf	1,989 82
8	Healy, Tibbitts & Co.	995	Constructing Vallejo St. Wharf	2,295 76
8	Healy, Tibbitts & Co.	996	Testing I beams	154 50

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1906				
Feb. 8	H. C. Holmes and Carl Uhlig	997	Use of patent	$2,500 00
10	Employés	998-1011	Payroll	27,323 15
10	Western Fuel Co.	1012	Cement, Vallejo St. Wh'f (D. P. 337)	1,326 55
10	Western Fuel Co.	1013	Cement, Vallejo St. Wh'f (D. P. 338)	1,326 55
10	Western Fuel Co.	1014	Cement, Vallejo St. Wh'f (D. P. 339)	1,326 55
10	Western Fuel Co.	1015	Cement, Vallejo St. Wh'f (D. P. 340)	1,326 54
10	Western Fuel Co.	1016	Cement, Vallejo St. Wh'f (D. P. 341)	1,326 54
10	Western Fuel Co.	1017	Cement, Vallejo St. Wh'f (D. P. 342)	1,326 54
16	Hickman & Masterson	1018	Lumber	3,776 77
16	Hickman & Masterson	1019	Lumber	606 36
16	H. C. Holmes and Carl Uhlig	1020	Use of patent	5,142 20
16	Healy, Tibbitts & Co.	1021	Constructing Pier No. 13	1,147 88
19	Payroll	1022	Carpenters' supplies	24 00
19	Boesch Lamp Co.	1023	Repairs	8 25
19	Brooks-Follis Electric Corp.	1024	Lamps	18 00
19	Barton, Squires & Byrne	1025	Cup leathers	45 00
19	Baker & Hamilton	1026	Hardware	268 42
19	R. D. Chandler	1027	Coal	696 04
19	City Front Stables	1028	Care of horses	86 00
19	A. Carlisle & Co.	1029	Stationery	259 20
19	H. Cowell Lime and Cement Co.	1030	Lime	4 10
19	Cunningham, Curtiss & Welch	1031	Stationery	78 10
19	Eagle Paint and Var. Co.	1032	Paint	45 60
19	Eureka Boiler Works	1033	Repairs, Belt Railroad	21 87
19	Getz Bros. & Co.	1034	Soap, etc.	16 88
19	Guide Publishing Co.	1035	Guides	11 00
19	W. F. Garratt & Co.	1036	Door knobs	9 20
19	Julian B. Harries	1037	Experting accounts	37 50
19	Hammond Lumber Co.	1038	Piles	1,223 99
19	Merchants' Exchange	1039	Reporting	25 00
19	Marine Exchange	1040	Reporting	25 00
19	Wm. J. Martin	1041	Martin's cleaner	15 00
19	J. R. McGuffick & Co.	1042	Oil, etc.	44 23
19	Mutual Elec. Light Co.	1043	Lights	1,631 33
19	H. M. Nagle	1044	Brooms	15 00
19	Pacific Coast Rubber Co.	1045	Packing	60 71
19	Plant Rubber and Supply Co.	1046	Packing	38 55
19	Pacific Hardware and Steel Co.	1047	Steel	16 96
19	Pac. States Tel. & Tel Co.	1048	Telephones	189 15
19	J. A. Roebling's Sons Co.	1049	Steel rope	270 18
19	H. B. Schindler	1050	Repairs	7 75
19	Spring Valley Water Co.	1051	Water	379 30
19	James A. Snook & Co.	1052	Hardware	664 57
19	Shainwald, Buckbee & Co.	1053	Rent	35 00
19	Southern Pacific Co.	1054	Repairs	85 36
19	Valvoline Oil Co.	1055	Oil	34 45
19	Harry Unna Co.	1056	Lamps, etc.	516 92
19	Vulcan Iron Works	1057	Repairs	78 00
19	U. S. Laundry Ass'n	1058	Washing	7 90
19	Western Fuel Co.	1059	Coal	1,086 66
19	Western Repair and Supply Co.	1060	Chandlery	89 97
19	Warren Imp. Co.	1061	Sand	75 00
19	Whittier-Coburn Co.	1062	Oil	28 95
19	Healy, Tibbitts & Co.	1063	Const'g Vallejo St. Wh'f (D. P. 343)	4,591 52
19	Healy, Tibbitts & Co.	1064	Const'g Vallejo St. Wh'f (D. P. 344)	4,591 52
19	Healy, Tibbitts & Co.	1065	Const'g Vallejo St. Wh'f (D. P. 345)	4,591 52

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1906				
Feb. 19	Healy, Tibbitts & Co.	1066	Const'g Vallejo St. Wh'f (D. P. 346)	$4,591 52
19	Healy, Tibbitts & Co.	1067	Const'g Vallejo St. Wh'f (D. P. 347)	4,591 52
19	Healy, Tibbitts & Co.	1068	Const'g Vallejo St. Wh'f (D. P. 348)	4,591 52
19	Healy, Tibbitts & Co.	1069	Const'g Vallejo St. Wh'f (D. P. 349)	4,591 52
19	Healy, Tibbitts & Co.	1070	Const'g Vallejo St. Wh'f (D. P. 350)	4,591 52
19	Healy, Tibbitts & Co.	1071	Const'g Vallejo St. Wh'f (D. P. 351)	4,591 52
19	Healy, Tibbitts & Co.	1072	Const'g Vallejo St. Wh'f (D. P. 352)	4,591 52
19	Healy, Tibbitts & Co.	1073	Const'g Vallejo St. Wh'f (D. P. 353)	4,591 52
19	Healy, Tibbitts & Co.	1074	Const'g Vallejo St. Wh'f (D. P. 354)	4,591 52
19	Healy, Tibbitts & Co.	1075	Const'g Vallejo St. Wh'f (D. P. 355)	4,591 52
19	Healy, Tibbitts & Co.	1076	Const'g Vallejo St. Wh'f (D P. 356)	4,591 52
19	Healy, Tibbitts & Co.	1077	Const'g Vallejo St. Wh'f (D. P. 357)	4,591 52
19	Healy, Tibbitts & Co.	1078	Const'g Vallejo St. Wh'f (D. P. 358)	4,591 52
19	Healy, Tibbitts & Co.	1079	Const'g Vallejo St. Wh'f (D. P. 359)	4,591 52
19	Healy, Tibbitts & Co.	1080	Const'g Vallejo St. Wh'f (D. P. 360)	4,591 52
19	Healy, Tibbitts & Co.	1081	Const'g Vallejo St. Wh'f (D. P. 361)	4,591 52
19	Healy, Tibbitts & Co.	1082	Const'g Vallejo St. Wh'f (D. P. 362)	4,591 52
19	James Mathews	1083	Washing	3 50
20	California Mill Co.	1084	Mill work	186 35
20	Thos. Crowley & Bros.	1085	Towing	112 50
20	Henry C. Peterson	1086	Launch hire	10 00
20	Haslett Warehouse Co.	1087	Weighing	6 56
21	James H. O'Brien	1088	Teams and carts	298 00
21	P. L. Jones & Co.	1089	Repairs	4 50
21	Western Union Tel. Co.	1090	Rent of clock	3 00
21	S. F. Towel Co.	1091	Towel service	7 00
21	J. O'Kane	1092	Repairs	1 75
21	S. F. Typewriter Exch'ge	1093	Ribbons	3 00
21	J. C. Sala	1094	Repairing tape	60
21	Henry Fautz	1095	Keys	2 00
23	F. Mundt	1096	Drayage	21 50
23	J. R. La Fontaine	1097	Blue prints	2 75
23	C. C. Moore & Co.	1098	Repairs	1 20
23	Pacific Construction Co.	1099	Constructing dolphins (D. P. 319)	2,988 92
27	Henry R. Patterson	1100	Drayage	8 75
27	Yates & Co.	1101	Paints, etc.	228 67
28	M. V. Vanderhoof	1102	Expense	5 40
28	State Treasurer	1103	Remittances	71,212 55
	Total			$245,088 46
Mar. 1	State Controller	1104	S. F. Depot Sinking Fund	$4,631 00
6	Robert Wakefield	1105	Constructing Pier No. 25	5,969 25
6	Holmes & Uhlig	1106	Use of patent	2,500 00
10	Employés	1107-21	Payroll	25,977 05
10	Gray Bros.	1122	Rock	5 50
10	Robert Wakefield	1123	Constructing Ferry Slip "A" (D. P. 218)	2,825 00
15	Healy, Tibbitts & Co.	1124	Constructing Piers Nos. 42 and 44	12,362 74
16	James Mathews	1125	Washing	3 50
16	Holmes & Uhlig	1126	Use of patent	5,142 20
16	Hickman & Masterson	1127	Lumber	3,614 65
16	Hickman & Masterson	1128	Lumber	347 21
20	J. M. Anderson	1129	Brief	49 80
20	James Byrne, Jr.	1130	Petty cash	301 65
20	Baker & Hamilton	1131	Hardware	565 50
20	Barton, Squires & Byrne	1132	Roofing	68 58
20	J. Browell	1133	Chimneys	102 00
20	Cowell Lime and Cement Co.	1134	Clay	5 75
20	Callahan Paint Co.	1135	Painting tug "Gov. Irwin"	75 80
20	R. D. Chandler	1136	Coal	545 85
20	Cunningham, Curtiss & Welch	1137	Toilet paper	15 00
20	City Front Stables	1138	Keeping horses	95 75

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1906				
Mar. 20	Devlin & Devlin	1139	Legal expenses	$1,010 00
20	Eagle Paint and Varnish Co.	1140	Paint	16 80
20	Flinn & Treacy	1141	Paving, etc.	509 90
20	W. T. Garratt & Co.	1142	Repairs	7 60
20	Guide Publishing Co.	1143	Guides	11 00
20	Gorham Rubber Co.	1144	Hose	27 61
20	Hammond Lumber Co.	1145	Piles	1,142 70
20	Merchants' Exchange	1146	Reporting	25 00
20	Marine Exchange	1147	Reporting	25 00
20	Mutual Elec. Light Co.	1148	Electric lights	1,484 53
20	Murray Bros.	1149	Repairs	10 40
20	H. M. Nagle	1150	Brooms	12 00
20	Pioneer Sawdust and Sand Depot	1151	Sawdust	12 50
20	Payne's Bolt Works	1152	Bolts	45 90
20	Plant Rubber and Supply Co.	1153	Packing	23 25
20	Pacific Hardware and Steel Co.	1154	Hardware	234 30
20	Pac. States Tel. & Tel. Co.	1155	Telephones	192 10
20	John Roach	1156	Diving	125 00
20	Risdon Iron Works	1157	Repairs	493 61
20	Southern Pacific Co.	1158	Repairs	1,157 21
20	Shainwald, Buckbee & Co.	1159	Rent	35 00
20	Spring Valley Water Co.	1160	Water	362 60
20	J. A. Snook & Co.	1161	Hardware	596 49
20	Western Fuel Co.	1162	Coal	1,108 45
20	S. F. Dry Dock Co.	1163	Docking tug "Gov. Irwin"	30 00
20	Harry Unna Co.	1164	Rags, etc.	14 32
20	Warren Impr'ment Co.	1165	Sand	54 00
20	Western Repair and Supply Co.	1166	Chandlery	143 74
20	Payroll	1167	Sweeper (Supplement)	60 00
20	California Mill	1168	Mill work	125 60
20	Whittier-Coburn Co.	1169	Oil	50 80
22	H. B. Schindler	1170	Repairs	52 25
22	J. H. O'Brien	1171	Teams and carts	259 50
27	J. Henderson & Son	1172	Repairs	34 35
27	Yates & Co.	1173	Paints and oils	186 79
29	Sacramento Union	1174	Advertising seawall bonds	36 67
29	Evening Express Co.	1175	Advertising seawall bonds	8 80
29	Oakland Enquirer Publishing Co.	1176	Advertising seawall bonds	18 75
29	San Francisco Call	1177	Advertising seawall bonds	42 00
29	San Francisco Chronicle	1178	Advertising seawall bonds	53 75
29	Thos. Crowley & Bros.	1179	Towing	100 00
31	F. Mundt	1180	Teaming	9 00
31	State Treasurer	1181	Remittances	74,254 67
	Total			$149,356 92
Apr. 2	State Controller	1182	S. F. Depot Sinking Fund	$4,631 00
2	State Controller	1183	S. F. Seawall Sinking Fund	1,724 64
6	Robert Wakefield	1184	Shed, Pier No. 13	1,372 81
6	Thomson Bridge Co.	1185	Repairs	445 00
6	Holmes & Uhlig	1186	Use of patent, Piers Nos. 42–44	5,142 20
6	Holmes & Uhlig	1187	Use of patent	2,500 00
7	Thos. Day Co.	1188	Desk lights	1 00
10	M. V. Vanderhoof	1189	Expenses	4 80
10	Employés	1190–1204	Payroll	28.158 80
10	Hyde Construction Co.	1205	Constructing Broadway Wharf No. 1 (D. P. 162)	4,188 50
16	J. T. & T. Quigley	1206	Cleaning carpet	7 38

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1906				
Apr. 28	Robert Wakefield	1207	Const'ng Filbert St. Wh'f (D. P. 72)	$3,234 42
28	Gray Bros.	1208	Rock, seawall—King and Channel streets (D. P. 300)	5,609 55
28	State Treasurer	1209	Remittance	73,145 14
	Total			$130,165 24
May 1	State Controller	1210	S. F. Depot Sinking Fund	$4,631 00
1	State Controller	1211	S. F. Seawall Sinking Fund	2,001 57
7	Robert Greig	1212	Slate roof, Union Depot (D. P.)	1,194 00
10	Employés	1213-27	Payroll	25,222 40
18	Hickman & Masterson	1228	Lumber	5,180 94
18	Hickman & Masterson	1229	Lumber	417 45
18	Darby Laydon	1230	Wrecking sheds	794 20
18	Jas. A. McMahon & Co.	1231	Repairs	2,101 30
18	Jas. A. McMahon & Co.	1232	Repairs	868 95
18	Jas. A. McMahon & Co.	1233	Wrecking sheds	849 75
18	Healy-Tibbitts Con. Co.	1234	Wrecking sheds	860 20
18	Thomson Bridge Co.	1235	Wrecking sheds	759 00
21	Getz Bros.	1236	Soap, etc.	16 88
21	W. T Garratt & Co.	1237	Plugs	5 90
21	Cal. Northwestern Ry.	1238	Journal boxes	14 36
21	Risdon Iron and Locomotive Works	1239	Repairs	212 02
21	Plant Rubber and Supply Co.	1240	Waste	13 51
21	Evening Post	1241	Advertising	300 00
21	Spring Valley Water Co.	1242	Water	376 85
21	W. & J. Sloane & Co.	1243	Curtains, etc.	99 48
21	Hammond Lumber Co.	1244	Piles	3,536 45
21	Eagle Paint and Var. Co.	1245	White lead	40 00
21	Baker & Hamilton	1246	Hardware	752 56
21	National Bank of D. O. Mills & Co.	1247	Exchange	147 91
21	Harry Uuna Co	1248	Dusters, etc.	108 73
21	Brooks-Follis Electrical Corp.	1249	Electrical goods	36 40
21	James A. Snook & Co.	1250	Rope, etc.	908 43
21	Julian B. Harries	1251	Experting books	37 50
21	Merchants' Exchange	1252	Reporting	25 00
21	Marine Exchange	1253	Reporting	25 00
21	J. Bronell	1254	Chimneys	65 00
21	J. A. Roebling's Sons Co.	1255	Wire rope	45 26
21	Guide Publishing Co.	1256	Guides	11 00
21	Eccles & Smith Co.	1257	Coil springs	162 50
21	J. R. McGuffick & Co.	1258	Oils	10 98
21	City Front Stables	1259	Keeping horses	99 25
21	Frank R. Thomas	1260	Repairs	25 00
21	U. S. Laundry Ass'n	1261	Washing	7 50
21	Cunningham, Curtiss & Welch	1262	Stationery	58 05
21	Henry Cowell Lime and Cement Co.	1263	Brick	3 15
21	Acme Lumber Co.	1264	Lumber	30 17
21	Pacific Hardware and Steel Co.	1265	Hardware	110 28
21	George F. Buswell	1266	Frictions	105 00
21	Whittier-Coburn Co.	1267	Paints	126 73
21	Valvoline Oil Co.	1268	Oil	42 13
21	George H. Tay Co.	1269	Tin	139 05
21	San Francisco Call	1270	Advertising	231 80
21	Western Repair and Supply Co.	1271	Chandlery	181 01
21	Holbrook, Merrill & Stetson	1272	Stoves	59 46

EXHIBIT B—*Continued.*

DISBURSEMENTS, 1905-1906—*Continued.*

Date.	Order.	Receipt No.	On Account of.	Amount.
1906				
May 21	Olsen-Cook Co.	1273	Repairs	$12 50
21	Vulcan Iron Works	1274	Sheaves	29 00
21	Mutual Elec. Light Co.	1275	Lights	1,570 01
21	Gray Bros.	1276	Rock	471 75
21	J. Anderson & Son	1277	Repairs	19 40
21	Healy-Tibbitts Con. Co.	1278	Bulkhead, Vallejo Street Wharf	1,860 81
21	Healy-Tibbitts Con. Co.	1279	Constructing Piers Nos. 42 and 44	5,000 00
23	W. N. Gabriel	1280	Service, rodman	38 50
23	R. N. Risdon	1281	Clerk	100 00
25	George Mendelson	1282	Horseshoes	9 00
25	H. R. Rood & Co.	1283	Piles, repair work	5,044 12
25	Henry R. Patterson	1284	Drayage	107 00
26	Yates & Co.	1285	Paints, etc.	273 05
28	Western Fuel Co.	1286	Coal	1,316 30
28	R. D. Chandler	1287	Coal	722 09
28	Southern Pacific Co.	1288	Repairs	939 30
28	J. A. McMahon Co.	1289	Construction	45 50
29	S. F. Towel Co.	1290	Washing	3 00
29	California Mill Co.	1291	Mill work	159 55
29	Pacific Construction Co.	1292	Repairing dolphins (D. P. 320)	2,988 92
31	Pacific Construction Co.	1293	Wrecking tower	5,800 00
31	Henry Fautz	1294	Keys	5 25
31	Call, Chronicle and Examiner	1295	Papers	13 50
31	Thomson Bridge Co.	1296	Repairs, Greenwich Street Wharf No. 2	852 60
31	Healy, Tibbitts & Co.	1297	Constructing Piers Nos. 42 and 44	17,528 33
31	Robert Wakefield	1298	Constructing Greenwich Street Wharf No. 1 (D. P. 90)	3,221 74
31	Robert Wakefield	1299	Constructing Greenwich Street Wharf No. 2 (D. P. 117)	3,164 92
31	M. F. Vanderhoof	1300	Expense	5 40
31	O. F. Palmer	1301	Washing windows	35 00
31	F. Mundt	1302	Teaming	8 00
31	Pacific Towel and Supply Co.	1303	Washing	3 00
31	State Treasurer	1304	Remittance	71.682 36
	Total, May, 1906			$176,080 96
June 1	State Controller	1305	S. F. Depot Sinking Fund	$4,631 00
1	State Controller.	1306	S. F. Seawall Sinking Fund	2,001 57
11	Employés	1307-25	Payroll	23,424 65
11	Robert Wakefield	1326	Constructing Ferry Slip "A" (D. P. 219)	2,825 00
12	Healy, Tibbitts & Co.	1327	Slip in Central Basin (D. P. 282)	1,596 82
15	Crane Co.	1328	Pipe	6 38
15	Southern Pacific Co.	1329	Creosoting piles (D. P. 262)	763 87
15	Healy, Tibbitts & Co.	1330	Constructing Vallejo St. Wharf (D. P. 343)	4,591 52
22	James Mathews	1331	Washing	3 50
25	Healy, Tibbitts Con. Co.	1332	Bulkhead, Vallejo Street Wharf	620 27
25	James A. McMahon Co.	1333	Repairs	1,023 90
25	Western Fuel Co.	1334	Cement, Vallejo Street Wharf (D. P. 337)	1,326 55
28	Thos. Crowley & Bros.	1335	Towing	118 50
29	Healy, Tibbitts & Co.	1336	Constructing Piers Nos. 42 and 44	82,418 25
29	S. F. Dry Dock Co.	1337	Constructing dry docks	1,560 30
30	State Treasurer	1338	Remittance	69,040 14
	Total June, 1906			$195,952 22
18	State of California, Act of Special Session 1906			100,000 00
	Total for year			$295,952 22

RECAPITULATION OF DISBURSEMENTS.

1904—July	$163,346 93	
August	138,079 08	
September	142,688 96	
October	173,724 69	
November	552,868 93	
December	151,185 89	
1905—January	185,969 01	
February	142,813 62	
March	161,201 28	
April	295,148 62	
May	241,588 36	
June	159,353 92	
		$2,507,969 29
1905—July	$188,206 51	
August	187,603 15	
September	212,801 35	
October	178,101 96	
November	162,743 17	
December	149,185 39	
1906—January	185,542 63	
February	245,088 46	
March	149,407 72	
April	130,165 24	
May	176,080 96	
June	295,952 22	
		2,260,878 76
Total		$4,768,848 05

EXHIBIT C.—*Summary of Receipts and Disbursements.*

RECEIPTS.

	1904-1905.	1905-1906.	Total.
From dockage	$184,724 10	$193,502 55	$378,226 65
From tolls	264,605 64	287,449 60	552,055 24
From wharfage	8,458 20	6,013 45	14,471 65
From rents	357,016 45	382,914 85	739,931 30
From Belt Railroad switching	79,673 75	77,787 25	157,461 00
From sale of old material	4,028 83	3,393 34	7,422 17
From damages, sales, etc.	5,552 12	13,067 83	18,619 95
From electric lighting	4,292 60	1,861 49	6,154 09
From fire loss account	2,594 30		2,594 30
From Piers 42 and 44 (rent 15 years paid in advance)	371.673 00		371,673 00
From legal expenses	1,035 81		1,035 81
From fees account	150 00		150 00
	$1.283,804 80	$965,990 36	$2,249,795 16
Draft returned and canceled	279 04		279 04
Deferred payment drafts issued	261,188 98	99,789 67	360,978 65
S. F. Harbor Improvement Fund, drafts on State Treasurer	771,246 05	872,339 83	1.643,585 88
Transfer to S. F. Depot Sinking Fund	55,572 00	55,572 00	111,144 00
Deferred payment drafts paid by Controller	135,878 42	161,459 12	297,337 54
Transfer to S. F. Seawall Sinking Fund		5,727 78	5,727 78
State of California (act of special session, 1906)		100,000 00	100,000 00
	$2,507,969 29	$2,260,878 76	$4,768,848 05

DISBURSEMENTS.

Salaries—Administrative and collection of revenue	$84,094 85	$84,961 20	$169,056 05
Maintenance and repair of wharves and buildings	251,250 97	181,458 92	432,709 89
Construction account	283,894 33	515,015 31	798,909 64
Seawall construction	149,022 10	1,631 77	150,653 87
Tugs and dredgers	135,870 08	62,086 12	197,956 20
Fire account	5,475 97	5,661 60	11,137 57
Belt Railroad	71,061 93	66,823 39	137,885 32
Union Depot	34.058 00	25,944 78	60,002 78
Damages, sales, etc.	417 79	1,555 23	1,973 02
Wharf and street cleaning and sprinkling	32,860 21	31,759 37	64,619 58
General expenses	47,565 14	44,607 32	92.172 46
	$1,095,571 37	$1,021,505 01	$2,117.076 38
Deferred payment drafts paid	135,878 42	161,459 12	297,337 54
Remittances to State Treasurer	1,220,668 46	916,614 85	2,137,283 31
Draft returned and canceled	279 04		279 04
Transfer to S. F. Depot Sinking Fund	55.572 00	55,572 00	111,144 00
Transfer to S. F. Seawall Sinking Fund		5,727 78	5,727 78
Transfer from State of California		100,000 00	100,000 00
	$2.507,969 29	$2,260,878 76	$4,768,848 05

EXHIBIT D.

Comparative Statement of Receipts and Disbursements—1863-1906.

FISCAL YEAR.	RECEIPTS.				DISBURSEMENTS.													
					EXPENSES.		CONSTRUCTION AND REPAIR.		DREDGING.									
From the Organization of the Commission	Revenue From All Sources	Deferred Payment Drafts	Drafts Refused and Canceled	Total	Salaries, Law Fees, Fuel, Rent, Printing, Stationery, etc.	Percentage per year	Building Sheds, Wharves, Bulkheads, etc., Ferry Foundation, and Repairs on Same	Seawall	Labor, Fuel, Oil, Water, Repairs, Ship Chandlery, etc.	Contract Dredging	Purchase of Scows and Dredgers	Constructing and Operating Belt Railroad	Miscellaneous, including damages paid	Transfer to S. F. Depot Sinking Fund	Transfer to S. F. Seawall Sinking Fund	Deferred Payment Drafts Paid	Balance in S. F. Harbor Imp. Fund June 30, 1906	Total
1863-64	$117,848 28			$117,848 28	$25,354 84	21.50	$67,599 82						$676 25					
1864-65	177,393 66			177,393 66	32,439 10	18.28	80,875 15											
1865-66	183,716 80			183,716 80	35,531 42	19.02	19,065 42	$3,607 00		$44,106 50								
1866-67	336,409 36			336,409 36	41,233 95	11.95	88,525 78	266 50		10,300 00			330 62					
1867-68	294,304 28			294,304 28	55,531 92	18.87	82,791 27	250,991 97		41,021 00			561 18					
1868-69	287,890 53			287,890 53	52,130 77	18.11	38,779 83	262,323 13		32,338 00								
1869-70	252,649 56			252,649 56	54,684 40	21.65	35,545 04	165,892 68		80,100 00								
1870-71	148,917 03			148,917 03	37,782 65	25.37	53,693 31			35,258 00								
1871-72	195,031 14			195,031 14	61,006 70	31.28	28,146 62			53,944 40								
1872-73	190,330 47			190,330 47	69,858 63	36.50	78,776 28			32,293 20								
1873-74	265,709 06			265,709 06	77,938 05	29.33	104,175 98	2,321 85		42,478 56	$34,070 00		6,344 01					
1874-75	373,541 72			373,541 72	68,617 14	18.37	209,540 80	1,078 25	$33,835 71		3,725 00		924 99					
1875-76	372,078 74			372,078 74	65,976 57	17.73	162,000 25		31,363 19	9,439 51			565 47					
1876-77	448,087 25			448,087 25	79,208 85	17.68	284,023 05		25,252 94		15,354 45							
1877-78	446,516 82			446,516 82	84,326 72	18.88	112,628 95	4,803 38	38,214 40		82,068 79		1,665 88					
1878-79	466,420 55			466,420 55	97,162 63	20.83	164,560 55	107,091 87	60,454 68		3,948 84		595 50					
1879-80	427,687 56			427,687 56	100,667 57	23.53	141,022 14	309,652 90	51,675 28		1,173 50		2,510 53					
1880-81	419,437 49			419,437 49	102,746 75	24.49	199,972 97	383,174 96	51,462 52				4,785 32					
1881-82	455,005 64			455,005 64	104,255 15	22.91	86,102 58	92,804 98	48,743 45				4,320 00					
1882-83	436,030 54			436,030 54	107,883 69	24.74	179,089 82	34,949 22	51,457 50		5,247 00		28,129 37					
1883-84	501,243 25			501,243 25	115,231 30	22.98	173,997 19	76,461 63	60,780 40				6,863 55					
1884-85	500,702 10			500,702 10	116,194 14	23.20	248,607 11	195,706 95	52,258 80				4,933 50					
1885-86	483,851 04			483,851 04	117,693 22	24.32	197,612 03	157,953 82	46,675 40				4,324 00					
1886-87	527,890 96			527,890 96	128,584 90	24.35	153,529 29	53,403 50	78,046 99				5,742 95					
1887-88	580,152 51			580,152 51	138,993 05	23.95	294,855 61	36,360 98	54,082 70				5,450 62					
1888-89	619,537 54			619,537 54	139,552 66	20.91	231,353 84	101,586 24	62,424 96				10,152 33					
1889-90	599,105 58			599,105 58	131,262 56	21.91	301,063 18	115,419 48	51,588 91				5,257 21					
1890-91	600,821 20			600,821 20	115,579 39	19.23	269,542 63	65,810 20	53,230 81			$327 61	9,600 62					
1891-92	651,112 11			651,112 11	114,860 89	17.64	275,083 97	122,112 90	56,081 70			81,307 46	7,663 95					
1892-93	629,957 55			629,957 55	121,882 55	19.34	319,991 36	72,025 44	54,006 33	865 15	25,384 00	15,933 10	5,771 81	$23,155 00				
1893-94	583,674 58			583,674 58	123,039 43	21.08	338,570 00	23,158 22	58,357 87			14,643 63	4,815 50	55,572 00				
1894-95	586,618 61			586,618 61	137,684 55	23.47	444,366 85	55 00	79,664 43			30,755 26	4,827 05	55,572 00				
1895-96	599,207 89			599,207 89	135,267 13	22.57	390,935 35		56,639 02			15,189 01	6,582 96	55,572 00				
1896-97	562,123 05			562,123 05	133,138 80	23.68	319,085 55	6,658 01	55,686 31			11,422 27	5,938 89	55,572 00				
1897-98	581,661 05			581,661 05	151,598 53	26.06	313,603 11		54,278 81			18,458 63	8,833 26	55,572 00				
1898-99	630,455 62		$123 45	630,579 07	170,678 51	27.07	293,560 22		54,102 91			25,539 38	10,553 75	55,572 00				
1899-00	731,033 41		34 80	731,068 21	150,533 68	21.66	385,662 52		60,593 79			37,476 81	10,768 53	55,572 00				
1900-01	772,989 03		11,623 43	784,612 46	148,669 59	19.23	460,741 42	3,060 93	46,166 24	1,900 50		76,346 58	11,467 99	55,572 00				
1901-02	825,191 43			825,191 43	164,294 43	19.91	460,548 25		59,494 87	7,691 25		67,316 66	8,277 71	55,572 00				
1902-03	829,096 35			829,096 35	168,061 41	20.27	375,195 39		58,873 99	11,199 00	19,500 00	57,650 63	9,693 24	55,572 00				
1903-04	1,008,193 09	$504,218 01	88 60	1,512,499 70	194,058 77	19.24	801,174 21	4,352 41	107,034 35		34,674 00	80,343 86	31,195 73	55,572 00		$232,102 22		
1904-05	1,283,804 80	261,188 98	279 04	1,545,272 82	*a* 197,888 30	15.41	*c* 535,145 30	*k* 149,022 10	*i* 135,870 08			*e* 71,061 93	*g* 6,583 66	55,572 00		135,878 42		
1905-06	* 1,065,990 36	99,789 67		1,165,780 03	*b* 177,769 73	16.67	*d* 705,537 38	*l* 1,631 77	*j* 62,086 12			*f* 66,823 39	*h* 7,656 62	55,572 00	$5,727 78	161,459 12	$295,209 20	
Totals	$22,049,419 59	$865,196 66	$12,149 32	$22,926,765 57	$4,646,855 02		$10,506,677 37	$2,803,738 27	$1,850,485 46	$402,935 07	$225,145 58	$670,596 51	$244,364 55	$745,591 00	$5,727 78	$529,439 76	$295,209 20	$22,926,765 57

a. b. c, d, e, f, g, h, i, j, k, l. See EXHIBIT A.

* Received from State of California, Act of special session 1906—Chapter XXXVI—$100,000.

EXHIBIT E.—*Statement of San Francisco Harbor Improvement Fund (State Treasurer, Custodian), for the Two Years ending June 30, 1906.*

1904—July 31	To amount remitted to State Treasurer	$67,321 28	
Aug. 31	do	67,441 59	
Sept. 30	do	77,960 73	
Oct. 31	do	76,832 65	
Nov. 30	do	442,697 82	
Dec. 31	do	76,540 04	
1905—Jan. 31	do	68,213 97	
Feb. 28	do	63,751 82	
Mar. 31	do	67,716 87	
Apr. 30	do	72,984 73	
May 31	do	66,530 02	
June 30	do	72,676 94	
			$1,220,668 46
1905—July 31	do	$69,864 69	
Aug. 31	do	71,374 54	
Sept. 30	do	104,090 16	
Oct. 30	do	81,747 75	
Nov. 30	do	77,014 34	
Dec. 31	do	78,747 74	
1906—Jan. 31	do	74,440 77	
Feb. 28	do	71,212 55	
Mar. 31	do	74,254 67	
Apr. 30	do	73,145 14	
May 31	do	71,682 36	
June 30	do	69,040 14	
			916,614 85
	June 18, 1906—From State of California (Act Special Session, 1906)		100,000 00
	June 30, 1905—Draft returned and canceled		279 04
	June 30, 1904—Amount in fund		115,442 05
			$2,353,004 40

		Drafts Drawn by Board.	Drafts Drawn for Deferred Payment Drafts.	Transfer to S. F. Depot Sinking Fund.	Transfer to S. F. Sea-wall Sinking Fund.	Total.
1904—July	By drafts	$45,183 15		$4,631 00		$49,814 15
Aug.	do	54,823 80	$6,433 93	4,631 00		65,888 73
Sept.	do	47,254 05	7,919 90	4,631 00		59,804 95
Oct.	do	43,477 82	28,500 15	4,631 00		76,608 97
Nov.	do	65,254 84	3,164 92	4,631 00		73,050 76
Dec.	do	57,051 84	7,919 91	4,631 00		69,602 75
1905—Jan.	do	76,836 97	30,846 92	4,631 00		112,314 89
Feb.	do	63,017 30	6,322 04	4,631 00		73,970 34
Mar.	do	75,311 06	7,919 91	4,631 00		87,861 97
Apr.	do	70,127 02	29,264 00	4,631 00		104,022 02
May	do	99,962 44	4,761 74	4,631 00		109,355 18
June	do	72,945 76	2,825 00	4,631 00		80,401 76
	Total	$771.246 05	$135,878 42	$55,572 00		$962,696 47
1905—July	By drafts	$70,127 40	$38,016 75	$4,631 00		$112,775 15
Aug.	do	98,891 17	7,750 66	4,631 00		111,272 83
Sept.	do	96,745 10	2,825 00	4,631 00		104,201 10
Oct.	do	59,850 31	27,724 64	4,631 00		92,205 95
Nov.	do	68,656 93	7,750 66	4,631 00		81,038 59
Dec.	do	59,296 40	2,825 00	4,631 00		66,752 40
1906—Jan.	do	73,651 73	27,724 64	4,631 00		106,007 37
Feb.	do	57,250 05	7,750 66	4,631 00		69,631 71
Mar.	do	63,725 81	2,825 00	4,631 00		71,181 81
Apr.	do	33,718 06	13,032 47	4,631 00	$1,724 64	53,106 17
May	do	86,416 80	10,569 58	4,631 00	2,001 57	103,618 95
June	do	104,010 07	12,664 06	4,631 00	2,001 57	123,306 70
	Total	$872,339 83	$161,459 12	$55,572 00	$5,727 78	$1,095,098 73
Total two years ending June 30, 1906		$1,643,585 88	$297,337 54	$111,144 00	$5,727 78	$2,057,795 20
Bal. in fund June 30, 1906						295,209 20
						$2,353,004 40

EXHIBIT F.

Statement of the San Francisco Harbor Improvement Fund—November 4, 1863, to June 30, 1906.

Fiscal Year. From the Organization of the Commission.	Charged to S. F. Harbor Improvement Fund (State Treasurer, Custodian).	Drawn from S. F. Harbor Improvement Fund (State Treasurer, Custodian).
1863–64	$71,897 39	$47,680 02
1864–65	123,365 23	62,334 82
1865–66	132,023 96	47,568 50
1866–67	268,573 45	64,345 94
1867–68	217,528 06	354,121 12
1868–69	212,532 07	310,213 27
1869–70	180,623 37	272,670 93
1870–71	96,097 20	73,914 13
1871–72	105,877 82	53,944 40
1872–73	91,042 59	80,640 23
1873–74	166,150 23	168,769 62
1874–75	245,369 00	189,549 17
1875–76	249,450 44	146,716 69
1876–77	310,909 33	266,661 37
1877–78	285,521 50	162,712 80
1878–79	274,370 87	241,764 39
1879–80	240,414 91	419,429 27
1880–81	204,782 41	527,487 44
1881–82	249,919 90	131,140 42
1882–83	194,860 84	165,586 90
1883–84	254,497 78	186,588 60
1884–85	259,702 01	376,700 41
1885–86	249,431 18	289,838 61
1886–87	245,509 83	136,926 50
1887–88	294,861 66	244,452 11
1888–89	321,605 12	247,137 61
1889–90	306,148 20	311,633 96
1890–91	319,721 19	232,991 25
1891–92	360,206 68	366,205 44
1892–93	334,575 70	376,049 89
1893–94	281,417 59	315,899 66
1894–95	215,278 73	381,585 26
1895–96	285,523 58	346,501 16
1896–97	256,612 21	281,991 29
1897–98	224,702 65	245,385 94
1898–99	334,943 72	314,371 42
1899–00	669,814 33	639,360 25
1900–01	725,703 72	745,015 51
1901–02	760,506 95	758,510 69
1902–03	761,337 47	687,986 78
1903–04	898,950 73	926,958 58
1904–05	1,220,947 50	962,696 47
1905–06	916,614 85	1,095,098 73
From State of California (Act of Special Session 1906, Chapter XXXVI)	100,000 00	------------
Balance in Treasury June 30, 1906		295,209 20
Total	$14,519,922 95	$14,519,922 95

EXHIBIT G.

Statement of San Francisco Depot Sinking Fund, June 30, 1906.

		Sinking Fund.	Interest.	Total.
1904—June	To amount transferred from S. F. Harbor Improvement Fund	$2,631 00	$2,000 00	$4,631 00
July	do	2,631 00	2,000 00	4,631 00
Aug.	do	2,631 00	2,000 00	4,631 00
Sept.	do	2,631 00	2,000 00	4,631 00
Oct.	do	2,631 00	2,000 00	4,631 00
Nov.	do	2,631 00	2,000 00	4,631 00
Dec.	do	2,631 00	2,000 00	4,631 00
1905—Jan.	do	2,631 00	2,000 00	4,631 00
Feb.	do	2,631 00	2,000 00	4,631 00
Mar.	do	2,631 00	2,000 00	4,631 00
Apr.	do	2,631 00	2,000 00	4,631 00
May	do	2,631 00	2,000 00	4,631 00
June	do	2,631 00	2,000 00	4,631 00
	Total	$31,572 00	$24,000 00	$55,572 00
1905—July	To amount transferred from S. F. Harbor Improvement Fund	$2,631 00	$2,000 00	$4,631 00
Aug.	do	2,631 00	2,000 00	4,631 00
Sept.	do	2,631 00	2,000 00	4,631 00
Oct.	do	2,631 00	2,000 00	4,631 00
Nov.	do	2,631 00	2,000 00	4,631 00
Dec.	do	2,631 00	2,000 00	4,631 00
1906—Jan.	do	2,631 00	2,000 00	4,631 00
Feb.	do	2,631 00	2,000 00	4,631 00
Mar.	do	2,631 00	2,000 00	4,631 00
Apr.	do	2,631 00	2,000 00	4,631 00
May	do	2,631 00	2,000 00	4,631 00
June	do	2,631 00	2,000 00	4,631 00
	Total	$31,572 00	$24,000 00	$55,572 00
	Total for two fiscal years ending June 30, 1906	$63,144 00	$48,000 00	$111,144 00
	Transferred prior to June 30, 1904	360,447 00	274,000 00	634,447 00
	Total	$423,591 00	$322,000 00	$745,591 00

Statement of San Francisco Seawall Sinking Fund, June 30, 1906.

		Sinking Fund	Interest.	Total.
1906—Apr.	Transfer from S. F. Harbor Improvement Fund	$1,169 14	$555 50	$1,724 64
May	do	1,168 22	833 35	2,001 57
June	do	1,168 22	833 35	2,001 57
	Total	$3,505 58	$2,222 20	$5,727 78

EXHIBIT H.

Statement of Deferred Payment Draft Account for the Two Fiscal Years Ending June 30, 1906.

DRAFTS ISSUED.

Date.	Draft No.	Issued to.	Date Payable.	Account of.	Amount.	Total.
1904 July 21	229	Robert Greig	Oct. 21,'04	Slate roof, Union Depot	$1,194 00	
	230	do	Jan. 21,'05	do	1,194 00	
	231	do	Apr. 21,'05	do	1,194 00	
	232	do	July 21,'05	do	1,194 00	
	233	do	Oct. 21,'05	do	1,194 00	
	234	do	Jan. 21,'06	do	1,194 00	
	235	do	Apr. 21,'06	do	1,194 00	
	236	(Spoiled)				
	237	Robert Greig	July 21,'06	do	1,194 00	
	238	do	Oct. 21,'06	do	1,194 00	
	239	do	Jan. 21,'07	do	1,194 00	
	240	do	Apr. 21,'07	do	1,194 00	
	241	do	July 21,'07	do	1,194 00	
	242	do	Oct. 21,'07	do	1,194 00	
	243	do	Jan. 21,'08	do	1,194 00	
	244	do	Apr. 21,'08	do	1,194 00	
	245	do	July 21,'08	do	1,194 00	
	246	do	Oct. 21,'08	do	1,194 00	
	247	do	Jan. 21,'09	do	1,194 00	
	248	do	Apr. 21,'09	do	1,194 00	
	249	do	July 21,'09	do	1,194 00	
	250	(Spoiled)				$23,880 00
	251	Healy, Tibbitts & Co	Oct. 21,'04	Repairing Slips 1, 3, 4, 6 and 7	$3,020 94	
	252	do	Jan. 21,'05	do	3,020 94	
	253	do	Apr. 21,'05	do	3,020 94	
	254	do	July 21,'05	do	3,020 95	
	255	do	Oct. 21,'05	do	3,020 95	
	256	do	Jan. 21,'06	do	3,020 95	$18,125 67
Oct. 21	257	Southern Pacific Co.	Jan. 19,'05	Creosoting piles	$763 87	
	258	do	Apr. 19,'05	do	763 87	
	259	do	July 19,'05	do	763 87	
	260	do	Oct. 19,'05	do	763 87	
	261	do	Jan. 19,'06	do	763 87	
	262	do	Apr. 19,'06	do	763 87	
	263	do	July 19,'06	do	763 87	
	264	do	Oct. 19,'06	do	763 87	
	265	do	Jan. 19,'07	do	763 87	
	266	do	Apr. 19,'07	do	763 87	
	267	do	July 19,'07	do	763 87	
	268	do	Oct. 19,'07	do	763 87	
	269	do	Jan. 19,'08	do	763 87	
	270	do	Apr. 19,'08	do	763 87	
	271	do	July 19,'08	do	763 87	
	272	do	Oct. 19,'08	do	763 87	
	273	do	Jan. 19,'09	do	763 88	
	274	do	Apr. 19,'09	do	763 88	
	275	do	July 19,'09	do	763 88	
	276	do	Oct. 19,'09	do	763 88	$15,277 44
Nov. 7	277	Healy, Tibbitts & Co	Feb. 2,'05	Constructing slip, Central Basin	$1,596 82	
	278	do	May 2,'05	do	1,596 82	
	279	do	Aug. 2,'05	do	1,596 82	
	280	do	Nov. 2,'05	do	1,596 82	
	281	do	Feb. 2,'06	do	1,596 82	
	282	do	May 2,'06	do	1,596 82	
	283	do	Aug. 2,'06	do	1,596 82	

EXHIBIT H—*Continued.*

DRAFTS ISSUED.

Date.	Draft No.	Issued to.	Date Payable.	Account of.	Amount.	Total.
1904 Nov. 7	284	Healy, Tibbitts & Co	Nov. 2,'06	Constructing slip, Central Basin	$1,596 82	
	285	do	Feb. 2,'07	do	1,596 82	
	286	do	May 2,'07	do	1,596 82	
	287	do	Aug. 2,'07	do	1,596 83	
	288	do	Nov. 2,'07	do	1,596 83	
	289	do	Feb. 2,'08	do	1,596 83	
	290	do	May 2,'08	do	1,596 83	
	291	do	Aug. 2,'08	do	1,596 83	
	292	do	Nov. 2,'08	do	1,596 83	
	293	do	Feb. 2,'09	do	1,596 83	
	294	do	May 2,'09	do	1,596 83	
	295	do	Aug. 2,'09	do	1,596 83	
	296	do	Nov. 2,'09	do	1,596 83	$31,936 50
1905 Apr. 27	297	Gray Bros.	July 27,'05	Constructing seawall	$5,609 54	
	298	do	Oct. 27,'05	do	5,609 54	
	299	do	Jan. 27,'06	do	5,609 54	
	300	do	Apr. 27,'06	do	5,609 55	
	301	do	July 27,'06	do	5,609 55	
	302	do	Oct. 27,'06	do	5,609 55	
	303	do	Jan. 27,'07	do	5,609 55	
	304	do	Apr. 27,'07	do	5,609 55	
	305	do	July 27,'07	do	5,609 55	
	306	do	Oct. 27,'07	do	5,609 55	
	307	do	Jan. 27,'08	do	5,609 55	
	308	do	Apr. 27,'08	do	5,609 55	
	309	do	July 27,'08	do	5,609 55	
	310	do	Oct. 27,'08	do	5,509 55	
	311	do	Jan. 27,'09	do	5,609 55	
	312	do	Apr. 27,'09	do	5,609 55	
	313	do	July 27,'09	do	5,609 55	
	314	do	Oct. 27,'09	do	5,609 55	
	315	do	Jan. 27,'10	do	5,609 55	
	316	do	Apr. 27,'10	do	5,609 55	112,190 97
May 25	317	Pacific Con. Co.	Aug. 25,'05	Constructing dolphins	$2,988 92	
	318	do	Nov. 25,'05	do	2,988 92	
	319	do	Feb. 25,'06	do	2,988 92	
	320	do	May 25,'06	do	2,988 92	
	321	do	Aug. 25,'06	do	2,988 92	
	322	do	Nov. 25,'06	do	2,988 92	
	323	do	Feb. 25,'07	do	2,988 92	
	324	do	May 25,'07	do	2,988 92	
	325	do	Aug. 25,'07	do	2,988 92	
	326	do	Nov. 25,'07	do	2,988 92	
	327	do	Feb. 25,'08	do	2,988 92	
	328	do	May 25,'08	do	2,988 92	
	329	do	Aug. 25,'08	do	2,988 92	
	330	do	Nov. 25,'08	do	2,988 92	
	331	do	Feb. 25,'09	do	2,988 92	
	332	do	May 25,'09	do	2,988 92	
	333	do	Aug. 25,'09	do	2,988 92	
	334	do	Nov. 25,'09	do	2,988 92	
	335	do	Feb. 25,'10	do	2,988 92	
	336	do	May 25,'10	do	2,988 92	59,778 40
1906 Feb. 10	337	Western Fuel Co.	May 8,'06	Cement	$1,326 55	
	338	do	Aug. 8,'06	do	1,326 55	
	339	do	Nov. 8,'06	do	1,326 55	
	340	do	Feb. 8,'07	do	1,326 54	
	341	do	May 8,'07	do	1,326 54	
	342	do	Aug. 8,'07	do	1,326 54	7,959 27

EXHIBIT H—*Continued.*

DRAFTS ISSUED.

Date.	Draft No.	Issued to.	Date Payable.	Account of.	Amount.	Total.
1906						
Feb. 19	343	Healy, Tibbitts & Co.	May 15, '06	Constructing Pier No. 13	$4,591 52	
	344	do	Aug 15, '06	do	4,591 52	
	345	do	Nov. 15, '06	do	4,591 52	
	346	do	Feb. 15, '07	do	4,591 52	
	347	do	May 15, '07	do	4,591 52	
	348	do	Aug. 15, '07	do	4,591 52	
	349	do	Nov. 15, '07	do	4,591 52	
	350	do	Feb. 15, '08	do	4,591 52	
	351	do	May 15, '08	do	4,591 52	
	352	do	Aug 15, '08	do	4,591 52	
	353	do	Nov. 15, '08	do	4,591 52	
	354	do	Feb. 15, '09	do	4 591 52	
	355	do	May 15, '09	do	4,591 52	
	356	do	Aug. 15, '09	do	4,591 52	
	357	do	Nov. 15, '09	do	4,591 52	
	358	do	Feb. 15, '10	do	4,591 52	
	359	do	May 15, '10	do	4,591 52	
	360	do	Aug. 15, '10	do	4,591 52	
	361	do	Nov. 15, '10	do	4,591 52	
	362	do	Feb. 15, '11	do	4,591 52	$91,830 40

Drafts issued	$360,978 65
Amount outstanding June 30, 1904	272,115 79
Total	$633,094 44

DRAFTS MATURED AND PAID.

Date.	Draft No.	To Whom Paid.	Amount.	Total.
1904				
Aug. 9	110	Robert Wakefield	$3,164 92	
9	127	City Street Improvement Co.	3,269 01	$6,433 93
Sept. 12	212	Robert Wakefield	$2,825 00	
19	226	H. R. Rood & Co.	1,340 00	
19	144	J. H. Bruce	2,662 33	
30	138	Dundon Bridge and Construction Co.	1,092 57	7,919 90
Oct. 1	194	F. H. Masow	$3,499 17	
8	156	Hyde Construction Co.	4,188 50	
8	39	Robert Wakefield	3,089 45	
15	204	James A. McMahon	1,841 88	
16	66	Robert Wakefield	3,234 42	
21	229	Robert Greig	1,194 00	
21	251	Healy, Tibbitts & Co.	3,020 94	
24	13	Robert Wakefield	3,649 75	
24	84	Robert Wakefield	3,221 74	
24	172	S. F. Dry Dock Co.	1,560 30	28,500 15
Nov. 7	111	Robert Wakefield		3,164 92
Dec. 9	213	Robert Wakefield	$2,825 00	
14	139	Dundon Bridge and Construction Co.	1,092 57	
19	227	H. R. Rood & Co.	1,340 00	
19	145	J. H. Bruce	2,622 34	7,919 91

EXHIBIT H—*Continued.*

DRAFTS MATURED AND PAID.

Date.	Draft No.	To Whom Paid.	Amount.	Total.
1905				
Jan. 5	195	F. H. Masow	$3,499 17	
9	157	Hyde Construction Co.	4,188 50	
9	40	Robert Wakefield	3,089 45	
7	205	James A. McMahon	1,841 88	
17	200	S. D. LeClair	3,143 20	
17	67	Robert Wakefield	3,234 42	
24	230	Robert Greig	1,194 00	
25	252	Healy, Tibbitts & Co.	3,020 94	
25	14	Robert Wakefield	3,649 75	
25	85	Robert Wakefield	3,221 74	
30	257	Southern Pacific Co.	763 87	$30,846 92
Feb. 3	173	S. F. Dry Dock Co.	$1,560 30	
7	112	Robert Wakefield	3,164 92	
9	277	Healy, Tibbitts & Co.	1,596 82	6,322 04
Mar. 9	214	Robert Wakefield	$2,825 00	
13	140	Dundon Bridge and Construction Co.	1,092 57	
17	228	H. R. Rood & Co.	1,340 00	
20	146	J. H. Bruce	2,662 34	7,919 91
Apr. 4	196	F. H. Masow	$3,499 16	
10	41	Robert Wakefield	3,089 45	
10	158	Hyde Construction Co.	4,188 50	
17	206	James A. McMahon	1,841 87	
17	68	Robert Wakefield	3,234 42	
22	174	S. F. Dry Dock Co.	1,560 30	
22	231	Robert Greig	1,194 00	
24	15	Robert Wakefield	3,649 75	
24	86	Robert Wakefield	3,221 74	
25	253	Healy, Tibbitts & Co.	3,020 94	
25	258	Southern Pacific Co.	763 87	29,264 00
May 4	278	Healy, Tibbitts & Co.	$1,596 82	
5	113	Robert Wakefield	3,164 92	4,761 74
June 9	215	Robert Wakefield		2,825 00
July 1	197	F. H. Masow	$3,499 16	
8	42	Robert Wakefield	3.089 45	
8	159	Hyde Construction Co.	4,188 50	
14	207	James A. McMahon	1,841 87	
15	201	S. D. LeClair	3,143 20	
18	69	Robert Wakefield	3,234 42	
21	175	S. F. Dry Dock Co.	1,560 30	
21	232	Robert Greig	1,194 00	
21	254	Healy, Tibbitts & Co.	3,020 95	
24	16	Robert Wakefield	3,649 75	
24	87	Robert Wakefield	3,221 74	
26	259	Southern Pacific Co.	763 87	
28	297	Gray Bros.	5,609 54	38,016 75
Aug. 2	279	Healy, Tibbitts & Co.	$1,596 82	
10	114	Robert Wakefield	3,164 92	
25	317	Pacific Construction Co.	2,988 92	7,750 66
Sept. 13	216	Robert Wakefield		2,825 00
Oct. 9	43	Robert Wakefield	$3,089 45	
9	160	Hyde Construction Co.	4,188 50	
16	70	Robert Wakefield	3,234 42	
17	208	James A. McMahon	1,841 87	
18	176	S. F. Dry Dock Co.	1,560 30	
19	260	Southern Pacific Co.	763 87	
21	233	Robert Greig	1,194 00	
24	88	Robert Wakefield	3,221 74	
28	298	Gray Bros.	5,609 54	
30	255	Healy, Tibbitts & Co.	3,020 95	27,724 64

EXHIBIT H—*Continued.*

DRAFTS MATURED AND PAID.

Date.	Draft No.	To Whom Paid.	Amount.	Total.
1905				
Nov. 6	115	Robert Wakefield	$3,164 92	
21	280	Healy, Tibbitts & Co.	1,596 82	
25	318	Pacific Construction Co.	2,988 92	
				$7,750 66
Dec. 12	217	Robert Wakefield		2,825 00
1906				
Jan. 9	44	Robert Wakefield	$3,089 45	
9	161	Hyde Construction Co.	4,188 50	
15	209	James A. McMahon	1,841 87	
16	71	Robert Wakefield	3,234 42	
22	256	Healy, Tibbitts & Co.	3,020 95	
23	177	S. F. Dry Dock Co.	1,560 30	
23	234	Robert Greig	1,194 00	
24	89	Robert Wakefield	3,221 74	
30	299	Gray Bros.	5,609 54	
30	261	Southern Pacific Co.	763 87	
				27,724 64
Feb. 2	281	Healy, Tibbitts & Co.	$1,596 82	
5	116	Robert Wakefield	3,164 92	
26	319	Pacific Construction Co.	2,988 92	
				7,750 66
Mar. 10	218	Robert Wakefield		2,825 00
Apr. 8	162	Hyde Construction Co.	$4,188 50	
16	72	Robert Wakefield	3,234 42	
28	300	Gray Bros.	5,609 55	
				13,032 47
May 7	235	Robert Greig	$1,194 00	
26	320	Pacific Construction Co.	2,988 92	
29	90	Robert Wakefield	3,221 74	
29	117	Robert Wakefield	3,164 92	
				10,569 58
June 9	219	Robert Wakefield	$2,825 00	
12	282	Healy, Tibbitts & Co.	1,596 82	
15	262	Southern Pacific Co.	763 87	
15	343	Healy, Tibbitts & Co.	4,591 52	
23	337	Western Fuel Co.	1,326 55	
29	178	S. F. Dry Dock Co.	1,560 30	
				12,664 06
		Total paid for two fiscal years ending June 30, 1906		$297,337 54
		*Balance outstanding June 30, 1906		335,756 90
		Total		$633,094 44

*The above outstanding deferred payment drafts are payable as follows:

Year ending June 30, 1907	$116,131 68
Year ending June 30, 1908	80,196 50
Year ending June 30, 1909	66,978 78
Year ending June 30, 1910	58,675 38
Year ending June 30, 1911	13,774 56
Total	$335,756 90

EXHIBIT I.

COST OF COMPLETED SEAWALL.

Section.	Length—Feet.	Cost per Lineal Foot.	Total Cost.
Section A, constructed in 1879-80	561	$152 61	$85,614 53
Section 1, constructed in 1878-79	1,000	165 63	165,631 40
Section 2, constructed in 1879-80	1,000	167 50	167,504 09
Section 3, constructed in 1879-81	1,000	235 50	235,049 51
Section 4, constructed in 1880-82	1,000	240 87	240,872 01
Section 5, constructed in 1883-84	1,000	169 89	169,893 57
Section 6, constructed in 1885-86	800	158 47	126,779 73
Section 7, constructed in 1887-89	1,000	109 32	109,327 99
Section 8b, constructed in 1888-90	450	248 50	111,629 12
Section B, constructed in 1890-93	1,000	114 60	114,601 18
Section 8a, constructed in 1891-93	392	219 41	86,008 09
Section 13, constructed in 1904-05	600	233 73	140,238 71
Total	9,803	Av., $178 83	$1,753,149 93

EXHIBIT J.

Belt Railroad Revenue and Expense for the Years ending June 30, 1906.

REVENUE.

Fiscal Year ending June 30—	Construction.	Sale of Old Material.	Switching Cars.	Total.
1892			$4,580 75	$4,580 75
1893			12,039 00	12,039 00
1894			10,775 25	10,775 25
1895			10,118 75	10,118 75
1896		$5,934 25	11,730 00	17,664 25
1897			11,619 25	11,619 25
1898			13,313 50	13,313 50
1899			17,090 25	17,090 25
1900			19,402 25	19,402 25
1901			27,477 00	27,477 00
1902			38,992 53	38,992 53
1903	$62 27		47,266 20	47,328 47
1904			71,924 12	71,924 12
1905		132 50	79,673 75	79,806 25
1906		219 69	77,787 25	78,006 94
Totals	$62 27	$6,286 44	$453,789 85	$460,138 56

EXHIBIT J—*Continued.*

EXPENSE.

Fiscal Year ending June 30—	Construction and Equipment.		Maintenance and Operating.		Total.
1891	$327 61				$327 61
1892	74,188 90		$7,118 56		81,307 46
1893	4,496 68		11,436 42		15,933 10
1894	50 69		14,592 94		14,643 63
1895	11,587 38		19,167 88		30,755 26
1896			15,189 01		15,189 01
1897			11,422 57		11,422 57
1898			18,458 63		18,458 63
1899			25,539 38		25,539 38
1900			37,476 81		37,476 81
1901	37,519 31		38,827 27		76,346 58
1902	19,314 90		48,001 86		67,316 76
1903	14,242 48		43,408 15		57,650 63
	Construction.	Equipment.	Maintenance.	Operating.	
1904	$402 71	$10,652 01	$25,695 79	$43,593 25	80,343 76
1905		300 00	24,567 23	46,194 70	71,061 93
1906			23,602 17	43,221 22	66,823 39
Total					$670,596 51

EXHIBIT K.

Work Under Way at Date of Last Biennial Report and Since Finished.

Slate roof on Union Depot and Ferry House. Robert Greig, contractor. Date of contract, October 31, 1903.

Contract price		$29,850 00
Paid Mar. 21, 1904	$995 00	
Paid Apr. 30, 1904	995 00	
Paid June 30, 1904	995 00	
Paid June 24, 1904	995 00	
Paid July 14, 1904	995 00	
Paid July 22, 1904	995 00	
Paid July 22, 1904—20 deferred payment drafts, each in sum of $1,194 (see Exhibit H)	23,880 00	
		$29,850 00

A section of seawall and wharf along same. Gray Bros., contractors. Date of contract, December 30, 1903.

Contract price—Stone for seawall, 97 cents per ton of 2,240 pounds.

Wharf			$6,100 00
Rock delivered, 138,287.33 tons at 97 cents			134,138 71
			$140,238 71
Cash payments—			
June 18, 1904	$2,940 91		
July 22, 1904	1,592 32		
Aug. 15, 1904	2,723 93		
Sept. 12, 1904	2,656 69		
Oct. 6, 1904	2,412 90		
Nov. 3, 1904	1,646 30		
Dec. 9, 1904	2,935 50		
Jan. 6, 1905	1,951 86		
Feb. 2, 1905	361 74		
Mar. 4, 1905	3,036 79		
Apr. 14, 1905	2,483 05		
Apr. 27, 1905	2,305 75		
		$28,047 74	
Twenty D. P. drafts (see Exhibit H)		112,190 97	
			$140,238 71

EXHIBIT K—*Continued.*

Constructing Southern Pacific Company's freight slip. Healy, Tibbitts & Co., contractors. Date of contract, January 6, 1904.

Contract price		$63,873 00	
Extra piling		1,051 68	
			$64,924 68
Cash payments—			
May 12, 1904	$11,177 77		
July 14, 1904	4,790 48		
Aug. 5, 1904	7,984 13		
Sept. 30, 1904	6,387 30		
Nov. 4, 1904	1,596 82		
Nov. 4, 1904	1,051 68		
		$32,988 18	
Twenty D. P. drafts (see Exhibit H)		31,936 50	
			$64,924 68

Creosoting piles and lumber for Southern Pacific Company's freight slip. Southern Pacific Co., contractor. Date of contract, February 3, 1904:

10,533 feet of 12-inch piling, at 25 cents per foot	$2,633 25	
5,026 feet of 13-inch piling, at 27 cents per foot	1,357 02	
22,748 feet of 14-inch piling, at 30 cents per foot	6,824 40	
11,313 feet of 15-inch piling, at 32 cents per foot	3,620 16	
2,022 feet of 16-inch piling, at 35 cents per foot	707 70	
294 feet of 17-inch piling, at 37 cents per foot	108 78	
67 feet of 18-inch piling, at 39 cents per foot	26 13	
		$15,277 44
Paid October 21, 1904, by 20 D. P. Drafts (see Exhibit H)		15,277 44

Repairing portions of spring lines and clusters of Ferry Slips 1, 3, 4, 6, and 7. Healy, Tibbitts & Co., contractors. Date of contract, February 3, 1904.

April 27, 1904—454 piles, at $16.90	$7,672 60	
68,592 feet of lumber, at $38 per M.	2,606 50	
June 1, 1904—203 piles, at $16.90	3,430 70	
31,296 feet of lumber, at $38 per M.	1,189 25	
June 22, 1904—294 piles, at $16.90	4,968 60	
32,617 feet of lumber, at $38 per M.	1,239 45	
July 21, 1904—120 piles, at $16.90	2,028 00	
27,170 feet of lumber, at $38 per M.	1,032 46	
		$24,167 56
Cash payments—		
April 30, 1904	$2,569 77	
June 3, 1904	1,154 99	
June 24, 1904	1,552 01	
July 22, 1904	765 12	
Six D. P. drafts (see Exhibit H)	18,125 67	
		$24,167 56

Slating roofs over upper deck landings between Ferry Slips 4–5 and 5–6. Robert Greig, contractor. Date of letter of agreement, June 29, 1904.

Contract price	$2,145 00
Paid August 15, 1904	2,145 00

EXHIBIT L.

Work Contracted for and Completed within the years June 30, 1904, and July 1, 1906.

Slating roofs over the upper deck landings between Slips 2–3 and 3–4. Robert Greig, contractor. Date of letter, July 20, 1904.

Contract price	$2,475 00
Paid September 2, 1904	2,475 00

Reconstructing the dolphins between Ferry Slips 3–4, 4–5, and 5–6. Pacific Construction Co., contractor. Date of contract, July 26, 1904.

Contract price		$74,723 00
Payments—		
Dec. 23, 1904	$4,483 38	
Feb. 27, 1905	5,977 84	
May 25, 1905	4,483 38	
May 25, 1905—Deferred payment drafts (Nos. 317-336, inclusive, each for $2,988.92) issued for	59,778 40	
		$74,723 00

Constructing shed in front of Slip "A." Frank Gallagher, contractor. Date of contract, September 7, 1904.

Contract price		$2,887 00
Extra work		60 11
		$2,947 11
Payments—		
Nov. 29, 1904	$2,165 25	
Jan. 6, 1905	721 75	
Jan. 6, 1905	60 11	
		$2,947 11

Repairing and repiling Pier No. 14 (Folsom Street Wharf No. 2). Dundon Bridge and Construction Co., contractor. Date of contract, September 28, 1904.

Contract price—		
Furnish, drive and fasten new piles, at $21.15 each (115)		$2.432 25
Furnish, fit, and fasten caps, etc., at $28 per M. ft. B. M. (61,238 ft.)		1,714 66
Furnish, fit, and fasten planking, at $18 per M. ft. B. M. (98,751 ft.)		1,777 52
Relay old stringers and planking, at $5 per M. ft. B. M. (42,709 ft.)		213 55
Pulling and bolting 25 piles, at $1.50		37 50
Spliced 6 old caps, labor on same		53 96
		$6,229 44
Payments—		
Jan. 5, 1905	$2,030 96	
Mar. 4, 1905	1,252 64	
Mar. 30, 1905	1,388 48	
May 13, 1905	1,557 36	
		$6,229 44

For constructing wharf along retaining wall at foot of Second street. Healy, Tibbitts & Co., contractors. Date of contract, October 19, 1904.

Contract price		$6,997 00
Payments—		
Dec. 23, 1904	$4,198 20	
Mar. 30, 1905	1,049 55	
May 13, 1905	1,749 25	
		$6,997 00

EXHIBIT L—*Continued.*

Cement for constructing dolphins between Ferry Slips 3–4, 4–5, and 5–6. The Holmes Lime Co., contractors. Date of contract, October 19, 1904.

Contract price, $10.12 per ton of 2,000 lbs. (in sacks). 431.81 tons, at $10.12		$4,369 92
Payments—		
Dec. 9, 1904	$749 36	
Feb. 2, 1905	839 72	
May 25, 1905	1,688 36	
July 14, 1905	1,092 48	
		$4,369 92

Constructing Piers Nos. 42 and 44. Healy, Tibbitts & Co., contractors. Date of contract, December 8, 1904.

Contract price—		
Pier No. 42	$129,673 00	
Pier No. 44	128,000 00	
Shed on Pier No. 42	26,000 00	
Shed on Pier No. 44	46,000 00	
	$329,673 00	
Extra	500 00	
Extra	500 00	
	$330,673 00	
Less deductions	279 50	
		$330,393 50
Payments—		
May 13, 1905	$37,088 21	
June 16, 1905	24,725 48	
July 21, 1905	24,725 47	
Aug. 17, 1905	49,450 95	
Sept. 23, 1905	37,088 21	
Oct. 21, 1905	12,362 74	
Nov. 23, 1905	12,362 74	
Nov. 24, 1905	500 00	
Jan. 4, 1906	19,780 38	
Mar. 15, 1906	12,362 74	
May 31, 1906	17,528 33	
June 29, 1906	82,418 25	
		$330,393 50

Cement for Piers Nos. 42 and 44. The Holmes Lime Co., contractor. Date of contract, December 8, 1904.

Contract price, $10.50 per ton of 2,000 lbs. net. 3,632.634 tons, at $10.50		$38,142 66
Payments—		
July 21, 1905	$5,929 26	
Aug. 17, 1905	6,442 63	
Sept. 15, 1905	8,111 88	
Oct. 21, 1905	5,344 92	
Nov. 11, 1905	2,778 31	
Dec. 15, 1905	9,535 66	
		$38,142 66

EXHIBIT L—*Continued.*

Paving Montgomery street, between Chestnut and Francisco streets. Flinn & Treacy, contractors. Date of contract, December 8, 1904.

Contract price—
$0.23½ per square foot basalt block paving.
$1.40 per lineal foot for 20-inch granite curb.
$0.37 per square foot basalt gutter, grouted and laid in cement.

4,240 square feet basalt blocks, at 23½ cents	$996 40	
550 feet gutter, at 37 cents	203 50	
275 feet curb, at $1.40	385 00	
		$1,584 90
Payment—		
March 20, 1905		$1,584 90

Filling in and repaving roadway between Vallejo and Green, Front and Davis streets. Flinn & Treacy, contractors. Date of contract, December 8, 1904.

Contract price—
6 cents per square foot for basalt block paving, including filling.
$6.50 per cubic yard for concrete bulkhead.

15,829 square feet basalt blocks, at 6 cents	$949 74	
55 cubic yards concrete, at $6.50	357 50	
64 feet 12-inch culvert, at $1.50	96 00	
1 catch basin	25 00	
		$1,428 24
Paid February 23, 1905		$1,428 24

Addition to Pier No. 5. Healy, Tibbitts & Co., contractors. Date of contract, December 29, 1904.

Contract price	$9,898 00	
Extra work and material	70 32	
		$9,968 32
Payments—		
Mar. 28, 1905	$3,711 75	
April 14, 1905	3,711 75	
April 21, 1905	70 32	
May 23, 1905	2,474 50	
		$9,968 32

Addition to Pier No. 6 (Howard Street Wharf No. 1). Healy, Tibbitts & Co., contractors. Date of contract, December 29, 1904.

Contract price		$9,160 00
Payments—		
Feb. 27, 1905	$5,152 50	
Mar. 20, 1905	1,717 50	
Apr. 21, 1905	2,290 00	
		$9,160 00

Removing and replacing marble in stairway in Nave. Western Iron Works, contractor. Date of contract, January 26, 1905.

Contract price—Original, May 4, 1904	$2,987 00	
Additional, January 26, 1905	1,920 00	
		$4,907 00
Payments—		
May 13, 1905	$3,680 25	
June 16, 1905	1,226 75	
		$4,907 00

EXHIBIT L—*Continued.*

Creosoting piles for Piers Nos. 5 and 6. H. R. Rood & Co., contractors. Date of contract, January 26, 1905.

Contract price, 40 cents for each lineal foot of space covered.		
Howard Street Wharf, Pier No. 6, 14,425 feet, at 40 cents	$5,770 00	
Jackson Street Wharf, Pier No. 5, 10,976 feet, at 40 cents	4,390 40	
		$10,160 40
Payments—		
Mar. 20, 1905	$7,620 30	
Apr. 21, 1905	2,540 10	
		$10,160 40

Creosoting piles. San Francisco Timber Preserving Co., contractor. Date of contract, February 2, 1905.

Contract price—		
11-inch piles, 26 cents— 123 feet	$31 98	
12-inch piles, 27 cents—2,855 feet	770 85	
13-inch piles, 28 cents—1,919 feet	537 32	
14-inch piles, 29 cents—2,132 feet	618 28	
15-inch piles, 32 cents—1,020 feet	326 40	
16-inch piles, 36 cents— 578 feet	208 08	
		$2,492 91
Paid February 27, 1905		$2,492 91

Repairing and extending south arm of slip in Central Basin. Thomson Bridge Co., contractor. Date of Contract, February 2, 1905.

Contract price		$5,950 00
Payments –		
Mar. 10, 1905	$1,487 50	
Apr. 14, 1905	1,487 50	
May 12, 1905	1,487 50	
June 19, 1905	1,487 50	
		$5,950 00

Constructing Pier No. 13 (Vallejo Street Wharf). Healy, Tibbitts & Co., contractors. Date of contract, February 9, 1905.

Contract price		$114,788 00
Payments—		
June 12, 1905	$2,295 76	
Aug. 3, 1905	4,591 52	
Sept. 15, 1905	4,591 52	
Nov. 11, 1905	5,739 40	
Jan. 8, 1906	2,295 76	
Feb. 8, 1906	2,295 76	
Feb. 16, 1906	1,147 88	
	$22,957 60	
20 deferred payment drafts, each $4,591.52	91,830 40	
		$114,788 00

Construction of scow pile-driver. Healy, Tibbitts & Co., contractors. Date of contract, February 23, 1905.

Contract price		$2,693 00
Payments—		
Apr. 21, 1905	$1,514 81	
May 13, 1905	504 94	
June 16, 1905	673 25	
		$2,693 00

EXHIBIT L—*Continued.*

Shed on bulkhead between Piers Nos. 25 and 27. Frank Gallagher, contractor. Date of contract, March 16, 1905.

Contract price		$1,370 00
Payments—		
Apr. 27, 1905	$1,027 50	
June 12, 1905	342 50	
		$1,370 00

Cement for Vallejo Street Wharf. Western Fuel Co., contractor. Date of contract, March 16, 1905.

Contract price, $10.98 per ton of 2,000 lbs. net. 906 tons at $10.98		$9,949 09
Payments—		
Feb. 8, 1906	$1,989 82	
May 8, 1906	1,326 55	
Aug. 8, 1906	1,326 55	
Nov. 8, 1906	1,326 55	
Feb. 8, 1906	1,326 54	
May 8, 1906	1,326 54	
Aug. 8, 1906	1,326 54	
		$9,949 09

Repairing building on bulkhead between Piers Nos. 9 and 11. Fred Miller, contractor. Date of contract, March 30, 1905.

Contract price		$2,185 00
Payments—		
May 23, 1905	$1,638 75	
July 7, 1905	546 25	
		$2,185 00

Constructing addition to shed on Pier No. 5 (Jackson Street Wharf). Hannah Bros., contractors. Date of contract, May 4, 1905.

Contract price		$4,473 00
Payments—		
May 25, 1905	$1,341 90	
June 16, 1905	1,174 16	
June 23, 1905	838 69	
July 28, 1905	1,118 25	
		$4,473 00

Widening and constructing shed on Greenwich Street Wharf No. 2 (Pier No. 25). Robert Wakefield, contractor. Date of contract, September 14, 1905.

Contract price		$23,877 00
Payments—		
Nov. 24, 1905	$5,372 32	
Dec. 28, 1905	5,372 33	
Jan. 25, 1906	7,163 10	
Mar. 6, 1906	5,969 25	
		$23,877 00

EXHIBIT L—*Continued.*

Cement for widening Greenwich Street Wharf No. 2 (Pier No. 25). Holmes Lime Co., contractor. Date of contract, September 21, 1905.

Contract price, $12.50 per ton. 192.31 tons, at $12.50		$2,403 88
Payments—		
Dec. 28, 1905	$1,802 91	
Jan. 25, 1906	600 97	
		$2,403 88

EXHIBIT M.

Work Contracted for Since June 30, 1904, but Not Yet Completed.

Erecting shed over Pier No. 13 (Vallejo Street Wharf). Robert Greig, contractor. Date of contract, December 1, 1905.

Contract price	$10,169 00
Paid April 6, 1906	1,372 81

Constructing Pier No. 27 and removing present pier and shed. Healy-Tibbitts Construction Co., contractors. Date of contract, May 17, 1906.

Contract price	$129,800 00

Constructing Section No. 12, Seawall. Gray Bros., contractors. Date of contract, May 17, 1906.

Contract price, 69 cents per ton of 2,240 pounds each.

Constructing freight platform on Seawall Lot No. 11. Frank Gallagher, contractor. Date of contract, June 14, 1906.

Contract price	$2,850 00

EXHIBIT N.

Statement of Cost of Dredging, by years, commencing June 30, 1875.

Fiscal Year Ending—	Salaries of Employés.	Repairs.	Coal.	Ship Chandlery, Water, Etc., etc.	Miscellaneous, including Docking Dredgers, Tugs, Scows.	Total.	No. Yards Dredged.	No. Hours Worked.	Cost per Cubic Yard, Cents.
June 30, 1875	$11,663 97	$10,362 99	$8,639 00	$1,386 64	$1,301 25	$33,835 71	303,429	2,348¾	10.76
June 30, 1876	11,932 98	7,639 43	8,224 04	1,660 85	1,905 74	31,363 19	342,638	2,634	9.15
June 30, 1877	11,980 99	4,041 44	5.971 71	1.582 10	1,676 79	25,253 03	280,197	2,478½	9.01
June 30, 1878	17,188 80	7,372 48	7,754 86	2,666 37	3,032 55	38,214 40	423,654	3,080	9.02
June 30, 1879	26,201 70	14,963 90	11.755 12	5.443 70	1,289 60	60,454 68	843,879	4,694	7.16
June 30, 1880	27,202 59	8,824 19	11,115 11	4,184 65	318 75	51,645 29	749,011	4,323	6.89
June 30, 1881	25,948 49	10,196 63	11,037 15	4,194 44	85 81	51,462 52	732,919	3,962⅓	7.02
June 30, 1882	25,860 00	9,556 57	8,925 33	4,101 10	300 45	48,743 45	639,570	3,639⅓	7.62
June 30, 1883	25,860 01	12,152 06	9,093 05	3,800 58	551 80	51,457 50	635,322	3,776⅓	8.13
June 30, 1884	26,358 00	20,906 35	9,838 60	3,627 45	50 00	60,780 40	643,100	3,663⅓	9.45
June 30, 1885	26,896 24	11,610 58	10,074 34	3,657 64	20 00	52,258 80	680,700	3,652⅓	7.68
June 30, 1886	26,634 65	6,293 18	9,886 55	3,841 02	20 00	46,675 40	678,900	3,758⅓	6.87
June 30, 1887	26.520 00	36,872 40	7,911 49	4.435 62	2,307 48	78,046 99	601,800	3,175⅓	12.97
June 30, 1888	27,787 00	10,264 87	11,339 27	4,154 26	537 30	54,082 70	717,600	3,797⅓	7.52
June 30, 1889	27.847 00	21,004 76	9,392 65	3,292 77	887 78	62.424 96	536,800	3,010	11.62
June 30, 1890	27,825 87	10,403 04	9,377 93	3,671 54	310 53	51,588 91	645,300	3,298	7.99
June 30, 1891	28,112 45	8,919 66	10,163 75	3.735 55	2,299 40	53,230 81	569,300	3,206½	9.35
June 30, 1892	28,151 00	14,121 49	9,545 08	3,736 01	528 12	56,081 70	522,400	3,568	10.73
June 30, 1893	27.655 72	12,858 62	8,596 79	3.533 20	1,362 00	54,006 33	641,400	3,127	8.44
June 30, 1894	28,350 30	17,505 81	8,931 46	3.099 10	471 00	58,357 67	677,200	3,743½	8.75
June 30, 1895	28,516 20	39,226 19	7,959 10	3.683 94	279 00	79,664 43	537,400	2,751	14.823
June 30, 1896	28.493 81	14,132 13	8,713 25	5,208 95	90 88	56.639 02	657,300	3,055	8.617
June 30, 1897	28,515 00	16,519 35	7,118 87	3,411 09	122 00	55,686 31	691,600	3,229	8.051
June 30, 1898	28,910 90	13,611 64	6,986 15	4.550 97	219 15	54,278 81	645,600	2,917	8.407
June 30, 1899	30,967 00	12,490 49	5,874 71	4.559 31	211 40	54,102 91	671,800	2,864	8.053
June 30, 1900	29,319 35	21,239 27	6,808 50	2,985 72	240 95	.60,593 79	670,700	2,903	9.034
June 30, 1901	27,720 40	8,332 02	7,603 23	2,480 59	30 00	46,166 24	794,800	3,521½	5.808
June 30, 1902	32,012 05	15,679 90	8,256 21	3.329 91	216 80	59,494 87	810,400	3,808	7.341
June 30, 1903	34,260 50	12,359 60	8,816 91	3.359 58	77 40	58,873 99	856,900	4,367	6.87
June 30, 1904	38,727 10	51,693 10	10,473 26	6,078 04	62 85	107,034 35	1,046,240	4,722	10.23
June 30, 1905	40,043 65	79,291 18	9,134 75	5,113 00	2,287 50	135,870 08	1,159,250	4,993	11.72
June 30, 1906	38,015 70	12,574 12	7,004 74	4,401 56	90 00	62,086 12	924,900	4,389	6.71

EXHIBIT O.

REPORT OF W. H. DAVIS, ATTORNEY FOR THE BOARD OF STATE HARBOR COMMISSIONERS.

San Francisco, Cal., October 29, 1906.

To the Honorable the Board of State Harbor Commissioners,
Ferry Building, San Francisco:

Gentlemen: I beg leave to submit herewith my report as Attorney for the Board for the period beginning July 1, 1904, and ending June 30, 1906.

In order to keep actively in touch with the conduct of affairs of the Water Front I have made it a point, during the period of time I have been the Board's attorney, to attend all of the meetings of the Board, and have thus been able to give immediate attention to and to determine many legal questions arising at said meetings and save the time which a written reference of such questions would occasion had I not been present.

Upon the more important legal questions which have arisen, I have given the Board my conclusions in writing.

In advising the Board, it has been my constant aim to avoid litigation. The effectiveness of the Board's administration of the affairs under its charge would, in most cases, be interfered with and hampered if action were delayed pending adjustment of controversies in the courts.

The magnitude of the business transacted by the Board, the extent of territory under its control, and its financial importance, necessarily bring before it questions of great legal variety, and it is impossible to give an accurate and detailed statement of every matter upon which the opinion of the Attorney is asked.

In a general way, the questions involved were the interpretation of contracts, matters connected with advertising for bids, the rights and duties of the Board and its officers and employés with respect to the property under its control, the interpretation of the laws governing the Board, the formulation of amendments to existing laws, the settlement of controversies between the Board and its tenants, contractors, and others, the removal and sale of obstructions, and matters connected with the Belt Railroad. Some of the more important matters connected with this department are referred to hereinafter at greater length.

Patent Litigation.—Since the submission of my last report the litigation between the Board and Messrs. Howard C. Holmes and Carl Uhlig, respecting the right of the Board to use certain patented methods of wharf construction, has been settled. Owing to the fact that the efforts of both parties to secure an adjudication as to the question whether or not the devices of said patentees were patentable did not meet with the success anticipated; and further, on account of the great expense of said litigation, the Board deemed it to be good business policy to settle said litigation by compromise. This conclusion of the Board was concurred in by your Attorney, and after much negotiation and consultation terms of compromise were agreed upon, whereby the Board is now permitted to use the very valuable method of wharf construction known as "Cylinder Pier Construction."

The Woodward Law.—Since the termination of the litigation concerning this law, enumerated in the last report of your Attorney, no further trouble has arisen concerning the sale of perishable products on the wharves and other State property, and the "Woodward Law," to all appearances, has worked smoothly and to the satisfaction of not only purchasers and consumers, but also dealers in perishable products.

Seawall Bond Issue.—At the election in November, 1904, the "San Francisco Seawall Act," providing for the issuance of bonds to the amount of $2,000,000 for the purpose of constructing the seawall and appurtenances, was submitted to the people and the same was approved by a large vote. In order that the bonds provided for might have a ready sale, the question of the validity of the different proceedings leading up to said issue was submitted to the Supreme Court of this State in an action brought by the Board against the State Treasurer. The Supreme Court decided that the issue was a valid one, and since then a portion of said bonds has been sold at a large premium.

Insurance.—At the request of the Board, I attended the last regular session of the Legislature with the object partially in view of obtaining an amendment to the Act permitting the Board to insure the property of the State on the water front of the City and County of San Francisco. The Legislature of 1901 passed an Act permitting the Board to insure said property to the extent of $550,000. As the result of my efforts the Legislature amended said Act, permitting the Board to increase said insurance to $700,000. The recent conflagration in this city has demonstrated the wisdom of the Legislature in permitting this insurance.

It now transpires that some fire insurance companies have canceled the policies issued upon the State's property, and that other companies have raised the premium which by the law the Board is authorized to pay, to wit: two per cent for a policy written for a three years' term. I have advised the Board that it can not pay a higher rate than set forth in the law authorizing the Board to insure the State's property. I recommend that your Attorney be authorized to secure legislation in that regard, if possible, which will properly meet the existing situation.

East Street.—Several owners of property fronting on East street have, during the past two years, sought to obtain from the Board an addition to their holdings, some claiming that the widening of East street and its extension eastward gave them a proportionate addition to their respective properties, others claiming that the line of East street, as established by the Legislature, overlapped their properties and deprived them of a portion thereof, according to their respective deeds. These questions are still unsettled, but it is sufficient to say that thus far the State is still in possession of all the property it has claimed title to. No actions have been commenced to determine these questions, but owing to the great value of these properties it seems hardly possible that a definite settlement thereof can be had without an appeal to the courts.

Legislation.—By direction of the Board your Attorney attended the regular session of the Legislature of 1905 for the purpose of endeavoring to secure certain needed legislation in respect to the water front of the City and County of San Francisco, and also to keep the Board acquainted with various proposed matters of legislation which might affect the water front.

At the request of the Board also, your Attorney attended the extra session of the Legislature of 1906. The presence of your Attorney was deemed advisable in order to secure needed legislation to enable the Board to properly conduct the affairs of the water front by reason of damage to the State's property through the fire and earthquake. The laws at this session of the Legislature were amended so as to permit the expenditure of a greater sum monthly for urgent repairs, and the Legislature appropriated the sum of $100,000 from the general fund for the purpose of enabling the Board to partially reconstruct and repair the damaged property of the State on the water front.

Belt Railroad.—During the past two years there have been a number of accidents on the Belt Railroad to persons as well as to property. Upon investigation, these accidents have all been shown to have been unavoidable on the part of the State's employés, and in all instances they have been exonerated. A number of cases of death by accident have resulted in the arrest of members of the train crew, and in these instances your Attorney has defended such employés. All such prosecutions have resulted in acquittals.

Conflict between City and State Authority.—The only instance where there has been danger of a conflict arising between the authorities of the city and State employés of the Board was upon the proposition as to whether or not it was the duty of the State to repair the sewers underneath the surface of East street. After a careful examination of the subject, your Attorney rendered his opinion to the effect that such repair should be done by the city at its own expense and that the duty of the State ceased in regard thereto when the sewers were constructed and paid for by it at the time they were extended from the western boundary of East street beyond the seawall. This opinion has subsequently been concurred in by the attorney for the Board of Public Works of the city and county.

Fisherman's Cove.—The shoaling of the waters of Fisherman's Cove was recently brought to the attention of the Board, and the cause was discovered to be dumping of débris upon the water lots immediately south of same. The question as to whether or not the dumping of débris upon private property could be stopped by the State, if it were shown that such dumping forced the mud out into the waters of the bay and caused navigation thereof to be impeded, was submitted to me, and I transmitted my opinion to the effect that property owners who permitted such dumping could be prevented from so doing by legal proceedings. Upon notification to the owners of said property, the practice of dumping in that locality has been discontinued, except in localities designated by the Chief Engineer, and no further trouble has arisen.

Litigation.—The policy of the Board has been responsible for the fact that there has been very little actual litigation in the courts during the past two years,

Albert C. Carroll et al. *vs.* Southern Pacific Company, Board of State Harbor Commissioners, Oregon Coal and Navigation Company, et al. In November, 1904, the above action was commenced in the Superior Court of the City and County of San Francisco. The plaintiffs in said action were the minor children of a former employé of the Board, who met his death while engaged in switching cars on the Belt Railroad. The action was brought to recover damages against defendants in the sum of $50,341.50. The original complaint and the first amended complaint in said action were both demurred to by your Attorney, and both demurrers have been sustained. The above action is still pending.

Howard C. Holmes et al. *vs.* Board of State Harbor Commissioners. In October, 1904, the above action was commenced in the Superior Court of the City and County of San Francisco to recover the sum of $27,685 claimed to be due from the Board as royalty for the use of the patents of plaintiffs. Upon the compromise of the various patent matters between the plaintiffs and defendants, this action was dismissed.

Charles H. Spear et al. *vs.* Truman Reeves. Petition for peremptory writ of mandate filed in the Supreme Court of the State of California to compel the defendant, as State Treasurer, to advertise for sale of seawall bonds. Writ ordered to issue.

M. M. Regensburger *vs.* Board of State Harbor Commissioners. Action begun in the Justices' Court of the City and County of San Francisco in November, 1905. Plaintiff was a money broker and sought to recover from the Board the amount of salary demand claimed to have been assigned to him by an employé of the Board. This action arose from the fact that said employé had twice assigned his salary. The matter was settled without cost to the Board.

Respectfully submitted.

W. H. DAVIS,
Attorney for the Board.

EXHIBIT P.

REPORT OF EXPERT ACCOUNTANT.

San Francisco, September 20, 1906.

To the Honorable the Board of State Harbor Commissioners,
San Francisco, Cal.:

Gentlemen: The books and accounts of the Board of State Harbor Commissioners have been examined by me for the two years ending June 30, 1906, as per my quarterly reports, and I have now to report the general condition of accounts on that date.

CASH ACCOUNT.

On the evening of June 30, 1906, I balanced the cash, and found as follows:

Cash receipts	$57,265 80
Less disbursements	3,605 38
Balance	$53,660 42
Add unpaid items on payrolls	573 15
	$54,233 57

Accounted for as follows:

Balance at Bank of California	$36,683 58	
Balance at San Francisco National Bank	12,977 18	
Payrolls, part payment	400 00	
Credit tolls not collected	128 11	
Sundry bills paid not entered	517 50	
Coin and checks found in safe	3,527 20	
		$54,233 57

The bank officers certified as to the correctness of the above balances.

As the cash due for the June business was not all collected, I balanced the cash again on July 13, and found everything correct.

SAN FRANCISCO HARBOR IMPROVEMENT FUND.

1904, July 1—Balance in the fund		$115,442 05
1906, June 30—Monthly balances remitted to State Treasurer, 24 months to date		2,137,283 31
Amount voted by State Legislature, Special Session 1906		100,000 00
Draft returned and canceled		279 04
		$2,353,004 40
Total sight drafts drawn on fund for two years	$1,643 585 88	
Deferred payment drafts paid during two years	297,337 54	
Monthly transfers of $4,631 to S. F. Depot Sinking Fund, 24 months	111,144 00	
Transfers to S. F. Seawall Sinking Fund	5,727 78	
		$2,057,795 20
Balance in fund June 30, 1906		$295,209 20

State Controller E. P. Colgan has favored me with a statement giving the balance of the above fund, as under:

June 30, 1906—State Controller's balance	$310,889 94
Add balance of June receipts remitted in July	69,040 14
	$379,930 08
Less long-standing difference	04
	$379,930 04

Deduct Drafts Outstanding.

No. 1288	$23 40	No. 85	$36 67	
1299	19 50	86	8 80	
1490	16 00	109	300 00	
1814	87 87	117	36 40	
1009	5 40	129	7 50	
1074	5 00	131	3 15	
128	25 00	136	42 13	
141	12 50	142	29 00	
156	620 27	157	1,023 90	
158	82,418 25			84,720 74
				$295,209 30

Difference, 10 cents.

From the data furnished me by the State Controller, I am unable to discover where this little difference of 10 cents comes in, but at the same time I can vouch for the correctness of the local accounting.

SAN FRANCISCO DEPOT SINKING FUND.

By the courtesy of State Treasurer Truman Reeves, I am furnished with a statement of the bond account, of which the following is a synopsis:

Cr.

July 1, 1904—Cash balance on hand	$17,002 37
June 30, 1905—Monthly transfers from S. F. Improvement Fund under Act of Legislature, 24 months at $4,631.00	111,144 00
June 30, 1905—Interest on $335,000 U. S. 4% bonds, 2 years	26,800 00
	$154,945 37

Dr.

June 30—Interest on bonds $600,000, 2 years at 4%	48,000 00
June 30—Cash balance on hand	$106,946 37
Add other assets:	
Par value of U. S. 4% bonds of 1907	70,000 00
Par value of U. S. 4% bonds of 1925	265,000 00
Value of fund June 30, 1906	$441,946 37

Total bond issue, $600,000. Time of redemption, January 1, 1912.

Assuming that the U. S. bonds of 1925 will sell at a proportionate premium January 1, 1912, and adding that to the monthly transfers and interest collectible during the interim, the fund will probably have a surplus of over $100,000.

Excepting the monthly transfers, this bond account finds no place in the Harbor Commissioners' books, being entirely in the hands of the State Treasurer.

The financial statements contained in your biennial report have all been carefully checked by me, and I find them correct and in strict accordance with the books and accounts of the Department.

The Commissioners can, however, feel gratified at the results of the two years' business, as the following comparative statement will show:

Total net receipts remitted to State Treasurer—	
For two years ending June 30, 1906	$2,137,283 31
For two years ending June 30, 1904	1,660,199 60
	$477,083 71
Less rent of Piers 42 and 44 for fifteen years, paid in advance	371,673 00
Increase	$105,410 71

I am, gentlemen, yours faithfully,

JULIAN B. HARRIES,
Certified Public Accountant.

BIENNIAL REPORT

OF THE

Board of State Harbor Commissioners

FOR THE

FISCAL YEARS COMMENCING JULY 1, 1906, AND ENDING

ERRATA

AGE 24

Total valuation of Seawall Lots should read $3,616,000, instead of $33,616,000.

AGE 81

"Steel protected from the elements" should read "steel **unprotected** *from the elements."*

SACRAMENTO:
W. W. SHANNON, : : : SUPERINTENDENT OF STATE PRINTING.
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BOARD OF STATE HARBOR COMMISSIONERS.

W. V. STAFFORD, *President*,	Commissioner.
HENRY J. CROCKER,	Commissioner.
WALTER E. DENNISON,	Commissioner.

WALTER B. THORPE,	Secretary.
JAMES BYRNE, JR.,	Assistant Secretary.
RALPH BARKER,	Assistant State Engineer.
WILLIAM H. DAVIS	Attorney.

OFFICE:

UNION DEPOT AND FERRY HOUSE, SAN FRANCISCO, CAL.

BIENNIAL REPORT

OF THE

BOARD OF STATE HARBOR COMMISSIONERS.

San Francisco, California, October 31, 1908.

To His Excellency, The Honorable James N. Gillett,
Governor of the State of California, Sacramento, California.

Sir: As required by law, the Board of State Harbor Commissioners for the harbor and port of San Francisco herewith respectfully submits its biennial report for the fiscal years commencing July 1, 1906, and ending June 30, 1908, embracing in detail all financial transactions of this department and work accomplished during the period named.

Respectfully yours,

WALTER V. STAFFORD, President,
WALTER E. DENNISON,
HENRY J. CROCKER,
Board of State Harbor Commissioners.

INTRODUCTION.

In presenting this report, the Board of State Harbor Commissioners desire to express their appreciation of the hearty coöperation of the civic bodies of the City of San Francisco—the good feeling shown by the Mayor and other officials of the city government in all matters where the State and municipal properties adjoin—and the high character of the service rendered by the employees of the Harbor Commission. For much of the information contained in the historical and descriptive portion of this report, the Harbor Commissioners are under deep obligation to Mr. Luther Wagoner and Col. W. H. Heuer, U. S. A., engineers of the Federated Harbor Improvement Associations.

In addition to the regular business statistics of the harbor, attention is called to the tables showing shipping arrivals; every vessel of the merchant marine entering the Port of San Francisco during the two years ending June 30, 1908, is accredited with one arrival, showing class, nationality and tonnage, with a summary showing the relative percentage of United States and foreign vessels both by numbers and tonnage.

The table of United States Navy vessel arrivals shows the importance of the Port of San Francisco as a port of call for war vessels.

The table of segregated building materials arriving during the term of this report is submitted as an evidence of probably the most stupendous building activity the world has ever witnessed.

PART I

HISTORICAL AND DESCRIPTIVE.

HISTORY, DESCRIPTION, AND EXISTING CONDITIONS OF SAN FRANCISCO HARBOR.

Historical.

A portion of the City and County of San Francisco lying east of Montgomery Street was originally tide land over which the tide ebbed and flowed.

The Legislature of the State in 1851 (see Statutes of California 1851, page 307) disposed of a large portion of this overflowed land, which was designated as "San Francisco Beach and Water Lots," by granting the use and occupation of such lots to the City of San Francisco for the term of ninety-nine years, but provided that the boundary line described in section 1 of said act should be and remain a permanent water front of the city, and authorized the authorities of the city to keep the same free and clear of all obstructions to the distance of five hundred feet therefrom.

The same legislature (see Statutes 1851, page 311) authorized the City of San Francisco to construct wharves at the ends of all streets terminating at the bay, said wharves to be made by the extension of the streets into the bay in their present direction, not exceeding two hundred yards beyond the present outline of the beach and water lots described in the act first cited; and the city was also authorized to prescribe rates of wharfage to be collected on said wharves. The act also provided that the space between wharves as extended should be free from obstruction and used as public slips for the accommodation and benefit of the general commerce of the State and city.

At the time of the passage by the Legislature of the acts referred to, that portion of the city north of the intersection of East, Sacramento, and Market Streets, and east of Drumm Street, was an open portion of the bay, and no street, or lot, or wharf, or other improvement had been made thereon.

The case of the *People* vs. *Kruger* (19 Cal. 411) gives some history of this portion of the City of San Francisco, and refers to the fact that in the year 1853 a street was built and erected from Clay Street to Jackson Street adjoining and outside of the water front line as established by the act of March 26, 1851; that it was built by different wharf companies under contract made with the city, by which contract said street was to be free for the public use in part consideration for the franchise received from the State; that said street lying easterly of the water front boundary is generally called East Street, and has been kept open as a street since the year 1853. It is related that in the year 1853 this street was partially built upon and occupied with stores, and that since the year 1855 the entire front has been built up and occupied by merchants.

In accordance with the authority given by the two acts of 1851, wharves were constructed as outlined therein, and the water front remained under the jurisdiction of the city authorities.

By act approved March 24, 1853, the Legislature provided that there should be a board of three commissioners, to be known as the Board of State Harbor Commissioners, one of whom shall be elected by the qualified electors of the State, one by the Senate and Assembly in joint convention, and one by the qualified electors of the City and County of San Francisco.

This act embodied a comprehensive scheme for the improvement and management of the water front, and made the first provision for a seawall; and provided that the said structure or seawall shall be commenced at some point between Harrison Street and Chestnut Street upon said water front.

The act also provided that upon the accumulation of the sum of $25,000 in the Harbor Protection Fund, the Commissioners shall cause a survey and estimate to be made for the construction of a seawall. At a subsequent date the Legislature provided for the appointment of the entire Board of Harbor Commissioners by the Governor of the State. With these we see the beginning of what has developed into the present system of seawall, thoroughfare, wharves, and docks.

It is also well to bear in mind that while the State has loaned its credit in the development of the water front, it never actually appropriated any money from its treasury for the support, improvement, or maintenance of the same until it was made necessary by reason of the destruction wrought by the disaster of earthquake and fire in 1906, when the sum of $100,000 was appropriated for the purpose of reconstructing and repairing the damaged property of the State on the water front.

The map of the city front and water-lot property of the City of San Francisco, dated 1864, shows the improvements existing at that time. A wharf at Third and King Streets, and another just east of King Street, were all of the improvements south of Bryant Street. From Bryant Street, at irregular intervals, wharves and slips were provided to Montgomery and Lombard Streets, beyond which point the only accommodation existing was at Meiggs Wharf, which was built from a base resting on private property on Bay Street. All of these improvements were on wood piling, and up to this time no seawall had been built. The water front map of 1866 shows an additional wharf at

Howard Street, but also shows the removal of what was then known as the Oakland Ferry or La Rue's Wharf. Other wharves existing at this time were at Mission Street, Market Street, Commercial Street, Clay Street, Washington Street, Jackson Street, Broadway, and Vallejo Street.

A map of a portion of the water front of the City of San Francisco. dated 1873, shows material change in the construction, and gives the first record of permanent bulkhead or seawall, commencing 52.6 feet from the north line of Howard Street to the south line of Howard Street parallel with the then established water front line; also between the north line of Vallejo Street and the north line of Union Street, the length of the former being 2,602 feet and the latter being 650 feet.

The Legislature of 1878 conformed the change in the alignment of the water front line from the east line of Taylor Street to the southern boundary of the city and county, entirely changing the bulkhead line and creating a thoroughfare of a minimum width of two hundred feet parallel with the same, and as a consequence placing all of the seawall bulkhead above described inside the present water front line, or what is now about the middle of East Street.

In August, 1878, plans were completed and advertised for the construction of the first section of the existing seawall, commencing at the intersection of the easterly line of Kearny Street with the water front line and running one thousand feet westerly. This section was followed in November of the same year by a contract for an additional one thousand feet, known as section 2, adjoining the first section, and running southeasterly.

The completion of these contracts may be considered as marking the commencement of the permanent harbor of San Francisco. Other sections followed as necessities and funds allowed, resulting in an aggregate length of seawall at the present time of 10,800.5 feet, constructed at a cost of nearly $2,000,000. Reference is hereby made to another part of this report which covers the cost of the completed seawall of San Francisco harbor, and likewise gives the length of each section.

Abutting on this seawall projecting piers or docks have been constructed from time to time as the necessities of the port dictated. It was the custom in earlier years to use green or untreated piles under these docks, but the ravages of marine worms, known as the *Teredo navalis* and *Limnoria terebrans,* allowed such construction only a short period of life. In more recent years creosoted piles have been substituted, it having been demonstrated that the properly preserved pile has a life extending from twenty to twenty-five years, under favorable conditions. Experience goes to show, however, that the many vicissitudes to which the pile is subjected, especially where exposed to collision from vessels, where careless employés find it necessary to bore holes and neglect to properly protect them, and where the work of creosoting, while being good as an average, is somewhat irregularly performed, the teredo has managed to reduce the theoretical twenty-five years of life to an actual twelve years, or thereabouts.

In July, 1895, the first steel cylinder pier was placed under Pier No. 7 at the foot of Pacific Street as the most up-to-date and modern substitute for the pile construction of the past. Other piers followed as rapidly as possible, so thoroughly had the new pile demonstrated its permanent value. Up to the present time there are twelve piers of this class of construction, eight of which have wooden caps, joists, and flooring, and four are supplemented with heavy steel caps over the cylinders. In addition to the twelve piers of more modern construction, there are sixteen docks built on preserved piles with wooden caps, joists, and flooring. The estimated lives of these latter piers are from seven to eight years only before the time that extensive repairs become necessary. Additional docking facilities are provided at the bulkhead wharves, of which there are 6,629 lineal feet, which, together with the aggregate length of the piers and docks now in use with 18,600 feet of frontage, gives a total of 25,229 lineal feet of dock room for shipping.

It will be the policy of the Board to increase rather than diminish the strength of future pier construction. Cylinder piles of reinforced concrete will still be used to support piers of steel frames completely imbedded in concrete, accomplishing a monolithic structure throughout. With the wharf sheds composed of either metal or reinforced concrete, the new type of construction will present an absolutely fireproof structure. The high first cost of permanent construction of this type will be more than offset by the lesser cost of maintenance.

Description.

The entrance of the Bay of San Francisco is nearly a mile in width, and has an average depth of five and one half fathoms, with a commodious channel having a minimum depth of nine fathoms. The waters of the entire bay cover an area of over 250 square miles, 24 square miles of which are in the immediate vicinity of San Francisco, and are now used as anchorage ground, exclusive of fairways, which occupy 7 square miles. In addition there are available for anchorage in San Francisco Bay proper over 40 square miles, while in the adjoining extensions, known as San Pablo and Suisun bays, there are over 20 square miles of additional anchorage ground, making a total of some 100 square miles, with a depth ranging from 18 to 60 feet at low tide, all of which affords excellent anchorage ground.

The Golden Gate is the entrance which connects the Bay of San Francisco and its rivers with the Pacific Ocean. It is about three miles in length, and, as above stated, nearly a mile wide at its narrowest part, and has a maximum depth of 360 feet. Its shores are high, bold, and rocky. Outside the entrance, and about 6 miles distant, is the 'bar,' on which there is a depth of at least 33 feet at low tide. There is also another channel of approach to the entrance to the harbor, known as the North or Bonita Channel, which is one third of a mile in width and which has a depth of 54 feet. No matter how great the draft of the ship of the future it will always be able to enter this port in safety.

At San Francisco nature has supplied a deep, safe, commodious waterway open to the commerce of the world. San Francisco, with San Pablo Bay its northern extension, covers an area of 420 square miles. The shore line of San Francisco Bay alone, leaving out of consideration for the time its numerous navigable inlets, measures 100 miles in length. From the southern portal of the Golden Gate at Fort Point, along the bay shore of San Francisco and San Mateo counties to Dumbarton Point, thence across the Narrows and along the shores of Alameda, Contra Costa, and Marin counties to Lime Point, every mile is suitable and available for commercial and industrial use. The City of San Francisco, situated on the peninsula on the south side of the entrance of the bay, has within its city and county limits a water frontage on the bay from the Presidio to the boundary line of San Mateo County, about 10 miles in length. If the measurements be made along the shore line to include the channels and basins, viz., South Basin, India Basin, Islais Creek, Central Basin, and Channel Street, the water front has an aggregate length of 13 miles.

The natural advantages of San Francisco harbor are obvious. We do not require expensive masonry basins or docks in which a fixed level of water is maintained by means of machinery and gates, and which only permit of ingress and egress at about the time of high water. Such inland docks are generally necessary at most of the large commercial ports of Europe, either because of excessive range of tides there, in some cases amounting to thirty or more feet, or by reason of a situation on comparatively narrow rivers, or from both causes. The following table gives the tidal range and width of rivers at various European ports compared with San Francisco where the average height of the tide is but 4.3 feet and a bay 4 miles in width:

London	Width of Thames, 1,400 feet;	tidal range, 24 feet.
Liverpool	Width of Mersey, 5,000 feet;	tidal range, 33 feet.
Antwerp	Width of Scheldt, 1,500 feet;	tidal range, 25 feet.
Hamburg	Width of Elbe, 1,000 feet;	tidal range, 17 feet.
Bremerhaven	Width of Weser, 2,300 feet;	tidal range, 10 feet.
Bremen	Width of Weser, 400 feet;	tidal range, 23 feet.
Rotterdam	Width of Meuse, 1,000 feet;	tidal range, — feet.
Havre	Width of Seine, —— feet;	tidal range, 25 feet.
San Francisco	Width of San Francisco Bay, 4 miles;	tidal range, 4.3 feet.

All of the above European ports now possess excellent accommodations for ships, but it has only been accomplished by the expenditure of vast sums of money, which at Liverpool has reached about $200,000 per acre of enclosed basin, and all of the ports are still engaged in extension of their improvements. Cessation of this work would mean loss of trade or perhaps commercial death.

The improvements made by the United States Government to the Bay of San Francisco, in the interests of navigation and commerce, consisted in the removal from the harbor of obstructions known as Blossom Rock, Shag Rock, Arch Rock, and Rincon Rock, and the establishment of light and fox signals at the entrance of and inside the harbor. The entrance to the harbor is thoroughly protected by fortifications of the most improved modern type. Surveys for estimating the cost of removal of two rocks, known as Centissima and Sears Rocks, on the east side of Bonita Channel, and also of two small rocks inside the harbor near Mission Rock, and known as Mission Bay Rock and Sonoma Rock, respectively, are in progress.

San Pablo Bay, which is a continuation of this harbor to the north, is 14 miles in length by about 12 miles in width. It is connected by Carquinez Straits with Suisun Bay, which is 10 miles long and from 5 to 6 miles wide. Into the head of this bay empty the two largest rivers in the State, the Sacramento and the San Joaquin.

Through San Pablo Bay there is a navigable channel which is kept at an approximate depth of 30 feet for its entire length to Carquinez Straits. Through the straits at Carquinez the channel is more than half a mile in its least width, and has a depth of from 8 to 10 fathoms. In Suisun Bay the channel has a least navigable depth of 13 feet at low tide.

The Sacramento River is navigable throughout the year for 262 miles of its length to Red Bluff. The San Joaquin is always navigable to Stockton about 40 miles above its mouth, and occasionally to Firebaughs, more than one hundred miles farther up the river. These two rivers drain the great central valley of the State and carry annually a commerce exceeding a million tons. While the population of these valleys is small, the lands are as fertile and as productive as any in the world and capable of furnishing homes for several million people.

Emptying into each of the bays above referred to are smaller navigable rivers, sloughs and creeks, which together float the commerce of very nearly another million tons a year. On or near the shores of San Francisco Bay, besides Oakland, Berkeley, and Alameda, are the flourishing towns of South San Francisco, San Mateo, Redwood City, Palo Alto, Newark, Alvarado, Hayward, San Lorenzo, San Leandro, Fruitvale, Piedmont, Richmond, San Rafael, Tiburon, Belvedere, and Sausalito. On or near San Pablo Bay are San Pablo, Giant, Sobrante, Pinole, Rodeo, Vallejo, and Mare Island Navy Yard; while on the straits of Carquinez are Crockett, Eckley, Port Costa, Martinez, and Benicia.

The area in which wharves may be built on the San Francisco water front is limited in length by that of the shore line on the bay in the county (about ten miles), and in width by the distance between the established harbor lines, known respectively as the bulkhead or seawall line and the pierhead line. These lines were recommended by state boards or commissions, and received final approval by the Secretary of War.

The bulkhead line is one to which solid filling from the shore is permitted, and on which about two miles of seawall has been constructed, and along which future extensions of the same may be built. Its general location is in water from 10 to 24 feet in depth. Between the bulkhead line and high water or shore line there was originally about 2,500 acres (four square miles) of submerged land, all of which was divided into city blocks and streets, and sold more than thirty years ago by the State of California through its Commissioners for the Sale of Salt Marsh, Tide, and Submerged Land. Approximately 900 acres of this submerged area, generally north of the Union Iron Works, has been reclaimed (filled in), and is now some of the most valuable real estate in the city. The other 1,600 acres, most of which lies south of the sugar refinery, in the vicinity of Islais Creek, India Basin, Hunter's Point and South Basin, little or no reclamation work has as yet been attempted. This submerged area might have been very useful for building wharves in enclosed basins, but having been disposed of by the State is now held at such a high valuation as to make it almost prohibitive for the State to acquire for harbor purposes. The pierhead line, or that which limits the length to which wharves may be built, is reasonably parallel to and from 200 to 800 feet outside the bulkhead line.

The water front of San Francisco is self-sustaining; that is, it produces a revenue which pays the expenses, and no tribute in the way of public taxation has ever yet been levied or required from city or State.

Since 1863, when the State Harbor Commissioners took charge of the harbor, the total receipts or revenue from all sources up to June 30, 1908, amounted to $25,520,194.10. The disbursements have been substantially the same. Port charges for dockage, tolls, and wharfage in the last ten years have varied from 11.2 cents to 15.7 cents per ton; amounts which compare favorably for the same service at other ports. The port revenue in seventeen European ports in 1906 was 40.6 cents per long ton of cargo.

The rapidity with which a vessel loads and discharges her cargo is one of the factors which determine the profit of the voyage for the shipowner. This is especially true where the charge for dockage is on a per diem rate. Its advantage to the dockowner is also considerable, as a greater number of vessels can be accommodated within a given time and a greater revenue derived from toll charges on merchandise reckoned by the ton. Efficiency of the labor employed in stevedoring and the convenient arrangement of the dock determine the rapidity with which cargo may be handled. Records have recently been established at San Francisco which compare favorably with those of European ports. The China steamers have recently discharged six thousand and loaded ten thousand tons in ten days, or at a rate of sixteen hundred tons a day of eight working hours; that is, two hundred tons per hour. The report of the Royal Commission of the Port of London, 1902, contains a record of observation of fifty-eight vessels discharging a total of 244,764 tons in 3,908 working hours, or 62.6 tons per working hour; and the report states that the minimum and maximum rates were respectively 50 and 176 tons. At Montreal eight of the same vessels discharged at a rate of 52.2 tons per hour; while eight discharged at New Orleans at a rate of 44.7 tons per hour.

The average rate of discharging cargo at San Francisco was not obtainable, but from recent records of single steamships it would seem to be greater than in foreign ports. The "Korea," which arrived at San Francisco on February 14, 1908, commenced discharging 6,319 tons of cargo at 12:30 p. m. on that date, and completed on the 18th at 1 p. m., within twenty-eight working hours or at a rate of 225.7 tons per working hour.

Wharf charges and tolls, including stevedoring and pilotage, at San Francisco harbor average about 58.4 cents per ton. The actual tolls for dockage are considerably less than at foreign ports, but the higher wages paid to stevedores bring the average of all port charges somewhat above that of foreign ports, which may be taken as approximately 53 cents per ton.

The following tables are compiled from the report of the London Commission in 1902, and the comparison is made with the charges at San Francisco for similar cargoes of approximately five parts grain, three of general merchandise, and two of lumber:

PORT CHARGES AT SAN FRANCISCO COMPARED WITH SIX EUROPEAN PORTS.

Compiled from the report of the Royal Commission, London, 1902. For a cargo steamer of 3,388 tons gross, 2,202 tons net, laden with 2,000 tons grain, 1,500 tons general merchandise and 666 M lumber (1,000 tons); discharging.

PORT CHARGES.

	Liverpool, 3 Days.	Hamburg, 7 Days.	Rotterdam, 5 Days.	Antwerp, 6 Days.	Bremerhaven, 4 Days.	London, 6 Days.
Harbor and river dues			$146 10			$38 25
Dock and quay dues	$713 59	$893 75		$267 85	$530 83	612 85
Pilotage	55 73	78 55	146 10	175 32	82 82	111 52
Tug hire	41 41	53 57	24 35	24 35	43 83	48 75
Boatmen	29 23	9 74	4 87	17 05	9 74	19 48
Totals	$839 96	$1,035 61	$321 42	$484 57	$667 22	$830 85
Stevedoring	$669 92	$686 82	$487 00	$558 04	$643 00	$937 00
Overtime	204 54	116 98	73 10	24 35	87 75	167 12
Tallying		95 50	170 45	102 38	146 25	230 25
Crane hire				97 50		121 41
Totals	$874 46	$899 30	$730 55	$782 27	$877 00	$1,455 78
Average port charges per net ton	$0 381	$0 47	$0 146	$0 22	$0 303	$0 38
Average cost stevedoring per actual ton	195	20	16	174	195	323
Average total charges	$0 576	$0 67	$0 306	$0 394	$0 498	$0 703

SAN FRANCISCO.

Dockage, 10 days at $19		$190 00
Tolls, 3,500 tons merchandise and grain		175 00
Tolls, 666 M lumber		66 60
		$431 60
Average per ton	$0 196	
Add for pilotage	047	
	$0 243	

Stevedoring 3,500 tons at 45c.		$1,575 00
Stevedoring 666 M lumber at 30c.		199 80
		$1,774 80
Average per ton	$0 3944	

Stevedoring 2,000 tons grain at 35c.	$700 00	
Stevedoring 1,500 tons merchandise at 40c.	600 00	
Stevedoring 666 M lumber at 50c.	333 00	= .243c.
4,500 tons.	$1,633 00	0.334c. per ton.
		57.7 cents.

COMPARISON OF PORT CHARGES.

	Port Dues.	Stevedoring.	All Charges.
Average six European ports	$ .3167	$ .2078	$ .5245
Average at San Francisco	.2430	.3944	.6374

PORT CHARGES AT SAN FRANCISCO COMPARED WITH SIX EUROPEAN PORTS.

Compiled from the report of the Royal Commission, London, 1902. For a cargo steamer of 9,040 tons gross, 5,146 tons net, laden with 5,000 tons grain, 3,000 tons general merchandise and 1,333 M lumber (2,000 tons); discharging.

PORT CHARGES.

	Liverpool, 3 Days.	Hamburg, 14 Days.	Rotterdam, 14 Days.	Antwerp, 14 Days.	Bremerhaven, 14 Days.	London, 14 Days.
Harbor and river dues			$389 60			$78 34
Dock and quay dues	$1,674 66	$1,799 76		$730 80	$1,509 70	1,253 56
Pilotage	120 60	117 30	219 15	277 59	83 94	147 54
Tug hire	116 90	76 43	43 83	77 92	78 39	290 00
Boatmen	53 57	9 47	7 30	24 35	16 56	24 35
Totals	$1,965 73	$2,002 96	$659 88	$1,110 66	$1,688 59	$1,793 79
Stevedoring	$1,908 12	$1,695 27	$1,071 40	$1,187 55	$1,339 80	$1,826 50
Overtime	633 10	243 50	146 10	243 50	243 50	641 78
Tallying		214 28	292 20	292 20	292 20	275 00
Crane hire				243 50		145 50
Totals	$2,541 22	$2,153 05	$1,509 70	$1,966 75	$1,875 50	$2,888 78
Average port charges per net ton	$0 38	$0 389	$0 127	$0 215	$0 327	$0 348
Average cost stevedoring per actual ton	28	238	167	217	209	318
Average total charges	$0 66	$0 626	$0 294	$0 432	$0 536	$0 667

SAN FRANCISCO.

16 days at $41.19		$659 04
Tolls, 8,000 tons merchandise and grain		400 00
Tolls, 1,333 M lumber		133 30
Total		$1,192 34
Average per ton	$0 231	
Stevedoring 8,000 tons at 45c.		$3,200 00
Stevedoring 1,333 M lumber at 45c.		599 85
Pilotage (if foreign)		132 00
Total		$3,931 85
Average per ton	$0 393	

5,000 tons grain at 35c.	$1,750 00	
3,000 tons merchandise at 40c.	1,200 00	
1,333 M lumber at 50c.	666 66	
10,000 tons	$3,616 66	= 36.17c per ton
Port charges		23.1
Total		$ 0.592

COMPARISON OF PORT CHARGES.

	Port Dues.	Stevedoring.	All Charges.
Average six European ports	$ .297	$ .239	$ .536
Average at San Francisco	.231	.393	.624

The following extracts are from "Harbor Rules, Regulations and Rates, adopted by the Board of State Harbor Commissioners, 1906":

RATES OF DOCKAGE.

Each rate is for a day of twenty-four (24) hours, or any part thereof, including Sundays, holidays and rainy days.

61. For all ocean vessels, steam or sail, and all sail vessels, steamboats, and barges navigating the bay of San Francisco and the rivers and other waters flowing into it, of two hundred net registered tons or under, 2 cents per ton; for all such vessels of over two hundred net registered tons, $4 for the first two hundred tons, and three-quarters of a cent for each additional ton.

Full rates shall be charged as follows:

62. (1) Vessels with cargo on board docking at a wharf while discharging cargo.

(2) Vessels with cargo on board docking at a wharf while discharging or taking on passengers and baggage.

(3) Vessels with no cargo on board docking at a wharf while discharging passengers and baggage.

(4) Vessels with cargo on board docking at a wharf while taking on stores, supplies or fuel oil for fuel for such vessel.

(5) Vessels with cargo on board docking at a wharf while lying idle.

(6) Vessels that are engaged in towing.

(7) Vessels that are not engaged in carrying freight and passengers.

Half rates shall be charged as follows:

63. (1) Vessels with no cargo on board docking at a wharf while loading cargo.

(2) Vessels with no cargo on board docking at a wharf while receiving passengers or receiving stores, supplies or fuel oil for fuel of such vessel.

(3) Vessels with cargo on board docking at a wharf while taking on a reasonable amount of cargo, exclusive of stores, supplies or fuel oil for fuel of such vessel.

(4) Vessels with no cargo on board while lying idle at a wharf.

(5) Vessels while receiving or discharging ballast or receiving stiffening.

(6) Vessels either discharging, loading or lying idle while occupying outside berths.

(7) Vessels while moored in docks, slips, basins or canals.

(8) Vessels engaged in towing and vessels not engaged in carrying freight and passengers not entitled to half rates.

64. When the per diem dockage of a vessel, as above described, is not a multiple of five it must be reduced or increased, as the case may be, to the nearest such multiple; *provided*, that if it be equally near to two such multiples, it must be increased to the first such mutiple above.

65. All bills for dockage must be paid when due, whether approved by the master or not. Failure to pay said bills on presentation will subject the vessels to be placed on the delinquent list, and to the penalties provided by law. Errors, if any, will be rectified by the Board.

66. When a vessel of any kind is charged or has paid dockage at a wharf for any day, she may use the same or any other wharf during that day without further charge, no matter how often she may leave and return; *provided*, a receipt for payment or transfer card from the Wharfinger at the first wharf be produced; and on application of the master the Wharfinger is required to issue such transfer card.

Rates of Dockage on Lighters.

66*a*. A lighter is understood to be a vessel which has neither power nor steering equipment.

67. A dockage rate of 1 cent per ton net tonnage per day will be charged on all lighters in the following cases:

(1) When discharging or loading at a wharf.

(2) When discharging into or loading from a vessel lying at a wharf, or when lying at a wharf or in a slip with or without cargo on board.

(3) When transporting from a wharf to a vessel, or from a vessel to a wharf, but one dockage charge will be made per day.

Rates of Tolls.

Both a discharging and a loading toll shall be imposed on all merchandise (including vessels' stores and supplies and fuel oil for such vessel) except where otherwise specified, and must be paid by the vessel discharging or loading same.

68. A ton is by weight 2,000 pounds, unless otherwise specified; by measurement, 40 cubic feet.

69. Merchandise, for the purpose of tolls or wharfage, must be computed by weight or measurement, as the one mode or the other will give the greater number of tons.

70. Of the following articles 2,240 pounds constitute a ton: coal, railroad iron, pig iron, gypsum, asphaltum, ores, crude or boiled sulphur, paving stones, sand, and ballast.

Tolls Per Ton.

71. On merchandise (except where otherwise specified) including vessels' stores and supplies and coal and fuel oil for such vessel, per ton, 5 cents.

On flour, grain and millstuffs, 5 cents.

On 400 pounds or less, 1 cent.

On 800 pounds or less and more than 400 pounds, 2 cents.

On 1,200 pounds or less and more than 800 pounds, 3 cents.

On 1,600 pounds or less and more than 1,200 pounds, 4 cents.

On 2,000 pounds or less and more than 1,600 pounds, 5 cents.

Tolls on merchandise, when measured or charged a higher rate, to be collected according to the foregoing subdivisions.

Tolls Charged Otherwise Than by the Ton.

72. On the following articles tolls must be paid as follows: On fir, redwood, spruce, and all soft-wood lumber, per 1,000 feet, board measure, 10 cents.

On oak, hickory, ash, and all hard-wood lumber, per 1,000 feet, board measure, 20 cents.

On lumber or timber discharged in the water in any slip, dock, basin, or canal, the same as if discharged on a wharf.

On piles discharged in any slip, dock, basin, or canal, per pile, 6 cents.

On fence posts, per 100, 10 cents.

On railroad ties, per 1,000 feet of lumber, board measure, contained therein (32 or 24 feet to a tie, according to size), 10 cents.

On shingles, per 40 bundles, 10 cents.

On laths, per 60 bundles, 10 cents.

On shakes, per 100 bundles, 10 cents.

On empty barrels (merchandise) each, ¼ cent.

On empty sugar barrels, each, ¼ cent.

On cord wood, per cord, 5 cents.

On tan bark and stave bolts, per cord, 5 cents.

On fire bricks, per 1,000, 15 cents.

On bricks (other than fire bricks) discharged on, or loaded from, any wharf, per 1,000, 10 cents.

On bricks (other than fire bricks) discharged from any vessel lying at any wharf, or in any slip, dock, or basin, into another vessel, or received into any such vessel from any lighter or other vessel, per 1,000, 5 cents.

On wool or cotton in sacks, per sack, 1 cent.

On wool or cotton in bales, strapped, per bale, 1½ cents.

On hops in bales, per bale, 1 cent.

On hides of cattle (green or dry), per hide, ¼ cent.

On skins, per skin, 1-16 cent.

On cattle, horses, and mules, per head, 5 cents.

On colts and calves, under a year old, per head, 2½ cents.

On sheep and hogs, per head, 1 cent.

On hay, per ton, 5 cents.

On crushed rock (long ton), 5 cents.

On reapers, mowers, horse rakes, hay presses, gang plows, cultivators, and wheeled vehicles, set up, each, 10 cents.

On headers and separators, set up, each, 20 cents.

On charcoal, per 35 sacks (of 55 pounds each), 5 cents.

On cement, 5 barrels to the ton, 5 cents.

On lime, 8 barrels to the ton, 5 cents.

On beef, pork, or fish, 6 barrels to the ton, 5 cents.

On sugar or syrup, 6 barrels to the ton, 5 cents.

On wine or liquor, per barrel, 1¼ cents.

On wine or liquor, per pipe, 5 cents.

On cocoanuts, per 1,000, unhusked, 15 cents.

On cocoanuts, per 1,000, husked, 10 cents.

On bananas, per bunch, ¼ cent.

On salmon, per ton of 2,000 pounds, 5 cents.

Crude oil (whether in barrels or bulk), per ton of 2,000 pounds (7¾ pounds to gallon), 5 cents.

Crude oil, naphtha, gasoline, etc., conveyed either inward or outward, over or through any wharf, bulkhead or other State structure, or loaded or discharged in any slip, basin or channel, per ton of 2,000 pounds (7¾ pounds to gallon), 5 cents.

73. (The weight of crude oil contained in tanks or vessels or conveyed to or from shipping, to be computed on the basis of 7¾ pounds per gallon, *if actual weight is not obtainable.*)

74. On empty packages, being returned to the owner, who uses them to send commodities to market, no tolls will be charged.

75. Grain, flour, millstuffs, beans and seeds will be subject at all wharves, to the same rules and rates of tolls and wharfage as are imposed on other merchandise.

Exception to Rule 75.

Grain, flour, millstuffs, beans, and seeds may remain on the wharves at Sections No. 1 and No. 2 of the seawall until 5 o'clock p. m. on the third day after discharge free of wharfage charge; for the next ten days, or any part thereof, there shall be a wharfage charge of 5 cents per ton; for each additional day thereafter the wharfage charge shall be 5 cents per ton; *provided*, that where any owner or consignee fails or refuses to pay, on demand, bills rendered for wharfage, or refuses to comply with other rules and regulations of the Board of State Harbor Commissioners, the provisions of Rule 82 shall apply and become immediately effective as to such owner or consignee. [Effective October 15, 1908.]

76. The term "grain" is intended to and does include wheat, barley, oats, corn, and rye; the term "flour" includes only the flour of wheat, and "millstuffs" includes only bran, middlings, shorts, and ground feed.

78. No tolls will be charged on donkey engines or stevedores' tools when taken on the wharf for the purpose of loading or discharging a vessel; nor on milk, butcher, baker, ice, or laundry supplies furnished daily to vessels.

79. Merchandise landed on a wharf and not removed therefrom, may be reshipped from the same wharf, without the payment of further toll, but the wharfage, if any due thereon, must be paid.

80. Merchandise, except bricks (other than fire bricks), discharged from a vessel lying at any wharf or within any slip, into lighters or other vessels, is subject to the same rates of toll as if discharged on or loaded from a wharf.

81. When the tolls have been paid on merchandise, on its being discharged from a vessel it may be landed thence on a wharf, or discharged into another vessel, without the payment of further tolls; except bricks (other than fire bricks), which shall be charged as follows: On bricks, 5 cents per one thousand.

Wharfage.

82. Merchandise must be removed from the wharf before 5 o'clock p. m. on the day following the one on which it was placed thereon; but Wharfingers are hereby authorized, when the owners or consignees of merchandise desire it, and it can be done without interfering with the business of the wharf, to allow merchandise to remain on the wharf after the prescribed time, at a wharfage charge equal to an additional toll for every forty-eight hours or part thereof. If merchandise be not removed within twenty-four hours after notice by the Wharfinger, it shall be liable to the penalties of section 2524 of the Political Code.

Exception to Rule 82.

Lumber discharged from vessels carrying 500,000 feet board measure, or over, and from vessels of no lesser capacity, may remain on wharf until 5 o'clock p. m. of the third day following its discharge. Then and thereafter all provisions of Rule 82 shall be effective and must be enforced.

This exception to Rule 82 to become effective July 31, 1907, and to continue in force until further notice.

Sea Wall Lots.

The Board having found that the rentals received from the State's property, known as seawall lots, which have been created at great cost by the building of East Street, were totally inadequate as in any sense being a reasonable return for the State's investment, decided to obtain an appraisal of the properties. Thomas Magee & Sons were directed to make this appraisal, for the sum of $1,000. Their report is as follows:

December 30, 1907.

Board of State Harbor Commissioners.
Union Depot and Ferry House, San Francisco, Cal.

GENTLEMEN: In response to your request, we herewith submit to you valuations of the various parcels of real estate owned by the Board of State Harbor Commissioners, together with rental values, as per map handed us. We have prepared and herewith enclose two maps with this report, on which are shown sales and leases of property situated in the immediate vicinity of the various properties named. It must be remembered, however, that in but few of the sales and leases shown are the properties so well located or so valuable as the properties owned by the State. Your land with frontage on East Street and the seawall, or on blocks or gores cornering on the water front, are much more valuable than land immediately in the rear of them. All of your properties are perfectly level, practically all have the great advantage of railroad tracks, and with the exception of those parcels lying west of Stockton Street, all front on streets which are paved.

VALUATION BASIS.

We understand that you want, and we have given you, the reasonable value of these properties for commercial use, and have disregarded the special value many of these pieces would have if used for the purposes of saloons, restaurants, lodging houses, and such retail lines of business as thrive on the water front. We herewith cite examples of just what we mean by this.

The rental of $2,250 per month, which will be obtained by Mr. George Whittel, when he completes his improvements on his block bounded by East, Battery, Filbert, and Greenwich streets, shows forcibly what rents can be obtained from numerous tenants, where the owner erects his own improvements and sublets in small parcels for the retail purposes indicated.

In our opinion the Whittel property is worth, on a commercial basis, say, $350,000, and a rental of 4 per cent net for commercial purposes would be in the neighborhood of $1,400 per month. The ground rental which will be obtained by Mr. Whittel when his improvements are completed, however, shows that an income of 5 per cent net will be obtained on about $450,000. The fact that the State does not rent for saloons, restaurants, lodging houses, etc., makes surrounding properties more valuable for these purposes, as it limits that character of retail business along the water front where most of your properties are located.

Many other illustrations like this could be cited. For instance, the fifty-vara lot at the southwest corner of Vallejo and Davis streets, which we would say is not worth over $125,000 for commercial purposes, justifies a valuation for the lot of $175,000 on a fifteen-year lease on a 5 per cent net basis, which has been offered the owner, if he will erect a building, for which the tenant offers to pay in addition 7 per cent net on its cost.

The value of the large tract at Central Basin is determined by its permanent water frontage. We are informed that the Drydock Company now occupying the space immediately in front of this land has a lease from your Board, which will expire in a few months, and that in all likelihood the drydock will soon be removed. This property *without* its entire frontage on permanent water front would be worth 25 per cent less than the figures we have named. It would then be worth only what similarly located land with railroad facilities, but without water frontage, is worth.

Illustrative of what land away from the water front is worth in this neighborhood with track privileges, we cite the block bounded by Santa Clara, Mariposa, Kentucky, and Tennessee streets, 400 feet front on Kentucky and Tennessee by 200 feet front on Santa Clara and Mariposa streets. This ground has been leased by Moses Hopkins to the Christenson Lumber Company for ten years at $600 per month. This is 6 per cent gross, or 5 per cent net, on a valuation of $120,000 (1 per cent being practically sufficient to cover taxes).

In our opinion, your tract of land being on the permanent water front, is worth 25 per cent more. We have, therefore, placed it at $350,000, which would practically be equivalent to $140,000 for each block 200 by 400, which it contains. The only sale of a large property in recent years in this vicinity was made in January, 1903, when the Arctic Oil Company sold to the Union Oil Company the two blocks, each 200 by 410, immediately south of your large holding for $250,000. This sale included a building worth about $25,000, and was at the rate of $112,500 a block of 200 by 410. In our opinion, this Union Oil Company property is worth at least $300,000 to-day. We have taken no account of the several subdivisions of your very large holdings here, and have valued the property as a whole only. The westerly portion of this large tract, if cut off from use of the water front, would be of less value by itself, but the property as a whole is not too large to be considered as one property with water frontage.

In our opinion, all of your properties, if owned by private individuals, could, under ordinary financial conditions, be sold for prices considerably in advance of the figures we have placed on them.

RENTAL VALUES.

Ground leases should return about 4 per cent net on the reasonable value of the land on a five-year lease and an increase of 10 per cent in the rental for each further five-year period.

Fifteen years, we are informed, is the longest lease you are authorized to make. As you have no taxes to pay, your ground rent returns would be higher, or you would be justified in accepting lower rentals than the private owner similarly located who rents for similar purposes. In other words, as it takes approximately 1 per cent to cover taxes (say, 1.86 per cent on a 60 per cent valuation) you would have that much advantage over the private owner.

If you erect brick or concrete improvements, you should receive a rental of 4 to 5 per cent on the value of the land and 7 to 8 per cent on the cost of improvements.

The higher rate on improvements is customary, in order to allow for the deterioration in the value of the building and to cover repairs and fire insurance. The life of such a building, if well constructed, should be fifty years. The increase in the value of your lands should offset the deterioration in the value of buildings of this kind erected thereon.

All improvements erected by tenants should revert to the State at the expiration of lease, except in substantial structures above two stories in height, in which case special arrangements can be made for the State to buy the building at a percentage of appraised value at the end of the lease.

We herewith append table showing our valuations and the ground rental on a 4 per cent net basis:

Property. (Seawall Lots.)	Area.	Valuation.	Ground Rental Value on 4 Per Cent Net Basis.
A	561 square feet	No practical value	
B	29,518 square feet	$67,500 00	$2,700 00 a year
1	72,781 square feet	200,000 00	8,000 00 a year
2	8,677 square feet	25,000 00	1,000 00 a year
3	38,849 square feet	120,000 00	4,800 00 a year
4	31,178 square feet	110,000 00	4,400 00 a year
5	41,195 square feet	150,000 00	6,000 00 a year
6	13,130 square feet	50,000 00	2,000 00 a year
7	87,067 square feet	325,000 00	13,000 00 a year
8	30,394 square feet	145,000 00	5,800 00 a year
9	4,727 square feet	25,000 00	1,000 00 a year
10	4,326 square feet	28,500 00	1,140 00 a year
11	45,372 square feet	262,500 00	10,500 00 a year
12	75,524 square feet	440,000 00	17,600 00 a year
13	3,103 square feet	20,000 00	800 00 a year
14	42,630 square feet	300,000 00	12,000 00 a year
15	75,447 square feet	505,000 00	20,200 00 a year
16	2,746 square feet	25,000 00	1,000 00 a year
24	78,285 square feet	400,000 00	16,000 00 a year
25	10,860 square feet	67,500 00	2,700 00 a year
Central Basin	206,909 square feet	350,000 00	15,000 00 a year
Total		$33,616,000 00	

It is possible that the properties close to the ferry slips at the foot of Lombard and Chestnut streets are more valuable by reason of their nearness to these slips. We have, however, disregarded this in our valuation.

In relation to Plot No. 25, it has been impossible for us to get the exact dimensions of this property, except as your map shows us that its area is 10,860 square feet, although the dimensions given on the map we have prepared would indicate a larger area. We have, however, valued it as if it contained 10,860 square feet.

Any further information or explanation of the detail of our figures we shall be glad to furnish you at any time.

Yours very truly,

(Signed) THOMAS MAGEE & SONS.

Immediately after the reception of this report, the rentals on all of the seawall lots were raised to 4 per cent of the appraised valuation, and the State to-day is enjoying said rentals.

In almost every case the rentals are paid for tenures from month to month, although under the law lots can be leased for a period of not to exceed twenty-five years. Lots "A" and "B" and Lots 1 to 16, inclusive, are within the provisions of this law, while lots that have been or are now being created by the construction of new seawall and the building of East Street do not come under said provisions. It is plain that the Legislature should extend the law to cover the lots in question, so that the Board may deal with the realty of the State in a uniform manner. It is the purpose of the Board of State Harbor Commissioners to declare by resolution the creation of such new lots as may be available through the continued construction of seawall, and to request the Legislature to give the necessary authority for leasing of the same for similar purposes as those already provided for.

Belt Railroad.

As an adjunct to the docks and piers, the State owns and operates what is known as the Belt Railroad, with four miles of main line and two miles of private spurs, serving the industries around the bay. This road handles cars from transbay railroads and delivers them to the various docks, factories, packing-houses, and warehouses around the water front. The road was constructed in 1891, under an act of the Legislature, and has been operated continuously by the State.

Believing this State railroad to be of inestimable value to the commercial interests, it will be the policy of the Board of State Harbor Commissioners to extend its operations to the territory south of Market Street as soon as the completion of the roadway behind the seawall recently constructed is sufficiently advanced, and by this means giving railroad car service between all of the docks now in course of construction and those contemplated and the main trunk railroad lines, and such adjacent properties as may be able to make rail connections.

The following table gives the number of carloads handled for the period of this report:

Year and Month.	Number.	Yearly Total.
1906—July	3,595	
August	4,607	
September	4,627	
October	5,113	
November	4,394	
December	3,903	
1907—January	3,925	
February	3,812	
March	4,097	
April	4,663	
May	4,891	
June	5,064	52,691
July	4,856	
August	5,698	
September	5,749	
October	6,384	
November	5,171	
December	3,990	
1908—January	3,620	
February	3,376	
March	3,646	
April	3,854	
May	3,690	
June	3,859	53,893
Total		106,584

Free Market.

The Board has endeavored to carry out the desire expressed through the legislative enactment of March, 1897, authorizing the Board to establish and maintain a free public market on the water front. Lack of available space rendered it impossible to construct a market with a sufficient space to transact business in the wholesale manner outlined in the act. The only available property in the neighborhood prescribed by law being a small seawall lot at the intersection of Drumm and East streets, known as Seawall Lot 16. Upon this space a market containing stalls, together with the necessary conveniences, has been erected, and has been in continual operation since April of this year, 1908.

A number of producers' organizations have placed their local representatives in the market, and have offered for sale a continuing stream of varied fruits and vegetables, eggs, poultry, and other agricultural products. Probably the greatest value obtained therefrom has been the object lesson which seems to have stirred the city government of San Francisco to action along similar lines upon a more extensive plan, in more promising neighborhoods, and therefore promising better results.

Time alone can determine the value of this experiment.

PART II

FINANCIAL AND STATISTICAL.

Recapitulation of Receipts for the Fiscal Year Beginning July 1, 1906, and Ending June 30, 1907.

	Dockage.	Tolls.	Wharfage.	Rents.	Miscellaneous.	Total.
Fisherman Wharf			$3,478 25	$624 00		$4,102 25
Sections "A," "B" 1 Seawall and Powell Street Wharf	$15,023 45	$10,641 17	57 50	570 00		26,292 12
Section 2, Seawall Wharf				105 00		105 00
Section 3, Seawall Wharf and Lombard Street Wharf (Pier 27)	7,033 15	5,995 43	356 15	1,537 50		14,922 23
Lombard Street Car Ferry Slips		30,294 38		29,900 00		60,194 38
Greenwich Street Wharf No. 2 (Pier 25)	5,562 70	2,864 84	43 85	5,400 00		13,871 39
Greenwich Street Wharf No. 1 (Pier 23)	7,569 70	5,568 46		5,100 00		18,238 16
Filbert Street Wharf (Pier 21)	17,429 40	5,465 00	130 00	1,102 50		24,126 90
Union Street Wharf No. 2 (Pier 19)	5,222 55	3,259 21	5 00	4,800 00		13,286 76
Union Street Wharf No. 1 (Pier 17)	13,162 70	3,823 17	128 60	324 00		17,438 47
Green Street Wharf (Pier 15)	3,252 00	2,862 73	68 85	7,680 00		13,863 58
Vallejo Street Wharf (Pier 13)	6,287 15	5,227 85	44 50	7,115 00		18,674 50
Broadway Wharf No. 2 (Pier 11)	8,361 60	6,202 33		5,880 00		20,443 93
Broadway Wharf No. 1 (Pier 9)	7,594 60	14,056 41	13 45	7,680 00		29,344 46
Pacific Street Wharf (Pier 7)	5,052 50	5,698 45		7,680 00		18,430 95
Jackson Street Wharf (Pier 5)	9,347 55	9,827 88	32 25	5,940 00		25,147 68
Washington Street Wharf (Pier 3)	6,899 40	5,008 46	1 10	2,662 00		14,570 96
Clay Street Wharf (Pier 1)	2,128 90	170 95		1,335 00		3,634 85
Union Depot and Ferry House, Ferry Slips 1, 2, 3, 4, 5, 6, 7, 8, Tolls and P. O. Building		12,781 72		129,334 00		142,115 72
Mission Street Wharf No. 1 (Pier 2)	8,572 00	7,837 61	126 25	6,590 50		23,126 36
Mission Street Wharf No. 2 (Pier 4)	5,547 45	5,451 36	22 00	8,910 00		19,930 81
Howard Street Wharf No. 1 (Pier 6)	17,915 40	6,826 49	67 00	765 00		25,573 89
Howard Street Wharf No. 2 (Pier 8)	3,990 90	6,094 21	293 00	4,601 00		14,979 11
Howard Street Wharf No. 3 (Pier 10)	4,600 00	4,224 33	100 25	3,615 00		12,539 58
Folsom Street Wharf No. 1 (Pier 12)				18,000 00		18,000 00
Folsom Street Wharf No. 2 (Pier 14)	9,753 75	10,680 73	195 45	7,741 00		28,370 93
Harrison Street Wharf (Pier 16)	4,576 50	3,233 32		2,125 00		9,934 82
Steuart Street Wharf (Pier 20)	8,889 20	10,221 33		4,185 00		23,295 53
Spear Street Wharf (Pier 24)	5,417 00	5,553 89		3,000 00		13,970 89
Main Street Car Ferry Slip and Tolls		9,845 02		14,400 00		24,245 02
Main Street Wharf (Pier 28)	9,401 70	4,382 27	300 00	450 00		14,533 97
Beale Street Wharf (Pier 32)	10,536 55	8,350 32	21 50	3,011 00		21,919 37
Fremont Street Wharf (Pier 34)	9,328 65	4,750 79	14 00			14,093 44
Pier 38	2,552 40	407 10		50 00		3,009 50
Pacific Mail Wharf (Pier 40)	552 95	105 75		26,000 00		26,658 70
Pacific Mail Wharf (Piers 42 and 44)	17,333 50	17,047 14	255 50	1,512 50		36,148 64
Third Street Wharf	6,525 70	3,532 75	155 00	1,600 00		11,813 45
Berry Street Wharf	13,065 84	10,537 39		8,040 00		31,643 23
Channel Street Wharf	6,873 50	3,967 24	102 00	12,893 75		23,836 44

Santa Fe Car Ferry Slip		[illegible]				[illegible]
China Basin Wharf				24,930 00		24,930 00
Southern Pacific Car Ferry Slip and Tolls		70,511 81		15,200 00		85,711 81
Center Street Wharf	6,523 35	6,832 89	659 80	3,375 00		17,391 04
Central Basin				47,364 80		47,364 80
Revenue from seawall lots				19,300 00		19,300 00
Sale of old material					$3,601 31	3,601 31
Belt Railroad revenue					89,971 00	89,971 00
Belt Railroad, sale of old material					10 00	10 00
Tugs and dredgers, sale of old material					1,768 90	1,768 90
Wharfage, damages, sales, etc.					10,896 78	10,896 78
U. S. Customs Department (rent and dockage)				3,540 00		3,540 00
Postoffice Station "D" and Ferry Slip No. 8 (lighting)					1,083 56	1,083 56
Unclaimed wages					174 95	174 95
Insurance account, premiums returned					263 85	263 85
Fire loss account					48,861 50	48,861 50
Totals	$271,883 69	$340,139 62	$6,671 25	$465,968 55	$156,631 85	$1,241,294 96

Recapitulation of Receipts for the Fiscal Year Beginning July 1, 1907, and Ending June 30, 1908.

	Dockage.	Tolls.	Wharfage.	Rents.	Miscellaneous.	Total.
Fisherman Wharf			$5,343 20	$961 00		$6,304 20
Sections "A," "B," 1 Seawall and Powell Street Wharf	$8,410 70	$12,387 05	220 50	4,810 75		25,829 00
Section 2 Seawall Wharf	2,299 55	1,329 45	953 75	180 00		4,762 75
Section 3 Seawall Wharf and Lombard Street Wharf (Pier 27)	3,265 95	3,129 61	28 70	3,062 50		9,486 76
Lombard Street Car Ferry Slips		34,054 03		27,000 00		61,054 03
Greenwich Street Wharf No. 2 (Pier 25)	8,151 25	3,590 41	58 00	5,400 00		17,199 66
Greenwich Street Wharf No. 1 (Pier 23)	4,263 70	3,280 81		5,100 00		12,644 51
Filbert Street Wharf (Pier 21)	8,396 85	3,110 91	107 60	486 00		12,101 36
Union Street Wharf No. 2 (Pier 19)	7,688 50	4,096 31		4,900 00		16,684 81
Union Street Wharf No. 1 (Pier 17)	4,616 20	1,654 49	20 50	30 25		6,321 44
Green Street Wharf (Pier 15)	2,527 50	3,974 58		7,680 00		14,182 08
Vallejo Street Wharf (Pier 13)	5,315 50	5,064 81		9,005 00		19,385 31
Broadway Wharf No. 2 (Pier 11)	8,173 40	5,268 96		5,880 00		19,322 36
Broadway Wharf No. 1 (Pier 9)	7,447 45	14,096 12		7,680 00		29,223 57
Pacific Street Wharf (Pier 7)	4,518 75	4,598 54	67 50	7,905 00		17,089 79
Jackson Street Wharf (Pier 5)	7,401 25	6,396 73		5,986 25		19,784 23
Washington Street Wharf (Pier 3)	6,848 50	6,008 10		2,637 00		15,493 60
Clay Street Wharf (Pier 1)	2,751 95	771 03		1,202 50		4,725 48
Union Depot and Ferry House, Ferry Slips 1, 2, 3, 4, 5, 6, 7, 8, Tolls, and P. O. Building		9,042 19		129,062 40		138,104 59

Recapitulation of Receipts for the Fiscal Year Beginning July 1, 1907, and Ending June 30, 1908—*Continued.*

	Dockage.	Tolls.	Wharfage.	Rents.	Miscellaneous.	Total.
Mission Street Wharf No. 1 (Pier 2)	$6,894 80	$6,029 27	$4 50	$6,282 00		$19,210 57
Mission Street Wharf No. 2 (Pier 4)	10,900 95	7,815 86	11 80	7,196 05		25,924 66
Howard Street Wharf No. 1 (Pier 6)	14,867 05	4,453 84	823 95	424 00		20,568 84
Howard Street Wharf No. 2 (Pier 8)	4,988 80	6,437 97		4,763 50		16,190 27
Howard Street Wharf No. 3 (Pier 10)	4,381 10	4,749 97	6 80	3,724 50		12,862 37
Folsom Street Wharf No. 1 (Pier 12)				18,360 00		18,360 00
Folsom Street Wharf No. 2 (Pier 14)	10,119 30	10,042 40	57 50	4,680 00		24,899 20
Harrison Street Wharf (Pier 16)	3,733 45	2,575 69	22 00	2,968 75		9,299 89
Steuart Street Wharf (Pier 20)	7,136 55	7,581 56		3,870 00		18,588 11
Spear Street Wharf) Pier 24)	5,171 20	5,454 40	204 00	3,000 00		13,829 60
Main Street Car Ferry Slip, and Tolls		3,800 55		14,400 00		18,200 55
Main Street Wharf (Pier 28)	5,519 20	3,806 33	1,567 50	902 00		11,795 03
Beale Street Wharf (Pier 32)	10,793 09	9,004 62	636 10	3,457 90		23,891 71
Fremont Street Wharf (Pier 34)	4 40	44 95				49 35
Pier 38	576 30	21 15				597 45
Pacific Mail Wharf (Pier 40)	71 60			10,000 00		10,071 60
Pacific Mail Wharf (Piers 42 and 44)	24,743 59	21,229 24		2,850 00		48,822 83
Third Street Wharf	5,175 45	3,125 41	357 40	2,515 00		11,173 26
Berry Street Wharf	5,858 65	4,804 86		7,885 15		18,548 66
Channel Street Wharf	3,106 45	4,162 33		15,330 00		22,598 78
Santa Fe Car Ferry Slip		16,717 99				16,717 99
China Basin				1,000 00		1,000 00
Southern Pacific Car Ferry Slip and Tolls		68,809 66		14,400 00		83,209 66
Center Street Wharf	10,393 75	10,904 17	80 25	3,025 00		24,403 17
Central Basin				12,265 65		12,265 65
Revenue from seawall lots				28,475 00		28,475 00
Sale of old material					$5,420 63	5,420 63
Belt Railroad revenue					113,565 00	113,565 00
Belt Railroad, sale of old material					616 50	616 50
Dredger No. 1					690 00	690 00
Tugs and dredgers, sale of old material					150 00	150 00
Wharfage, damages, sales, etc.					8,263 28	8,263 28
U. S. Customs Department (rent and dockage)				3,540 00		3,540 00
Postoffice Station "D," and Ferry Slip No. 8 (lighting)					840 45	840 45
Unclaimed wages					91 85	91 85
Fire loss account					7,511 23	7,511 23
Sidewalk area account				7 00		7 00
Totals	$226,512 68	$323,426 35	$10,571 55	$404,290 15	$137,148 94	$1,101,949 67

SUMMARY OF RECEIPTS FROM JULY 1, 1906, TO JUNE 30, 1908.

	1906–1907.	1907–1908.	Total.
From dockage	$271,883 69	$226,512 68	$498,396 37
From tolls	340,139 62	323,426 35	663,565 97
From wharfage	6,671 25	10,571 55	17,242 80
From rents	465,968 55	404,290 15	870,258 70
From Belt Railroad revenue	89,971 00	113,565 00	203,536 00
From Belt Railroad, sale of old material	10 00	616 50	626 50
From sale of old material	3,601 31	5,420 63	9,021 94
From wharfage, damages, sales, etc.	10,896 78	8,263 28	19,160 06
From fire loss account	48,861 50	7,511 23	56,372 73
From insurance account, premiums returned	263 85		263 85
From electric lighting	1,083 56	840 45	1,924 01
From Dredger No. 1		690 00	690 00
From tugs and dredgers, sale of old material	1,768 90	150 00	1,918 90
From unclaimed wages	174 95	91 85	266 80
Totals	$1,241,294 96	$1,101,949 67	$2,343,244 63

DISBURSEMENTS FROM JULY 1, 1906, TO JUNE 30, 1908.

Administration Account—					
Salaries of Commissioners	*a*	$9,600 00	*b*	$9,600 00	$19,200 00
Salaries of Chief Engineer and Assistants	*a*	10,052 50	*b*	2,633 35	12,685 85
Salaries of Chief Wharfinger and Assistants	*a*	7,728 00	*b*	8,296 00	16,024 00
Salary of attorney	*a*	2,400 00	*b*	2,400 00	4,800 00
Salaries of watchmen	*a*	3,996 30	*b*	8,311 85	12,308 15
Collection of Revenue—					
Salaries of secretaries and clerks	*a*	12,500 00	*b*	15,597 10	28,097 10
Salaries of wharfingers	*a*	24,000 00	*b*	23,975 80	47,975 80
Salaries of collectors	*a*	15,711 05	*b*	15,822 60	31,533 65
Expense account	*a*	13,293 19	*b*	21,438 01	34,731 20
Urgent repair	*c*	70,152 28	*d*	28,020 93	98,173 21
Repairs (contract)	*c*	243,333 22	*d*	97,746 86	341,080 08
Pile driving	*c*	42,087 88	*d*	5,518 20	47,606 08
Cleaning wharves, bulkheads, and streets	*a*	25,964 93	*b*	35,306 65	61,271 58
Wharf offices and furniture	*g*	30 00	*h*	5,190 63	5,220 63
Legal expense	*a*	173 85	*b*	173 45	347 30
Fire account	*g*	5,690 03	*h*	5,773 98	11,464 01
Dredger No. 1	*i*	13,559 03	*j*	12,131 93	25,690 96
Dredger No. 2	*i*	13,047 31	*j*	25,734 33	38,781 64
Dredger No. 3	*i*	17,409 58	*j*	18,189 29	35,598 87
Tug "Governor Markham"	*i*	13,503 35	*j*	12,229 15	25,732 50
Tug "Governor Irwin"	*i*	12,372 15	*j*	13,241 29	25,613 44
Construction account	*c*	112,772 33	*d*	298,161 90	410,934 23
Seawall account			*d*	9,546 00	*9,546 00
Dockage refunded	*g*	461 40	*h*	248 40	709 80
Tolls refunded	*g*	656 55	*h*	822 23	1,478 78
Wharfage refunded	*g*	58 95	*h*	74 25	133 20
Rent refunded	*g*	1,870 00	*h*	911 25	2,781 25
Switching refunded			*h*	2 50	2 50
Wharfage, damages, sales, etc.	*g*	2,335 88	*h*	1,607 06	3,942 94
Belt Railroad equipment			*f*	12,873 00	12,873 00
Belt Railroad maintenance	*e*	35,871 89	*f*	75,880 20	111,752 09
Belt Railroad operating	*e*	45,456 72	*f*	51,183 87	96,640 59
Electric lighting and supplies	*a*	23,954 05	*b*	24,602 12	48,556 17
Union Depot and Ferry House	*a*	32,222 12	*b*	37,040 72	69,262 84
Earthquake and fire account	*c*	335,100 10			335,100 10
Insurance account—premium paid	*a*	14,000 00			14,000 00
Special repair			*d*	367,510 47	367,510 47
Launch "James N. Gillett, Jr."			*j*	1,279 30	1,279 30
		$1,161,364 64		$1,249,074 67	$2,410,439 31
Transfer to San Francisco Depot Sinking Fund from S. F. Harbor Improvement Fund		55,572 00		55,572 00	111,144 00
Transfer to San Francisco Seawall Sinking Fund from S. F. Harbor Improvement Fund		24,018 69		24,018 64	48,037 33
Deferred payment drafts paid		116,131 68		80,196 50	196,328 18
Part payment of principal and interest on $250,000 loan				60,000 00	60,000 00
Totals		$1,357,087 01		$1,468,861 81	$2,825,948 82
Balance in treasury, June 30, 1908					62,688 91
					$2,888,637 73

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* Posted through error to seawall account. Should have been charged to repairs (contract).

a, b, c, d, e, f, g, h, i, j. See comparative statement of Receipts and Disbursements, page 32.

Summary of Receipts and Disbursements, by Months, for the Two Fiscal Years Ending June 30, 1908.

Receipts.

Months.	From Dockage, Tolls, Wharfage, Rents, Belt Railroad, Etc.	Draft Returned and Canceled.	Total.
1906—July	$81,504 97		$81,504 97
August	95,690 17		95,690 17
September	123,067 33		123,067 33
October	107,230 51		107,230 51
November	95,457 80		95,457 80
December	99,001 62		99,001 62
1907—January	100,850 55		100,850 55
February	93,930 29		93,930 29
March	97,495 35		97,495 35
April	102,865 44		102,865 44
May	104,395 90		104,395 90
June	139,805 03		139,805 03
Total, 1906-1907	$1,241,294 96		$1,241,294 96
1907—July	$89,237 40	$183 90	$89,421 30
August	95,942 27		95,942 27
September	92,033 20		92,033 20
October	82,492 56		82,492 56
November	97,866 57		97,866 57
December	104,223 48		104,223 48
1908—January	91,879 73		91,879 73
February	85,640 52		85,640 52
March	84,475 48		84,475 48
April	91,459 47		91,459 47
May	94,264 94		94,264 94
June	92,434 05		92,434 05
Total, 1907-1908	$1,101,949 67	$183 90	$1,102,133 57
Total, 1906-1908	$2,343,244 63	$183 90	$2,343,428 53
State of California, General Fund Loan			250,000 00
			$2,593,428 53
Balance June 30, 1906			295,209 20
Total.			$2,888,637 73

Disbursements.

Months.	From Dockage, Tolls, Wharfage, Rents, Belt Railroad, Etc.	Total.
1906—July	$86,027 80	$86,027 80
August	67,757 35	67,757 35
September	55,808 74	55,808 74
October	85,060 33	85,060 33
November	115,009 08	115,009 08
December	77,987 42	77,987 42
1907—January	103,606 27	103,606 27
February	119,503 64	119,503 64
March	105,318 07	105,318 07
April	100,795 44	100,795 44
May	115,909 21	115,909 21
June	128,581 29	128,581 29
Total, 1906-1907	$1,161,364 64	$1,161,364 64
1907—July	$101,223 56	$101,223 56
August	89,080 24	89,080 24
September	95,439 64	95,439 64
October	107,899 43	107,899 43
November	119,723 98	119,723 98
December	154,002 80	154,002 80
1908—January	111,922 76	111,922 76
February	96,749 21	96,749 21
March	109,966 99	109,966 99
April	116,273 30	116,273 30
May	83,412 20	83,412 20
June	63,380 56	63,380 56
Total, 1907-1908	$1,249,074 67	$1,249,074 67
Total, 1906-1908	$2,410,439 31	$2,410,439 31
Transfer to San Francisco Depot Sinking Fund		111,144 00
Transfer to San Francisco Seawall Sinking Fund		48,037 33
Deferred payment drafts paid		196,328 18
Part payment on loan		60,000 00
		$2,825,948 82
Balance June 30, 1908		62,688 91
		$2,888,637 73

COMPARATIVE STATEMENT OF RECEIPTS AND DISBURSEMENTS—1863-1908.

FISCAL YEAR.	RECEIPTS.				DISBURSEMENTS.														TOTAL
					EXPENSES.		CONSTRUCTION AND REPAIR.		DREDGING.										
From the Organization of the Commission.	Revenue From All Sources	Deferred Payment Drafts	Drafts Refused and Canceled	Total	Salaries, Law Fees, Fuel, Rent, Printing, Stationery, etc.	Percentage Per Year	Building Sheds, Wharves, Bulkheads, etc., Ferry Foundation, and Repairs on Same	Seawall	Labor, Fuel, Oil, Water, Repairs, Ship Chandlery, etc.	Contract Dredging	Purchase of Scows and Dredgers	Constructing and Operating Belt Railroad	Miscellaneous, Including Damages Paid	Transfer to San Francisco Depot Sinking Fund	Transfer to San Francisco Seawall Sinking Fund	Deferred Payment Drafts Paid	Balance in San Francisco Harbor Improvement Fund June 30, 1908	Part Payment of Principal and Interest on Loan from State of California of $250,000.00; Act March 17, 1907, Chap. 202.	
1863-64	$117,848 28			$117,848 28	$25,354 84	21.50	$67,599 82						$676 25						
1864-65	177,393 66			177,393 66	32,439 10	18.28	80,875 15												
1865-66	183,716 80			183,716 80	35,531 42	19.02	19,055 42	$3,607 00		$44,106 50									
1866-67	336,409 36			336,409 36	41,233 95	11.95	88,525 78	266 50		10,300 00			330 62						
1867-68	294,304 28			294,304 28	55,531 92	18.87	82,791 27	250,991 97		41,021 00			561 18						
1868-69	287,890 53			287,890 53	52,130 77	18.11	38,779 83	262,323 13		32,338 00									
1869-70	252,649 56			252,649 56	54,684 40	21.65	35,545 04	165,892 68		80,100 00									
1870-71	148,917 03			148,917 03	37,782 65	25.37	53,693 31			35,258 00									
1871-72	195,031 14			195,031 14	61,006 70	31.28	28,146 62			53,944 40									
1872-73	190,330 47			190,330 47	69,858 63	36.50	78,776 28			32,293 20									
1873-74	265,709 06			265,709 06	77,938 05	29.33	104,175 98	2,321 85		42,478 56	$34,070 00		6,344 01						
1874-75	373,541 72			373,541 72	68,617 14	18.37	209,540 80	1,078 25	$33,835 71		3,725 00		924 99						
1875-76	372,078 74			372,078 74	65,976 57	17.73	162,000 25		31,363 19	9,439 51			565 47						
1876-77	448,087 25			448,087 25	79,208 85	17.68	284,023 05		25,252 94		15,354 45								
1877-78	446,516 82			446,516 82	84,326 72	18.88	112,628 95	4,803 38	38,214 40		82,068 79		1,665 88						
1878-79	466,420 55			466,420 55	97,162 63	20.83	164,560 55	107,091 87	60,454 68		3,948 84		595 50						
1879-80	427,687 56			427,687 56	100,667 57	23.53	141,022 14	309,652 90	51,675 28		1,173 50		2,510 53						
1880-81	419,437 49			419,437 49	102,746 75	24.49	199,972 97	383,174 96	51,462 52				4,785 32						
1881-82	455,005 64			455,005 64	104,255 15	22.91	86,102 58	92,804 98	48,743 45				4,320 00						
1882-83	436,030 54			436,030 54	107,883 69	24.74	179,089 82	34,949 22	51,457 50		5,247 00		28,129 37						
1883-84	501,243 25			501,243 25	115,231 30	22.98	173,997 19	76,461 63	60,780 40				6,863 55						
1884-85	500,702 10			500,702 10	116,194 14	23.20	248,607 11	195,706 95	52,258 80				4,933 50						
1885-86	483,851 04			483,851 04	117,693 22	24.32	197,612 03	157,953 82	46,675 40				4,324 00						
1886-87	527,890 96			527,890 96	128,584 90	24.35	153,529 29	53,403 50	78,046 99				5,742 95						
1887-88	580,152 51			580,152 51	138,993 05	23.95	294,855 61	36,360 98	54,082 70				5,450 62						
1888-89	619,537 54			619,537 54	139,552 66	20.91	231,353 84	101,586 24	62,424 96				10,152 33						
1889-90	599,105 58			599,105 58	131,262 56	21.91	301,063 18	115,419 48	51,588 91				5,257 21						
1890-91	600,821 20			600,821 20	115,579 39	19.23	269,542 63	65,810 20	53,230 81			$327 61	9,600 62						
1891-92	651,112 11			651,112 11	114,860 89	17.64	275,083 97	122,112 90	56,081 70			81,307 46	7,663 95						
1892-93	629,957 55			629,957 55	121,882 55	19.34	319,991 36	72,025 44	54,006 33	865 15	25,384 00	15,933 10	5,771 81	$23,155 00					
1893-94	583,674 58			583,674 58	123,039 43	21.08	338,570 00	23,158 22	58,357 87			14,643 63	4,815 50	55,572 00					
1894-95	586,618 61			586,618 61	137,684 55	23.47	444,366 85	55 00	79,664 43			30,755 26	4,827 05	55,572 00					
1895-96	599,207 89			599,207 89	135,267 13	22.57	390,935 35		56,639 02			15,189 01	6,582 96	55,572 00					
1896-97	562,123 05			562,123 05	133,138 80	23.68	319,085 55	6,658 01	55,686 31			11,422 27	5,938 89	55,572 00					
1897-98	581,661 05			581,661 05	151,598 53	26.06	313,603 11		54,278 81			18,458 63	8,833 26	55,572 00					
1898-99	630,455 62		$123 45	630,579 07	170,678 51	27.07	293,560 22		54,102 91			25,539 38	10,553 75	55,572 00					
1899-00	731,033 41		34 80	731,068 21	150,533 68	21.66	385,662 52		60,593 79			37,476 81	10,768 53	55,572 00					
1900-01	772,989 03		11,623 43	784,612 46	148,669 59	19.23	460,741 42	3,060 93	46,166 24	1,900 50		76,346 58	11,467 99	55,572 00					
1901-02	825,191 43			825,191 43	164,294 43	19.91	460,548 25		59,494 87	7,691 25		67,316 66	8,277 71	55,572 00					
1902-03	829,096 35			829,096 35	168,061 41	20.27	375,195 39		58,873 99	11,199 00	19,500 00	57,650 63	9,693 24	55,572 00					
1903-04	1,008,193 09	$504,218 01	88 60	1,512,499 70	194,058 77	19.24	801,174 21	4,352 41	107,034 35		34,674 00	80,343 86	31,195 73	55,572 00		$232,102 22			
1904-05	1,283,804 80	261,188 98	279 04	1,545,272 82	197,888 30	15.41	535,145 30	149,022 10	135,870 08			71,061 93	6,583 66	55.572 00		135,878 42			
1905-06	1,065,990 36	99,789 67		1,165,780 03	177,769 73	16.67	705,537 38	1,631 77	62,086 12			66,823 39	7,656 62	55,572 00	$5,727 78	161,459 12			
1906-07	1,241,294 96			1,241,294 96	*a* 195,595 99	15.76	*c* 803,445 81		*i* 69,891 42			*e* 81,328 61	*g* 11,102 81	55,572 00	24,018 69	116,131 68			
1907-08	1,351,949 67		183 90	1,351,949 67	*b* 205,197 65	15.18	*d* 806,504 36		*j* 82,805 29			*f* 139,937 07	*h* 14,630 30	55,572 00	24,018 64	80,196 50	$62,688 91	$60,000 00	
Totals	$24,642,664 22	$865,196 66	$12,333 22	$25,520,194 10	$5,047,648 66		$12,116,627 54	$2,803,738 27	$2,003,182 17	$402,935 07	$225,145 58	$891,862 19	$270,097 66	$856,735 00	$53,765 11	$725,767 94	$62,688 91	$60,000 00	$25,520,194 10

a, b, c, d, e, f, g, h. See Summary of Disbursements, July 1, 1906, to June 30, 1908, page 31.

Summary of Receipts and Disbursements by Months [illegible]

Summary of Receipts and Disbursements.

Receipts.	1906-1907.	1907-1908.	Total.
From dockage	$271,883 69	$226,512 68	$498,396 37
From tolls	340,139 62	323,426 35	663,565 97
From wharfage	6,671 25	10,571 55	17,242 80
From rents	465,968 55	404,290 15	870,258 70
From Belt Railroad revenue	89,971 00	113,565 00	203,536 00
From Belt Railroad, sale of old material	10 00	616 50	626 50
From sale of old material	3,601 31	5,420 63	9,021 94
From wharfage, damages, sales, etc.	10,896 78	8,263 28	19,160 06
From fire loss account	48,861 50	7,511 23	56,372 73
From insurance account, premiums returned	263 85		263 85
From electric lighting	1,083 56	840 45	1,924 01
From Dredger No. 1		690 00	690 00
From tugs and dredgers, sale of old material	1,768 90	150 00	1,918 90
From unclaimed wages	174 95	91 85	266 80
Totals	$1,241,294 96	$1,101,949 67	$2,343,244 63
Drafts returned and canceled		183 90	183 90
State of California, General Fund		250,000 00	250,000 00
	$1,241,294 96	$1,352,133 57	$2,593,428 53
Balance in treasury, June 30, 1906			295,209 20
			$2,888,637 73

Expenditures.	1906-1907.	1907-1908.	Total.
Salaries—administrative and collection of revenue	$85,987 85	$86,636 70	$172,624 55
Maintenance and repair of wharves and buildings	355,573 38	498,796 46	854,369 84
Construction account	112,772 33	498,161 90	410,934 23
Seawall account		9,546 00	*9,546 00
Tugs and dredgers	69,891 42	82,805 29	152,696 71
Fire account	5,690 03	5,773 98	11,464 01
Belt Railroad	81,328 61	139,937 07	221,265 68
Union Depot	32,222 12	37,040 72	69,262 84
Wharfage, damages, sales, etc.	2,335 88	1,607 06	3,942 94
Wharf and street cleaning and sprinkling	25,964 93	35,306 65	61,271 58
General expense	40,497 99	53,462 84	93,960 83
Earthquake and fire account	335,100 10		335,100 10
Insurance account—premium paid	14,000 00		14,000 00
Totals	$1,161,364 64	$1,249,074 67	$2,410,439 31
Transfer to San Francisco Depot Sinking Fund from San Francisco Harbor Improvement Fund	55,572 00	55,572 00	111,144 00
Transfer to San Francisco Seawall Sinking Fund from San Francisco Harbor Improvement Fund	24,018 69	24,018 64	48,037 33
Deferred payment drafts paid	116,131 68	80,196 50	196,328 18
Part payment of principal and interest on $250,000 loan		60,000 00	60,000 00
Totals	$1,357,087 01	$1,468,861 81	$2,825,948 82
Balance in treasury, June 30, 1908			62,688 91
			$2,888,637 73

* Posted through error to Seawall account. Should have been charged to repairs (contract)—maintenance and repairs of wharves and buildings.

Note.—Itemized vouchers for all disbursements are on file in the office of the Secretary of the Board of State Harbor Commissioners.

Disbursements of the San Francisco Seawall Fund for Two Fiscal Years ending June 30, 1908.

Account of—	Date.	Receipt No.	Amount.	Total.
Advertising	June 25, 1907	1	$351 00	
Advertising	June 25, 1907	2	240 95	
				$591 95
Construction Section 12, seawall	Sept. 13, 1907	3	$8,042 47	
do	Oct. 5, 1907	5	7,330 26	
do	Nov. 1, 1907	6	8,515 67	
do	Dec. 7, 1907	10	13,653 17	
do	Jan. 10, 1908	13	12,085 87	
do	Feb. 7, 1908	14	9,674 28	
do	Mar. 7, 1908	17	3,857 28	
do	Apr. 11, 1908	24	5,211 59	
do	May 12, 1908	29	1,667 21	
do	June 4, 1908	32	2,899 66	
				72,937 46
Pay roll	Oct. 5, 1907	4	$590 00	
do	Nov. 11, 1907	7	25 00	
do	Nov. 11, 1907	8	610 00	
do	Dec. 3, 1907	9	610 00	
do	Jan. 10, 1908	11	18 75	
do	Jan. 10, 1908	12	465 00	
do	Feb. 7, 1908	15	472 50	
do	Mar. 10, 1908	18	365 00	
do	Mar. 10, 1908	19	13 75	
do	Apr. 10, 1908	22	21 25	
do	Apr. 10, 1908	23	295 50	
do	May 11, 1908	28	300 00	
do	June 10, 1908	33	147 50	
				3,934 25
Creosoted piling	Feb. 14, 1908	16	$14,012 92	
do	Mar. 19, 1908	20	4,670 97	
				18,683 89
Driving piles	Apr. 17, 1908	25	$103 60	
				103 60
Lumber	Apr. 22, 1908	26	$860 32	
do	Apr. 24, 1908	27	497 35	
do	May 22, 1908	31	1,471 72	
				2,829 39
Construction of wharf on Section 12	Apr. 2, 1908	21	$1,200 00	
do	May 18, 1908	30	400 00	
do	June 29, 1908	34	636 75	
				2,236 75
				$101,317 2

Statement of San Francisco Harbor Improvement Fund (State Treasurer, Custodian), for the Two Years ending June 30, 1908.

1906—July 31	To amount remitted to State Treasurer	$73,675 03	
Aug. 31	do	92,206 22	
Sept. 30	do	117,908 90	
Oct. 31	do	102,537 55	
Nov. 30	do	89,008 08	
Dec. 31	do	93,872 00	
1907—Jan. 31	do	93,556 93	
Feb. 28	do	87,544 58	
Mar. 31	do	91,444 84	
Apr. 30	do	96,389 76	
May 31	do	98,765 21	
June 30	do	134,233 58	
			$1,171,142 68
July 31	do	$83,765 71	
Aug. 31	do	90.262 04	
Sept. 30	do	90,235 80	
Oct. 31	do	81,162 31	
Nov. 30	do	96,258 82	
Dec. 31	do	101,703 44	
1908—Jan. 31	do	90,922 28	
Feb. 29	do	84,003 23	
Mar. 31	do	83,354 18	
Apr. 30	do	89,574 25	
May 31	do	91,616 44	
June 30	do	91,070 24	
			1,073,928 74
	Transferred from General Fund per act of Legislature		250,000 00
	Drafts returned and canceled		183 90
	June 30, 1906—Amount in fund		295,209 20
			$2,790,464 52

	Drafts Drawn by Board.	Drafts Drawn for Deferred Payment Drafts.	Transfer to San Francisco Depot Sinking Fund.	Transfer to San Francisco Seawall Sinking Fund.	Part Principal and Interest on Loan from General Fund.	Total.
1906—July	$78,197 86	$13,019 79	$4,631 00	$2,001 52		$97,850 17
Aug.	64,273 40	15,992 90	4.631 00	2,001 57		86,898 87
Sept.	50,650 31	4,019 00	4,631 00	2,001 57		61.301 88
Oct.	80,367 37	13,316 22	4.631 00	2.001 57		100,316 16
Nov.	108,559 36	13,668 73	4,631 00	2,001 57		128,860 66
Dec.	72,857 80	2,825 00	4.631 00	2,001 57		82,315 37
1907—Jan.	96,312 65	13,316 22	4,631 00	2,001 47		116,261 34
Feb.	113,117 93	10,503 80	4,631 00	2,001 57		130,254 30
Mar.	99.267 56	2,825 00	4.631 00	2,001 57		108,725 13
Apr.	94,319 76	6,146 37	4,631 00	2.001 57		107,098 70
May	110,278 52	12,064 10	4,631 00	2.001 57		128,975 19
June	123,009 84	8,434 55	4,631 00	2,001 57		138,076 96
Totals	$1,091,212 36	$116,131 68	$55,572 00	$24,018 69		$1,286,934 73
July	$95,751 87	$9,127 72	$4,631 00	$2,001 47		$111,512 06
Aug.	83,400 01	8.906 98	4,631 00	2,001 57		98,939 56
Sept.	93,642 24	4,421 83	4,631 00	2,001 57		104,696 64
Oct.	106,569 18	8.363 85	4,631 00	2,001 57		121,565 60
Nov.	118,116 23	9,941 14	4,631 00	2,001 57		134,689 94
Dec.	151,482 76	2,825 00	4,631 00	2,001 57		160,940 33
1908—Jan.	110,965 31	9,127 72	4,631 00	2,001 47		126,725 50
Feb.	95,111 92	9,177 27	4.631 00	2,001 57		110,921 76
Mar.	108,845 69		4,631 00	2.001 57		115,478 26
Apr.	114,388 08	6,803 55	4,631 00	2,001 57		127,824 20
May	80,763 70	11,501 44	4,631 00	2.001 57		98.897 71
June	62,016 75		4,631 00	2,001 57	$60,000 00	128,649 32
Totals	$1,221,053 74	$80,196 50	$55,572 00	$24,018 64	$60,000 00	$1,440,840 88
Two years ending June 30, '08	$2,312,266 10	$196,328 18	$111,144 00	$48,037 33	$60,000 00	$2,727,775 61
Balance in fund June 30, 1908						62,688 91
						$2,790,464 52

Statement of the San Francisco Harbor Improvement Fund—November 4, 1863, to June 30, 1908.

Fiscal Year. From the Organization of the Commission.	Remittances to the Credit of San Francisco Harbor Improvement Fund (State Treasurer, Custodian).	Drafts on San Francisco Harbor Improvement Fund (State Treasurer, Custodian).
1863-64	$71,897 39	$47,680 02
1864-65	123,365 23	62,334 82
1865-66	132,023 96	47,568 50
1866-67	268,573 45	64,345 94
1867-68	217,528 06	354,121 12
1868-69	212,532 07	310,213 27
1869-70	180,623 37	272,670 93
1870-71	96,097 20	73,914 13
1871-72	105,877 82	53,944 40
1872-73	91,042 59	80,640 23
1873-74	166,150 23	168,769 62
1874-75	245,369 00	189,549 17
1875-76	249,450 44	146,716 69
1876-77	310,909 33	266,661 37
1877-78	285,521 50	162,712 80
1878-79	274,370 87	241,764 39
1879-80	240,414 91	419,429 27
1880-81	204,782 41	527,487 44
1881-82	249,919 90	131,140 42
1882-83	194,860 84	165,586 90
1883-84	254,497 78	186,588 60
1884-85	259,702 01	376,700 41
1885-86	249,431 18	289,838 61
1886-87	245,509 83	136,926 50
1887-88	294,861 66	244,452 11
1888-89	321,605 12	247,137 61
1889-90	306,148 20	311,633 96
1890-91	319,721 19	232,991 25
1891-92	360,206 68	366,205 44
1892-93	334,575 70	376,049 89
1893-94	281,417 59	315,899 66
1894-95	215,278 73	381,585 26
1895-96	285,523 57	346,501 16
1896-97	256,612 21	281,991 29
1897-98	224,702 65	245,385 94
1898-99	334,943 72	314,371 42
1899-00	669,814 33	639,360 25
1900-01	725,703 72	745,015 51
1901-02	760,506 95	758,510 69
1902-03	761,337 47	687,986 78
1903-04	898,950 73	926,958 58
1904-05	1,220,947 50	962,696 47
1905-06	916,614 85	1,095,098 73
From State of California (act of Special Session 1906, Chapter XXXVI)	100,000 00	----------------
1906-07	1,171,142 68	1,286,934 73
1807-08	1,074,112 64	1,440,840 88
From State of California (act of Special Session 1907, Chapter 202, act of March 13, 1907	250,000 00	----------------
Balance in treasury, June 30, 1908	----------------	62,688 91
Totals	$17,015,178 27	$17,015,178 27

Statement of San Francisco Depot Sinking Fund June 30, 1908.

		Sinking Fund.	Interest.	Total.
1906—July	To amount transferred from S. F. Harbor Improvement Fund	$2,631 00	$2,000 00	$4,631 00
Aug.	do	2,631 00	2,000 00	4,631 00
Sept.	do	2,631 00	2,000 00	4,631 00
Oct.	do	2,631 00	2,000 00	4,631 00
Nov.	do	2,631 00	2,000 00	4,631 00
Dec.	do	2,631 00	2,000 00	4,631 00
1907—Jan.	do	2,631 00	2,000 00	4,631 00
Feb.	do	2,631 00	2,000 00	4,631 00
Mar.	do	2,631 00	2,000 00	4,631 00
Apr.	do	2,631 00	2,000 00	4,631 00
May	do	2,631 00	2,000 00	4,631 00
June	do	2,631 00	2,000 00	4,631 00
	Totals	$31,572 00	$24,000 00	$55,572 00
July	To amount transferred from S. F. Harbor Improvement Fund	$2,631 00	$2,000 00	$4,631 00
Aug.	do	2,631 00	2,000 00	4,631 00
Sept.	do	2,631 00	2,000 00	4,631 00
Oct.	do	2,631 00	2,000 00	4,631 00
Nov.	do	2,631 00	2,000 00	4,631 00
Dec.	do	2,631 00	2,000 00	4,631 00
1908—Jan.	do	2,631 00	2,000 00	4,631 00
Feb.	do	2,631 00	2,000 00	4,631 00
Mar.	do	2,931 00	2,000 00	4,631 00
Apr.	do	2,631 00	2,000 00	4,631 00
May	do	2,631 00	2,000 00	4,631 00
June	do	2,631 00	2,000 00	4,631 00
	Totals	$31,572 00	$24,000 00	$55,572 00
	Totals for two fiscal years ending June 30, 1908	$63,144 00	$48,000 00	$111,144 00
	Transferred prior to June 30, 1906	423,591 00	322,000 00	745,591 00
	Totals	$486,735 00	$370,000 00	$856,735 00

Note.—Bonds were issued in 1893 for the construction of San Francisco Depot and Ferry House, to the amount of $600,000. The bonds will expire in 1912, and amounts have been paid upon them as shown in the table above.

Statement of San Francisco Seawall Sinking Fund June 30, 1908.

		Sinking Fund.	Interest.	Total.
1906—July	Transfers from S. F. Harbor Improvement Fund	$1,168 22	$833 30	$2,001 52
Aug.	do	1,168 22	833 35	2,001 57
Sept.	do	1,168 22	833 35	2,001 57
Oct.	do	1,168 22	833 35	2,001 57
Nov.	do	1,168 22	833 35	2,001 57
Dec.	do	1,168 22	833 35	2,001 57
1907—Jan.	do	1,168 22	833 25	2,001 47
Feb.	do	1,168 22	833 35	2,001 57
Mar.	do	1,168 22	833 35	2,001 57
Apr.	do	1,168 22	833 35	2,001 57
May	do	1,168 22	833 35	2,001 57
June	do	1,168 22	833 35	2,001 57
	Totals	$14,018 64	$10,000 05	$24,018 69
July	To amount transferred from S. F. Harbor Improvement Fund	$1,168 22	$833 25	$2,001 47
Aug.	do	1,168 22	833 35	2,001 57
Sept.	do	1,168 22	833 35	2,001 57
Oct.	do	1,168 22	833 35	2,001 57
Nov.	do	1,168 22	833 35	2,001 57
Dec.	do	1,168 22	833 35	2,001 57
1908—Jan.	do	1,168 22	833 25	2,001 47
Feb.	do	1,168 22	833 35	2,001 57
Mar.	do	1,168 22	833 35	2,001 57
Apr.	do	1,168 22	833 35	2,001 57
May	do	1,168 22	833 35	2,006 57
June	do	1,168 22	833 35	2,001 57
	Totals	$14,018 64	$10,000 00	$24,018 64
	Totals for two fiscal years ending June 30, 1908	$28,037 28	$20,000 05	$48,037 33
	Transferred prior to June 30, 1906	3,505 58	2,222 20	5,727 79
	Totals	$31,542 86	$22,222 25	$53,765 11

Statement of Deferred Payment Draft Account for the Two Fiscal Years ending June 30, 1908.

DRAFTS MATURED AND PAID.

Date of Payment.	Draft No.	To Whom Paid.	Amount.	Total.
1906				
July 8	163	Hyde Construction Company	$4,188 50	
18	179	San Francisco Drydock Company	1,560 30	
19	263	Southern Pacific Company	763 87	
21	237	Robert Grieg	1,194 00	
24	91	Robert Wakefield	3,221 74	
27	301	Gray Bros.	5,609 55	$16,537 96
Aug. 2	283	Healy, Tibbitts & Company	$1,596 82	
5	118	Robert Wakefield	3,164 92	
8	338	Western Fuel Company	1,326 55	
15	344	Healy, Tibbitts & Company	4,591 52	
25	351	Pacific Construction Company	2,988 92	13,668 73
Sept. 9	220	Robert Wakefield	$2,825 00	2,825 00
Oct. 8	164	Hyde Construction Company	$4,188 50	
18	180	San Francisco Drydock Company	1,560 30	
19	264	Southern Pacific Company	763 87	
21	238	Robert Grieg	1,194 00	
27	302	Gray Bros.	5,609 55	13,316 22
Nov. 2	284	Healy, Tibbitts & Company	$1,596 82	
5	119	Robert Wakefield	3,164 92	
8	339	Western Fuel Company	1,326 55	
15	345	Healy, Tibbitts & Company	4,591 52	
25	322	Pacific Construction Company	2,988 92	13,668 73
Dec. 9	221	Robert Wakefield	$2,825 00	2,825 00
1907				
an. 8	165	Hyde Construction Company	$4,188 50	
18	181	San Francisco Drydock Company	1,560 30	
19	265	Southern Pacific Company	763 87	
21	239	Robert Grieg	1,194 00	
27	303	Gray Bros.	5,609 55	13,316 22
Feb. 2	285	Healy, Tibbitts & Company	$1,596 82	
8	340	Western Fuel Company	1,326 54	
15	346	Healy, Tibbitts & Company	4,591 52	
25	323	Pacific Construction Company	2,988 92	10,503 80
March 9	222	Robert Wakefield	$2,825 00	2,825 00
April 8	166	Hyde Construction Company	$4,188 50	
18	182	San Francisco Drydock Company	1,560 30	
19	266	Southern Pacific Company	763 87	
21	240	Robert Grieg	1,194 00	
27	304	Gray Bros.	5,609 55	13,316 22
May 2	286	Healy, Tibbitts & Company	$1,596 82	
8	341	Western Fuel Company	1,326 54	
15	347	Healy, Tibbitts & Company	4,591 52	
25	324	Pacific Construction Company	2,988 92	10,503 80
une 9	223	Robert Wakefield	$2,825 00	2,825 00
uly 18	183	San Francisco Drydock Company	$1,560 30	
19	267	Southern Pacific Company	763 87	
21	241	Robert Greig	1,194 00	
27	305	Gray Bros.	5,609 55	9,127 72
1907				
Aug. 2	287	Healy, Tibbitts & Company	$1,596 83	
8	342	Western Fuel Company	1,326 54	
15	348	Healy, Tibbitts & Company	4,591 52	
25	325	Pacific Construction Company	2,988 92	$10,503 81
Sept. 9	224	Robert Wakefield	$2,825 00	2,825 00
Oct. 18	184	San Francisco Drydock Company	$1,560 30	
19	268	Southern Pacific Company	763 87	
21	242	Robert Grieg	1,194 00	
27	306	Gray Bros.	5,609 55	9,127 72

Statement of the Deferred Payment Draft Account for the Two Fiscal Years—*Continued.*

DRAFTS MATURED AND PAID.

Date of Payment.	Draft No.	To Whom Paid.	Amount.	Total.
1907				
Nov. 2	288	Healy, Tibbitts & Company	$1,596 83	
15	349	Healy, Tibbitts & Company	4,591 52	
25	326	Pacific Construction Company	2,988 92	$9,177 27
Dec. 9	225	Robert Wakefield	$2,825 00	2,825 00
1908				
Jan. 18	185	San Francisco Drydock Company	$1,560 30	
19	269	Southern Pacific Company	763 87	
21	243	Robert Grieg	1,194 00	
27	307	Gray Bros.	5,609 55	9,127 72
Feb. 2	289	Healy, Tibbitts & Company	$1,596 83	
15	350	Healy, Tibbitts & Company	4,591 52	
25	327	Pacific Construction Company	2,988 92	9,177 27
April 18	186	San Francisco Drydock Company	$1,560 30	
19	270	Southern Pacific Company	763 87	
21	244	Robert Grieg	1,194 00	
27	308	Gray Bros.	5,609 55	9,127 72
May 2	290	Healy, Tibbitts & Company	$1,596 83	
15	351	Healy, Tibbitts & Company	4,591 52	
25	328	Pacific Construction Company	2,988 92	9,177 27
				$196,328 18
		Balance outstanding June 30, 1906		335,756 90
		Balance outstanding June 30, 1908		$139,428 72

DRAFTS OUTSTANDING JUNE 30, 1908.

Date Issued.	Draft No.	Issued to.	Date Payable.	Account of.	Amount.	Total.
1904						
July 21	245	Robert Grieg	July 21,'08	Slate roof, Union Depot	$1,194 00	
	246	do	Oct. 21,'08	do	1,194 00	
	247	do	Jan. 21,'09	do	1,194 00	
	248	do	Apr. 21,'09	do	1,194 00	
	249	do	July 21,'09	do	1,194 00	
	250	(Spoiled)				$5,970 00
Oct. 21	271	Southern Pacific Co.	July 19,'08	Creosoting piles	$763 87	
	272	do	Oct. 19,'08	do	763 87	
	273	do	Jan. 19,'09	do	763 88	
	274	do	Apr. 19,'09	do	763 88	
	275	do	July 19,'09	do	763 88	
	276	do	Oct. 19,'09	do	763 88	4,583 26
Nov. 7	291	Healy, Tibbitts & Co.	Aug. 2,'08	Constructing slip, Central Basin	$1,596 83	
	292	do	Nov. 2,'08	do	1,596 83	
	293	do	Feb. 2,'09	do	1,596 83	
	294	do	May 2,'09	do	1,596 83	
	295	do	Aug. 2,'09	do	1,596 83	
	296	do	Nov. 2,'09	do	1,596 83	9,580 98
1905						
Apr. 27	309	Gray Bros.	July 27,'08	Constructing sea-wall	$5,609 55	
	310	do	Oct. 27,'08	do	5,609 55	
	311	do	Jan. 27,'09	do	5,609 55	
	312	do	Apr. 27,'09	do	5,609 55	
	313	do	July 27,'09	do	5,609 55	
	314	do	Oct. 27,'09	do	5,609 55	
	315	do	Jan. 27,'10	do	5,609 55	
	316	do	Apr. 27,'10	do	5,609 55	44,876 40

Statement of the Deferred Payment Draft Account for the Two Fiscal Years—*Continued.*

DRAFTS OUTSTANDING JUNE 30, 1908.

Date Issued.	Draft No.	Issued to.	Date Payable.	Account of.	Amount.	Total.
1905 May 25	329	Pacific Con. Co.	Aug.25,'08	Constructing dolphins	$2,988 92	
	330	do	Nov.25,'08	do	2,988 92	
	331	do	Feb. 25,'09	do	2,988 92	
	332	do	May 25,'09	do	2,988 92	
	333	do	Aug.25,'09	do	2,988 92	
	334	do	Nov.25,'09	do	2,988 92	
	335	do	Feb. 25,'10	do	2,988 92	
	336	do	May 25,'10	do	2,988 92	
1906 Feb. 19	352	Healy, Tibbitts & Co.	Aug.15,'08	Constructing Pier No. 13	$4,591 52	$23,911 36
	353	do	Nov.15,'08	do	4,591 52	
	354	do	Feb. 15,'09	do	4,591 52	
	355	do	May 15,'09	do	4,591 52	
	356	do	Aug.15,'09	do	4,591 52	
	357	do	Nov.15,'09	do	4,591 52	
	358	do	Feb. 15,'10	do	4,591 52	
	359	do	May 15,'10	do	4,591 42	
	360	do	Aug.15,'10	do	4,591 52	
	361	do	Nov.15,'10	do	4,491 52	
	362	do	Feb. 15,'11	do	4,591 52	
						50,506 72
						$139,428 72

RÉSUMÉ.

Amount of deferred payment drafts outstanding June 30, 1906	$335,756 90
Amount of deferred payment drafts matured and paid from July 1, 1906, to June 30, 1908	196,328 18
Amount of deferred payment drafts still due and payable	$139,428 72

The above outstanding deferred payment drafts are payable as follows:

Fiscal year ending June 30, 1909	$66,978 78
Fiscal year ending June 30, 1910	58,675 38
Fiscal year ending June 30, 1911	13,774 56
Total	$139,428 72

Cost of Completed Seawall.

Section.	Length in Feet.	Cost per Lineal Foot.	Total Cost.
Section B, constructed in 1890–93	1,000	$114 60	$114,601 18
Section A, constructed in 1879–80	561	152 61	85,614 53
Section 1, constructed in 1878–79	1,000	165 63	165,631 40
Section 2, constructed in 1879–80	1,000	167 50	167,504 09
Section 3, constructed in 1879–81	1,000	235 50	235,049 51
Section 4, constructed in 1880–82	1,000	240 87	240,872 01
Section 5, constructed in 1883–84	1,000	169 89	169,893 57
Section 6, constructed in 1885–86	800	158 47	126,779 73
Section 7, constructed in 1887–89	1,000	109 32	109,327 99
Section 8*b*, constructed in 1888–90	450	248 50	111,629 12
Section 8*a*, constructed in 1891–93	389.5	220 82	86,008 09
Section 12, constructed in 1907–08	1,000	97 25	97,249 95
Section 13, constructed in 1904–05	600	233 73	140,238 71
Totals	10,800.5	Av., $171 33	$1,850,399 88
In addition to the above amount of seawall constructed, there is approximately 800 feet of seawall breakwater at Fisherman's Wharf. These breakwaters were constructed in 1900–01 at a cost as follows:	800	$19 58	$15,665 54

Financial Statement of the Belt Railroad from 1891 to June 30, 1908.

Fiscal Year Ending June 30.	Disbursements.					Revenue.			
	Construction and Equipment.		Maintenance and Operation.		Total.	Construction.	Sale of Old Material.	Switching Cars.	Total.
1891	$327 61				$327 61				
1892	74,188 90		$7,118 56		81,307 46			$4,580 75	$4,580 75
1893	4,496 68		11,436 42		15,933 10			12,039 00	12,039 00
1894	50 69		14,592 94		14,643 63			10,775 25	10,775 25
1895	11,587 38		19,167 88		30,755 26			10,118 75	10,118 75
1896			15,189 01		15,189 01		$5,934 25	11,730 00	17,664 25
1897			11,422 57		11,422 57			11,619 25	11,619 25
1898			18,458 63		18,458 63			13,313 50	13,313 50
1899			25,539 38		25,539 38			17,090 25	17,090 25
1900			37,476 81		37,476 81			19,402 25	19,402 25
1901	37,519 31		38,827 27		76,346 58			27,477 00	27,477 00
1902	19,314 90		48,001 86		67,316 76			38,992 53	38,992 53
1903	14,242 48		43,408 15		57,650 63	$62 27		47,266 20	47,328 47
1904	11,054 72		69,289 04		80,343 76			71,924 12	71,924 12
1905	300 00		70,761 93		71,061 93		132 50	79,673 75	79,806 25
1906			66,823 39		66,823 39		219 69	77,787 25	78,006 94
	Construction.	Equipment.	Maintenance.	Operation.					
1907			$35,871 89	$45,456 72	81,328 61		10 00	89,971 00	89,981 00
1908		$15,373 00	75,880 20	51,183 87	142,437 07		3,116 50	113,565 00	116,681 50
Totals					$894,362 19	$62 27	$9,412 94	$657,325 85	$666,801 06

NOTE.—The item of $3,116.50 under the heading "Sale of Old Material" includes a $2,500 credit on the purchase of a new locomotive from the Baldwin Locomotive Works (see Contract No. 30, Table of Contracts). The balance was from the sale of old rail.

To maintenance charge for the year 1908 includes new rail, plates, bolts, frogs and crossings for replacing a portion of the main line of the Belt Railroad. The amount thus expended was $20,468.68.

Work Under Way at Date of Last Biennial Report and Since Finished.

No.	Description.	Contractors.	Contract Price.	Date of Contract.	Date of Payments.	Amount.	Total.	Date of Completion
15	Erecting shed over Pier No. 13 (Vallejo street wharf).	Robert Grieg	$10,169 00	Dec. 1,'05	April 6,'06	$1,372 81		
			Less whitewashing 350 00	Aug. 14,'06	Aug. 14,'06	2,440 56		
			$9,819 00		Nov. 2,'06	1,906 69		
					Jan. 11,'07	1,644 19		
					Feb. 13,'07	2,454 75	$9,819 00	Jan. 3,'07
36 (16)	Construction of Pier No. 27 (Lombard street) and removing present pier and shed.	Healy, Tibbitts Construction Co. (assigned to the Pacific Construction Co. November 23, 1906.)	$129,000 00	May 17,'06	Feb. 23,'07	$24,337 50		
			Plus 19,750 00	Nov. 23,'06	May 10,'07	17,523 00		
			Plus 1,175 20		June 13,'07	12,655 50		
			Plus 1,135 76		July 12,'07	7,788 00		
					Aug. 9,'07	19,470 00		
					Aug. 9,'07	881 40		
					Sept. 5,'07	7,956 00		
					Oct. 5,'07	16,824 37		
					Nov. 8,'07	339 00		
					Nov. 15,'07	5,608 13		
					Nov. 15,'07	290 56		
					Dec. 20,'07	37,387 50	151,060 96	
17	Construction of Section 12 of the seawall	Gray Bros.	Contract invalidated by decision rendered by the Attorney General.					
18	Construction of freight platform on seawall lot No. 11.	Frank Gallagher	$2,850 00	June 14,'06	July 7,'06	$2,137 50		
					Aug. 14,'06	712 50	$2,850 00	
							$163,729 96	

Work Contracted for and Completed Within the Years June 30, 1906, and July 1, 1908.

No.	Description.	Contractors.	Contract Price.	Date of Contract.	Date of Payments.	Amount.	Total.	Date of Completion
19	Construction of 200 feet of wharf along Section 1 of the seawall.	Hyde, Harjes & Co.	$2,890 00	July 6,'06	Aug. 25,'06 Oct. 2,'06	$2,167 50 722 50	$2,890 00	Aug. 23,'06
20	Construction of 200 feet of wharf along Section 1 of the seawall.	Healy, Tibbitts Construction Co.	2,872 00	July 6,'06	Sept. 25,'06 Oct. 25,'06	$2,154 00 718 00	2,872 00	Sept. 13,'06
21	Construction of platform and office building on seawall lot No. 5.	Frank Gallagher	4,120 00	July 19,'06	Aug. 25,'06 Oct. 25,'06	$3,090 00 1,030 00	4,120 00	Aug. 23,'06
22	Construction of freight shed on seawall lot No. 12.	Fred Miller	9,000 00	Aug. 9,'06	Dec. 10,'06 Dec. 27,'06 Jan. 26,'07	$4,050 00 2,700 00 2,250 00	9,000 00	Dec. 20,'06
23	Repairs to tower and Union Depot and Ferry House.	Pacific Construction Co.	43,397 00 Plus 9,000 00 $52,397 00	Aug. 16,'06 Sept. 15,'06	Oct. 25,'06 Nov. 2,'06 Dec. 28,'06 Apr. 20,'07 May 24,'07	$13,754 21 17,683 99 3,929 77 3,929 78 13,099 25	52,397 00	April 18,'07
24	Rebuilding shed on Pier No. 19 (Union Street Wharf No. 2.)	Empire State Construction and Engineering Co.	25,766 00	Aug. 15,'06	Oct. 13,'06 Nov. 12,'06 Mar. 6,'07 Mar. 25,'07 Apr. 29,'07	$4,831 12 6,763 58 6,763 57 966 23 6,441 50	25,766 00	Mar. 21,'07
25	Construction of 200 feet of wharf along Section 1 of the seawall.	Hyde, Harjes & Co.	2,890 00	Aug. 22,'06	Sept. 14,'06 Oct. 25,'06	$2,167 50 722 50	2,890 00	Sept. 13,'06
26	Construction of shed on Pier No. 5 (Jackson Street Wharf).	Jas. A. McMahon Co.	14,585 00	Aug. 30,'06	Nov. 2,'06 Dec. 10,'06 Jan. 11,'07 Feb. 13,'07	$5,469 37 3,281 63 2,187 75 3,646 25	14,585 00	Jan. 3,'07
27	Construction of shed on Pier No. 11 (Broadway Wharf No. 2).	Standard Building Co., Incorporated.	9,972 00	Sept. 13,'06	Nov. 2,'06 Dec. 10,'06 Jan. 11,'07	$3,739 50 3,739 50 2,493 00	9,972 00	Dec. 6,'06
28	Construction of 200 feet of wharf along Section 1 of the seawall.	Hyde, Harjes & Co.	2,890 00	Sept. 20,'06	Nov. 2,'06 Dec. 10,'06	$2,167 50 722 50	2,890 00	Nov. 1,'06
29	Construction of shed on approach to Ferry Slip No. 7.	Frank Gallagher	3,690 00	Sept. 29,'06	Apr. 20,'07 May 24,'07	$2,767 50 922 50	3,690 00	April 30,'07
30	Additional to contract No. 23	Pacific Construction Co.	9,000 00	Sept. 13,'06	Payments	under Contract No. 23.		

31	Construction of shed on Pier No. 3 (Washington Street Wharf).	Frank Gallagher..........		2,565 00	Oct. 4,'06	Nov. 26,'06 Jan. 11,'07	$1,923 75 641 25	2,565 00	Nov. 15,'06
32	Construction of wharf along water front south of China Basin, Atchison, Topeka and Santa Fe lease.	Thomson Bridge Co.		24,930 00	Oct. 4,'06	Feb. 4,'07 Mar. 16,'07 Apr. 20,'07	$7,479 00 11,218 50 6,232 50	24,930 00	Mar. 14,'07
33	Repiling wharves on Section 13 of the seawall.	Pacfic Construction Co. .	Aggregate est.	5,935 00	Oct. 11,'06	Feb. 14,'07 July 27,'07 Aug. 30,'07	$2,374 03 3,514 59 1,962 88	7,851 50	July 19,'07
34	Construction of 200 feet of wharf along Section 1 of the seawall.	Hyde, Harjes & Co.		2,890 00	Oct. 22,'06	Nov. 27,'07 Dec. 27,'07	$2,167 50 722 50	2,890 00	Nov. 15,'07
35	Construction of 200 feet of wharf along Section 2 of the seawall.	Hyde, Harjes & Co.		2,890 00	Dec. 3,'06	Jan. 11,'07 Feb. 13,'07	$2,167 50 722 50	2,890 00	Jan. 13,'07
36	Construction of Pier No. 27 (Lombard Street Wharf) and removing present pier and shed.	Pacific Construction Co. (Assigned to Pacific Construction Co., by and with the consent of the Board of State Harbor Commissioners, Nov. 23, 1906.)	 Plus Plus Plus	129,000 00 19,750 00 1,175 20 1,135 76	Nov. 23,'06	See payments under Contract No. 16.			
37	Repairs to Union Depot and Ferry House	Pacific Construction Co.	 Less amount for resetting marble	60,687 00 93 00 $60,594 00	Dec. 13,'06	Jan. 19,'07 Feb. 15,'07 Apr. 20,'07 Sept. 26,'07 Nov. 1,'07	$20,481 46 13,654 58 6,827 28 4,481 78 15,148 50	60,594 00	Sept. 26,'07
38	Construction of shed and cesspool on Sections 1 and 2 of the seawall.	American Construction Co.		15,240 00	Dec. 13,'06	June 21,'07 July 27,'07 Oct. 11,'07 Nov. 15,'07	$5,143 50 3,429 00 2,857 50 3,810 00	15,240 00	
39	Contract to furnish lumber for six consecutive months.	Hickman & Masterson...	4 x 12 in.—22, 24 26, 28, and 32 ft., Douglas fir at $33.00 per M ft. (B. M.); 12 x 12 in.—22 and 32 ft. Douglas fir at $34.00 per M ft. (B. M.); 10 x 12 in.—22 and 32 ft. Douglas fir at $34.00 per M ft. (B. M.); 8 x 12 in.—12 to 32 ft. Douglas fir at $34.00 per M ft. (B. M.); 8 x 10 in.—10 to 20 ft. Douglas fir at $34.00 per M ft. (B. M.); cartage $1.25 per M ft. (B. M.) additional.		Dec. 21,'06	Jan. 19,'07 Mar. 13,'07 Mar. 29,'07 Apr. 20,'07 May 17,'07 June 21,'07 July 27,'07	$2,022 99 11,402 64 11,599 22 10,510 76 9,691 86 10,669 33 4,856 30	60,753 10	

Work Contracted for and Completed Within the Years June 30, 1906, and July 1, 1908—*Continued.*

No.	Description.	Contractors.	Contract Price.	Date of Contract.	Date of Payments.	Amount.	Total.	Date of Completion
40	Construction of 200 feet of wharf along Section 2 of the seawall.	Hyde, Harjes & Co.	$2,890 00	Dec. 27,'06	Feb. 4,'07 Mar. 13,'07	$2,167 50 722 50	$2,890 00	Jan. 31,'07
1	Assignment of contract for constructing Section 12 of the seawall.	Gray Bros. assign to Gray Bros. Crushed Rock Co. (See contract No. 17 for original.)	Contract invalidated by decision rendered by Attorney General.					
2	Furnishing, delivering and placing rock for raising a sunken portion of the seawall.	Gray Bros. Crushed Rock Co.	Contract invalidated by decision rendered by Attorney General.					
3	Raising and repairing sunken portion of East street, between Howard and Folsom streets.*	Pacific Construction Co.	(Estimated) $4,334 50	Jan. 17,'07	Mar. 25,'07 Apr. 15,'07 Apr. 29,'07	$2,047 74 1,346 96 682 58	4,077 28	Apr. 11,'07
4	Furnishing creosoted piling to aggregate 100,000 feet in length, and to be delivered ships tackle, San Francisco.	H. R. Rood & Co.	12 in. butt, 54c. per lin. ft. 13 in. butt, 55c. per lin. ft. 14 in. butt, 57c per lin. ft. 15 in. butt, 58c. per lin. ft. 16 in. butt, 60c. per lin. ft.	Jan. 31,'07	June 12,'07 Feb. 14,'08 Mar. 21,'08 Mar. 21,'08	$27,766 32 14,012 92 9,255 44 4,670 97	55,705 65	Feb. 13,'08
5	Construction of 200 feet of wharf along Section 2 of the seawall.	Hyde, Harjes & Co.	$2,890 00	Feb. 21,'07	Apr. 8,'07 May 10,'07	$2,167 50 722 50	2,890 00	Apr. 4,'07
6	Furnishing cement for construction of Pier 27 (Lombard Street Wharf.)	Pacific Construction Co.	$13.90 per ton of 2,000 lbs.	Feb. 21,'07	June 13,'07 July 12,'07 Aug. 9,'07 Sept. 5,'07 Oct. 5,'07 Nov. 8,'07 Dec. 13,'07	$2,877 97 2,321 55 2,172 60 3,910 87 908 66 2,312 81 4,864 82	19,459 28	Nov. 7,'07
7	Reconstruction of wharf along Sections 2, 1, A and B of the seawall.	Mercer-Fraser Co.	$25,406 00 Plus 2,388 75 Plus 503 58	Mar. 14,'07	June 21,'07 July 19,'07 Aug. 17,'07 Aug. 16,'07 Sept. 5,'07 Sept. 23,'07 Oct. 26,'07	$5,716 35 8,574 52 1,791 56 2,858 18 597 19 2,283 13 6,477 40	28,298 33	Sept. 19,'07
8	Paving and repaving East street, between Francisco and Kearny streets.	W. F. Hanrahan	(Estimated) 7,267 64	Apr. 11,'07	July 12,'07 Aug. 16,'07	$6,274 89 2,091 63	8,366 52	July 11,'07

9	Furnishing and placing rock for sunken portion of seawall.	Healy, Tibbitts Construction Co.	$1.48 per ton of 2,000 lbs.	Apr. 18,'07	July 12,'07 Aug. 9,'07 Sept. 5,'07 Dec. 7,'07 Dec. 14,'07 Mar. 21,'08	$5,550 00 3,996 00 1,666 69 1,959 08 965 70 4,712 49	18,849 96	Feb. 27,'08
10	Purchasing old lumber from the Board of State Harbor Commissioners.	G. A. Love	$4.10 per M ft. B. M.	Mar. 18,'07	Mondays	....	5,065 01	April 18,'08
11	Repairing and reconstructing pavement Fisherman's Wharf.	Flinn & Treacy	$0.145 per sq. ft. $0.1575 per sq. ft. for market house floor, including drains and foundation.	June 1,'07	July 12,'07 Aug. 27,'07	$1,118 81 372 94	1,491 75	July 11,'07
12	Construction of two wharves in Central Basin.	Atlantic, Gulf & Pacific Co.	$44,760 00	June 13,'07	Oct. 3,'07 Nov. 8,'07 Dec. 7,'07 Jan. 28,'08 Feb. 24,'08	$13,428 00 10,071 00 6,714 00 3,357 00 11,190 00	$44,760 00	Jan. 21, '08
13	Construction of Section 12 of the seawall†	Healy, Tibbitts Construction Co.	$0.789 per ton of 2,240 pounds for rock furnished, delivered and placed.	June 20,'07	Sept. 13,'07 Oct. 5,'07 *Nov. 1,'07 Dec. 7,'07 Jan. 10,'08 Feb. 7,'08 Mar. 7,'08 Apr. 11,'08 May 12,'08 June 4,'08	$8,042 47 7,330 26 8,515 67 13,653 17 12,085 87 9,674 28 3,857 28 5,211 59 1,667 21 2,899 66	72,937 46	June 4,'08
14	Still in effect.							
15	Removing outer 340 feet of Pier No. 34 and outer 110 feet of Pier No. 38.‡	Healy, Tibbitts Construction Co.	Contractors to keep old material and to pay a bonus of $20.	July 2,'07				
16	Constructing shed on Section 2 of the seawall, planking space under same, and constructing two cesspools.	American Construction Co.	$11,993 00 Plus 5,996 50	July 25,'07	Sept. 5,'07 Oct. 11,'07 Nov. 8,'07 Nov. 25,'07 Dec. 28,'07	$4,722 25 2,023 81 3,373 04 3,373 02 4,497 38	17,989 50	Nov. 21,'07
17	Furnishing and placing Italian marble for toilet rooms in ladies' parlor in the Ferry Building.	Galassi Marble & Mosaic Co.	2,078 00	July 25,'07	Aug. 27,'07 Sept. 26,'07	$1,558 50 519 50	2,078 00	Aug. 27,'07

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*The United Railroads agreed to pay a pro rata cost of the entire contract, which amounted to $6,272.75, making their share $2,195.47.

†There is a retained payment of 25 per cent due July 9, 1908, of the total amount of the contract. Said payment amounts to $24,312.49.

‡Contractor gives bonus.

Work Contracted for and Completed Within the Years June 30, 1906, and July 1, 1908—*Continued.*

No.	Description.	Contractors.	Contract Price.	Date of Contract.	Date of Payments.	Amount.	Total.	Date of Completion
18	Repiling, repairing and replanking bulkhead along Steuart street, between Piers Nos. 12 and 14.	Mervy-Elwell Co.	Drive, fit and fasten piles furnished by Board at $6.50. Furnish, fit and fasten new lumber at $25 per M ft. (B. M.). Relay old lumber at $6 per M ft. (B. M.).	Aug. 2,'07	Oct. 26,'07 Nov. 15,'07 Nov. 30,'07	$1,421 25 724 47 473 75	$2,619 47	Oct. 10,'07
19	Building a gasoline launch	Stone & Van Bergen	Basis of 15 per cent above a fixed sum of $1,500, *i. e.*, the contractor to receive a profit of $225.	Aug. 2,'07	Sept. 23,'07 Dec. 30,'07	$975 00 1,232 59	2,207 59	Dec. 12,'07
20	Furnishing and installing a 50-horsepower marine engine in launch.	Union Gas Engine Co.	$2,705 00 Plus 76 00	Aug. 2,'07	Oct. 26,'07 Nov. 30,'07	$2,085 75 695 25	2,781 00	Oct. 24,'07
21	Furnishing and installing on State Dredger No. 2 one marine horizontal return tubular boiler.	Eureka Boiler Works Company.	2,675 00	Aug. 8,'07	Oct. 19,'07 Nov. 25,'07	$2,006 25 668 75	2,675 00	Oct. 17,'07
22	Lease to Atchison, Topeka and Santa Fe Railway Company.	(See Contract No. 32, October 4, 1906, Thomson Bridge Company, contractors.)						
23	Still in effect.							
24	Excavation for oil tank on Seawall lot No. 9	Healy, Tibbitts Construction Co.	990 00	Sept. 26,'07	Nov. 8,'07 Dec. 13,'07	$742 50 247 50	990 00	Nov. 7,'07
25	Paving East street, between Lombard and Vallejo streets.	Flinn & Treacy	28¾c. per sq. ft. for new paving. 10c. per sq. ft. for relaying old paving. Including the furnishing and relaying of redwood curbing.	Sept. 26,'07	Nov. 8,'07 Dec. 13,'07 Jan. 15,'08 Feb. 29,'08 Feb. 29,'08 Feb. 29,'08 Apr. 2,'08	$2,916 64 3,322 47 838 95 721 59 192 50 152 50 2,599 88	10,744 53	Feb. 27,'08
26	Curbing and recurbing, paving and repaving East street, between Francisco and North Point streets.	Flinn & Treacy	$1.40 per lin. ft. for new curb in place. 25c. per lin. ft. for resetting curb. 28¾c. per sq. ft. for new paving. 10c. per sq. ft. for old paving.	Oct. 10,'07	Dec. 7,'07 Jan. 15,'08 Feb. 29,'08 Apr. 2,'08	$2,317 12 8,420 07 912 60 3,883 26	15,533 05	Feb. 27,'08

27	Constructing a wharf in Central Basin	Healy, Tibbitts Construction Co.	$3,911 00	Oct. 17, '07	Dec. 7,'07 Jan. 31,'08 Mar. 7, 08	$1,319 96 1,613 29 977 75	3,911 00	Jan. 30,'08
28	Construction of a shed on Pier No. 27 (Lombard Street Wharf).	Mercer-Fraser Co.........	22,475 00	Oct. 24, '07	Dec. 13,'07 Jan. 15,'08 Feb. 7,'08 Feb. 29,'08 April 2,'08	$3,371 25 6,742 50 3,371 25 3,371 25 5,618 75	22,475 00	Feb. 27,'08
29	Still in effect.							
30	Construction and delivery of one locomotive as per Harriman line specifications.	Baldwin Locomotive Works (Williams, Dimond Co., agents).	$15,380 00 Less for Belt Railroad Locomotive No. 1 in part payment. 2,500 00 $12,880 00	Oct. 24, '07	April 17,'08	$12,373 00	12,873 00	Apr. 16,'08
31	Paving East street, between Kearny and Taylor streets.	Eureka Construction Co.	$1.90 for cesspools in place, each. $1.94 per lin. ft. for curbing in place, including curved curbing. 31½c. per sq. ft., for basalt pavement in place.	Nov. 7, '07	Jan. 3,'08 Jan. 31,'08 Mar. 7,'08 Mar. 21,'08 April 24,'08	$14,678 37 12,938 90 10,430 56 189 00 12,745 61	50,982 44	Mar. 19,'08
32	Paving East street to a point north of Folsom street.	C. L. Harney	8¾c. per sq. ft., repaving with old blocks. $1.90 per lin. ft. for stone curbing, including drains. $60 construction of one new drain. $1.50 per lin. ft. for stone sewer pipe.	Nov. 14, '07	Mar. 21,'08 April 11,'08 May 18,'08 June 23,'08	$4,537 50 4,147 12 2,392 46 3,692 36	14,769 44	May 14,'08
33	Furnishing materials and paving a roadway on Center street, east of Illinois street.	Eureka Construction Co.	32c. per sq.ft. for pavement. 30c. per lin. ft. for stone curbing in place.	Nov. 14, '07	Feb. 24,'08 Mar. 30,'08	$5,360 61 1,786 87	7,147 48	Feb. 20,'08
34	Removal of about 2,000 lineal feet of Belt Railroad and replacement with 9-inch girder rail.	Flinn & Treacy	$2 15 per lin. ft. for removing single track. $4.65 per lin. ft. for removing double track. $6.75 per lin. ft. for removing triple track. $125 for each turnout and ground throw. $350 for each crossover.	Dec. 5, '07	Mar. 7,'08 April 11,'08	$6,032 55 2,010 85	8,043 40	Mar. 4,'08

Work Contracted for and Completed Within the Years June 30, 1906, and July 1, 1908—*Continued.*

No.	Description.	Contractors.	Contract Price.	Date of Contract.	Date of Payments.	Amount.	Total.	Date of Completion
35	Furnish materials and construct a Free Market on Seawall lot No. 16.*	Bamford Building Co....	$5,476 00	Dec. 19, '07	Feb. 7,'08	$2,053 50	$2,053 50	Mar. 26,'80
36	Construction of an extension of shed on Clay Street Pier.	Frank Gallagher....	1,225 00	Dec. 19, '07	Mar. 7,'08 Apr. 11,'08	$918 75 306 25	1,225 00	Mar. 5,'08
37	Still in effect.							
38	Construction of shed over Pier No. 3 (Washington Street Wharf.)	Hood & Fann	1,132 00	Jan. 3, '08	Jan. 25,'08 Feb. 29,'08	$849 00 283 00	1,132 00	Jan. 23,'08
39	Construction of two landing floats to be delivered on the water front.	Stone & Van Bergen.....	1,996 00	Jan. 3, '08	Apr. 2,'08 May 18,'08	$1,497 00 499 00	1,996 00	Apr. 2,'08
40	Furnishing and delivering one 2-yard clamshell dredger bucket.	Stockton Iron Works	1,300 00	Jan. 7, '08	Mar. 7,'08	$1,300 00	1,300 00	Mar. 5,'08
41	Alterations on ground floor, south wing, Union Depot and Ferry House.†	McLaughlin & Walsh....	7,300 00	Jan. 16, '08	Feb. 7,'08 Feb. 29,'08 Mar. 14,'08 Apr. 17,'08	$2,737 50 1,642 50 2,107 50 2,162 50	8,650 00	Feb. 27,'08
42	Modification of contract No. 13 for the construction of Section 12 of the seawall.	Healy, Tibbitts Construction Co.						
43	Construction of a wharf along Section 12 of the seawall.	Darby Laydon	1,600 00	Feb. 6,'08	Apr. 2,'08 May 18,'08	$1,200 00 400 00	1,600 00	Apr. 2,'08
44	Laying bituminous pavement on Pier No. 27 (Lombard Street Wharf).	J. W. McDonald, Jr.	$0.11 per sq. ft.	Feb. 6,'08	Mar. 7,'08 Apr. 11,'08	$1,854 13 618 04	2,472 17	Mar. 5,'08
45	Construction of a wharf in Central Basin .	Hyde, Harjes & Co.	1,577 00	Feb. 13,'08	Mar. 21,'08 May 29,'08	$1,182 75 394 25	1,577 00	Mar. 19,'08
46	Laying asphalt wearing surface on bulkhead between Piers No. 19 and No. 21, foot of Filbert street.	J. W. McDonald, Jr.	$0.11 per sq. ft.	Feb. 27,'08	Mar. 21,'08 Apr. 24,'08	$947 56 315 85	1,263 41	Mar. 19,'08
47	Furnishing and installing a fuel oil burning appliance on State Dredger No. 3.	Theo. M. Markle Engineering and Supply Co.	395 00	Feb. 27,'08	Mar. 30,'08 May 4,'08	$296 25 98 75	395 00	Mar. 26,'08

	nut streets.	....	c. per sq. ft. for new pavement. 7½c per sq. ft. for old pavement. $1.40 per lin. ft. for new curbing. 30c. per lin. ft. for resetting curbing. $60 for each cesspool.	Mar. 5,'08	May 4,'08 June 12,'08	$686 75 228 92	915 67	Apr. 30,'08
49	Removing upper landing to Slip 1, Union Depot and Ferry House, and constructing a new one.	Pringle, Dunn & Moscript.	$2,995 00 Plus 128 00 $3,123 00	Mar. 19,'08	May 12,'08 June 12,'08 June 12,'08	$2,246 25 748 75 128 00	3,123 00	May 8,'08
50	Furnishing and installing iron armored conduit on each corner of tower of Union Depot and Ferry House, and placing balance of lights in working order.	Pacific Shipsmithing and Electric Co.	725 00	Mar. 23,'08	Mar. 30,'08	$725 00	725 00	Apr. 30,'08
51	Still in effect.							
52	Still in effect.							
53	Still in effect.							
xx	Construction of two landing floats to be delivered on the water front.‡	Stone & Van Bergen	2,296 00	Mar. 23,'08	May 12,'08 June 12,'08	$1,722 00 574 00	2,296 00	May, '08
xx	Agreement to furnish granite curbing and basalt blocks to be used in repaving East street, between Market and Folsom streets.‡	C. S. Harney	$58 per M for blocks. $1.75 per lin. ft. for curbing.	Mar. 25,'08	May 18,'08 June 23,'08	$2,873 82 3,692 36	6,566 18	June, '08
	Grand total	....	....	....	....	....	$788,276 50	

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*Owing to legal obligations of the contractors this contract has not as yet been settled.

†A bonus of $50 per day was paid for advance completion. Twenty-seven days at $50 per day, $1,350.

‡Informal contract.

Work Contracted for Since June 30, 1906, but Not Yet Completed.

No.	Description.	Contractors.	Contract Price.	Date of Contract.	Date of Payments.	Amount.	Total.
14	Electric current for lighting the Union Depot and Ferry House, and other buildings within the jurisdiction of the Board of State Harbor Commissioners.*	Mutual Electric Light Co.	Arc lights of 2,000 candle power, at the rate of $1.30 per week each, the same to burn from sunset to sunrise each and every night during the seven days of each week. $0.294 per 1,000 watt hours for electric current for incandescent lighting, including the furnishing of incandescent arc lamps, trimming and keeping the same in order.	July 1,'07	July 27,'07	$1,415 00	
					Aug. 16,'07	1,490 00	
					Sept. 23,'07	1,487 92	
					Nov. 25,'07	3,277 64	
					Dec. 20,'07	1,784 85	
					Jan. 21,'08	2,027 09	
					Feb. 25,'08	2,023 14	
					Mar. 21,'08	1,841 79	
					Apr. 22,'08	1,758 48	
					May 22,'08	1,808 43	
					June 23,'08	2,197 20	$21,111 74
29	Supply lumber to the Board of State Harbor Commissioners for one year.†	Hickman & Masterson ..	$15.75 per M feet (B. M.) Cartage $1 per M feet (B. M.) additional.	Nov. 1,'07	Dec. 20,'07	$1,822 55	
					Jan. 21,'08	1,771 42	
					Feb. 25,'08	2,212 63	
					Mar. 21,'08	2,489 35	
					Apr. 22,'08	3,901 88	
					May 22,'08	2,746 42	
					June 20,'08	1,159 65	16,103 90
37	Furnish and deliver fuel oil to the roundhouse of the Belt Railroad.‡	Union Oil Company.....	$1 per barrel..........................	Dec. 19,'07	Feb. 25,'08	$1,143 00	
					Apr. 22,'08	930 00	
					June 23,'08	1,005 00	3,078 00
51	Construction of freight shed on seawall lot No. 11.§	Fann & Hood	$2,905 00	Apr. 16,'08	June 26,'08	$2,178 75	2,178 75
52	Purchasing old lumber from the Board of State Harbor Commissioners.‖	G. A. Love	$2.25 per M feet (B. M.)............... ..	Apr. 20,'08	....	$404 74	404 74
53	Furnish materials and repair East street east of the United Railroads tracks, between Washington and Clay streets.¶	Eureka Construction Co.	$0.08 per sq. ft. for taking up present pavement, grading, preparing roadbed and repave with taken-up blocks. $0.25 per lin. ft. for taking up old curb, raising existing drains and cesspools to proper grade, and reset taken-up curbing. Furnish and construct each new catch-basin for cost plus 10 per cent. Furnish and lay 10-inch stone sewer pipe for cost plus 10 per cent.	Apr. 20,'08	May 29,'08	$2,016 06	2,016 06

54	Furnish all labor and the necessary fastenings for placing stringers, planking and curbing along Section 12 of the seawall.	Mercer-Fraser Co.	$849 00	June 11,'08			
55	Furnishing, delivering, and placing 800 tons, more or less, of rock for raising the southerly end of the breakwater at Fisherman's Wharf.	San Francisco Bay Improvement Co.	$0.98 per ton of 2,000 pounds	June 18,'08			
							$44,893 19

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* Contract awarded July 1, 1907, expiring June 30, 1910.
† Contract expires November 1, 1908.
‡ Contract awarded for three years. Expires January 2, 1911.
§ Contract completed June 26, 1908. 25 per cent of total amount of contract retained for 35 days.
‖ Contract expires April 20, 1909.
¶ Contract completed May 29, 1908. 25 per cent of total amount of contract retained for 35 days.

Statement of Cost of Dredging, by Years, Commencing June 30, 1875.

Fiscal Year Ending—	Salaries of Employes.	Repairs.	Coal.	Ship Chandlery, Water, Etc.	Miscellaneous, Including Docking, Dredgers, Towing, Etc.	Total.	Number of Yards Dredged.	Number of Hours Worked.	Cost per Cubic Yard, Cents.
June 30, 1875	$11,663 97	$10,362 99	$8,639 00	$1.386 64	$1.301 25	$33,835 71	303.429	2,348¾	10.76
June 30, 1876	11,932 98	7,639 43	8,224 04	1,660 85	1.905 74	31,363 19	342,638	2,634	9.15
June 30, 1877	11,980 99	4,041 44	5,971 71	1,582 10	1,676 79	25,253 03	280.197	2,478½	9.01
June 30, 1878	17,188 80	7,372 48	7,754 86	2,666 37	3,032 55	38,214 40	423.654	3,080	9.02
June 30, 1879	26,201 70	14,963 90	11,755 12	5,443 70	1,289 60	60,454 68	843,879	4,694	7.16
June 30, 1880	27,202 59	8,824 19	11,115 11	4,184 65	318 75	51,645 29	749,011	4,323	6.89
June 30, 1881	25,948 49	10,196 63	11,037 15	4,194 44	85 81	51,462 52	732,919	3,962⅓	7.02
June 30, 1882	25,860 00	9,556 57	8,925 33	4,101 10	300 45	48,743 45	639,570	3,639⅕	7.62
June 30, 1883	25,860 01	12,152 06	9,093 05	3,800 58	551 80	51,457 50	635,322	3,776⅕	8.13
June 30, 1884	26,358 00	20,906 35	9,838 60	3,627 45	50 00	60,780 40	643,100	3,663⅕	9.45
June 30, 1885	26,896 24	11,610 58	10,074 34	3,657 64	20 00	52,258 80	680,700	3,652⅕	7.68
June 30, 1886	26,634 65	6,293 18	9,886 55	3,841 02	20 00	46,675 40	678,900	3,758⅕	6.87
June 30, 1887	26,520 00	36,872 40	7,911 49	4,435 62	2,307 48	78,046 99	601,800	3,175⅕	12.97
June 30, 1888	27,787 00	10,264 87	11,339 27	4,154 26	537 30	54,082 70	717,600	3,797½	7.52
June 30, 1889	27,847 00	21,004 76	9,392 65	3,292 77	887 78	62,424 96	536,800	3,010	11.62
June 30, 1890	27,825 87	10,403 04	9,377 93	3,671 54	310 53	51,588 91	645,300	3,298	7.99
June 30, 1891	28,112 45	8,919 66	10,163 75	3,735 55	2,299 40	53,230 81	569,300	3,206⅓	9.35
June 30, 1892	28,151 00	14,121 49	9,545 08	3,736 01	528 12	56,081 70	522,400	3,568	10.73
June 30, 1893	27,655 72	12,858 62	8,596 79	3,533 20	1,362 00	54,006 33	641,400	3,127	8.44
June 30, 1894	28,350 30	17,505 81	8,931 46	3,099 10	471 00	58,357 67	677,200	3,743½	8.75
June 30, 1895	28,516 20	39,226 19	7,959 10	3,683 94	279 00	79,664 43	537,400	2,751	14.823
June 30, 1896	28,493 81	14,132 13	8,713 25	5,208 95	90 88	56,639 02	657,300	3,055	8.617
June 30, 1897	28,515 00	16,519 35	7,118 87	3,411 09	122 00	55,686 31	691,600	3,229	8.051
June 30, 1898	28,910 90	13,611 64	6,986 15	4,550 97	219 15	54,278 81	645,600	2,917	8.407
June 30, 1899	30,967 00	12,490 49	5,874 71	4,559 31	211 40	54,102 91	671,800	2,864	8.053
June 30, 1900	29,319 35	21,239 27	6,808 50	2,985 72	240 95	60,593 79	670.700	2,903	9.034
June 30, 1901	27,720 40	8,332 02	7,603 23	2,480 59	30 00	46,166 24	794,800	3,521½	5.808
June 30, 1902	32,012 05	15,679 90	8,256 21	3,329 91	216 80	59,494 87	810,400	3,808	7.341
June 30, 1903	34,260 50	12,359 60	8,816 91	3,359 58	77 40	58,873 99	856,900	4,367	6.87
June 30, 1904	38,727 10	51,693 10	10,473 26	6,078 04	62 85	107,034 35	1,046,240	4,722	10.23
June 30, 1905	40,043 65	79,291 18	9,134 75	5,113 00	2,287 50	135,870 08	1,159,250	4,993	11.72
June 30, 1906	38,015 70	12,574 12	7,004 74	4,401 56	90 00	62,086 12	924,900	4,389	6.71
June 30, 1907	41,446 40	12,251 50	9,457 34	6,646 18	90 00	69,891 42	1,056,700	4,882	6.61
June 30, 1908	40,656 30	21,218 48	12,159 39	6,709 82	782 00	81,525 99	900,500	4,364	9.053

NOTE.—The increased cost per cubic yard for the year ending June 30, 1908, is due to several different reasons, as given below, viz: 1. Imperative repairs to Dredgers Nos. 1 and 2, including a new boiler for Dredger No. 2 at a cost of $2,675; repairing a boiler on Dredger No 1 which was burnt, costing $725; a new bucket for Dredger No. 2, costing $1,300; repairs to four mud scows. 2. The increased length of haul insisted upon by the Federal authorities to dumping grounds farther out in the bay, thus decreasing the yardage and increasing the cost of towage. 3. Increased cost of fuel.

Building Materials Unloaded and Paying Toll at the Port of San Francisco for the Two Fiscal Years Beginning July 1, 1906, and Ending June 30, 1908.

Exclusive of all materials received via direct rail routes.

Months.	Feet (B. M.) Lumber.	Number of Bricks.	Tons of Gravel, Sand, Ballast, Crushed Rock.	Number of Shingles.	Number of Laths.	Number of Shakes.	Tons of Cement.	Tons of Glass.	Tons of Lime.
1906—July	38,861,692	264,000	324,990	7,945,750	11,468,400	83,000	2,040		1,436
August	39,285,295	671,500	1,309	8,273,750	4,743,550		10,598		1,607
September	49,363,858	678,000	5,227	13,783,500	1,446,150	49,500	4,689		961
October	70,381,039	1,541,500	3,147	40,499,250	1,314,750		18,218		3,034
November	54,279,102	761,500	2,005	27,060,750	4,435,650	164,250	20,863		2,737
December	116,766,656	2,224,000	5,167	24,887,250	1,595,650	1,379,725	1,215		1,748
1907—January	110,010,159	3,527,000	56,218	40,420,750	8,112,850	886,975	6,763	442	2,235
February	63,301,649	1,637,466	7,872	72,922,000	4,923,300	591,125	3,796	481	1,669
March	64,141,900	7,527,540	14,431	5,677,750	86,543,250	43,525	4,843	572	3,173
April	62,834,891	4,108,502	31,113	16,321,250	2,747,700	873,175	843	520	1,688
May	65,830,406	2,763,100	44,855	12,190,500	3,262,100	148,700	4,829	715	2,936
June	33,746,219	1,889,000	21,026	6,132,500	188,000	141,800	1,620	750	4,320
Totals for 1906-1907	768,802,866	27,593,108	517,360	276,115,200	130,781,350	4,361,775	80,317	3,840	27,544
1907—July	23,938,181	3,808,791	16,435	4,755,000	4,503,750	135,000	4,935	926	1,820
August	7,462,396	2,460,000	21,467	7,205,500		95,000	1,208	305	2,681
September	16,897,487	1,956,517	14,229	1,709,593	20,240,000		4,219	130	748
October	29,346,297	2,689,000	15,751	1,398,634	692,000	106,000	1,523	100	3,748
November	26,205,088	2,167,000	16,974	12,945,500	200,000	700	4,482	220	3,406
December	20,638,751	1,670,539	1,380	4,677,000	745,100	10,000	6,230	420	1,254
1908—January	22,019,029	1,690,600	13,009	719,750	953,700	25,000	557	440	2,071
February	24,003,200	2,389,000	14,576	895,000	577,600			500	1,605
March	16,079,750	2,682,000	17,215	6,719,250	1,171,400	650,000	4,313	620	1,655
April	27,900,079	2,027,000	17,494	5,966,250	752,200		900	300	1,497
May	35,024,109	1,837,000	13,233	5,980,750	2,222,400		1,021	760	1,889
June	24,013,466	2,676,000	16,535	2,802,750	3,195,000	194,000	75	640	1,332
Totals for 1907-1908	273,528,373	28,053,847	178,298	55,774,977	35,253,150	1,215,700	29,463	5,361	23,706
Totals for two fiscal years	1,042,331,239	55,646,955	695,658	331,890,177	166,034,500	5,577,475	109,780	9,201	51,250

NOTE.—Reports of building material do not include structural iron and steel, these commodities not being segregated from general merchandise. The brick shown are other than fire brick, *i.e.*, building brick.

Tons of Coal Discharged at San Francisco Over State Wharves for the Fiscal Year—July 1, 1906, to June 30, 1907.

Wharves.		1906.						1907.						Total.
No.	Location.	July.	August.	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April	May.	June.	
	Center Street					100								100
42 and 44	Pacific Mail Docks									3,021				3,021
34	Fremont Street										119			119
32	Beale Street	4,490	929	7,330	19,033	6,822	7,284	5,445	3,578	7,105	15,574	5,615	8,057	91,262
28	Main Street										117		104	221
24	Spear Street										1,867			1,867
20	Steuart Street									4,818			824	5,642
16	Harrison Street													
14	Folsom Street No. 2	22,353	11,641	17,055	14,191	13,135	22,770	15,871	12,676	12,913	14,051	20,417	16,202	193,275
8	Howard Street No. 2	898	831										60	1,789
6	Howard Street No. 1											200		200
4	Mission Street No. 2			3,499	2,364	1,660	1,428	6,674	17,224	10,191	13,589	2,402		59,031
2	Mission Street No. 1									84				84
3	Washington Street					42								42
5	Jackson Street										21			21
9	Broadway No. 1										2,831		1,478	4,309
13	Vallejo Street													
15	Green Street				1,616				5,926		1,887			9,429
17	Union Street No. 1	851												851
19	Union Street No. 2													
21	Filbert Street													
	Section 3, Seawall													
	Section 1, Seawall													
	Section B, Seawall													
	Southern Pacific (discharged over State wharves)	13,668	5,517	3,822	3,781	3,591	6,200	3,679	5,463	6,380	7,831	6,710	7,006	73,648
	Totals	42,260	18,918	31,706	40,985	25,350	37,682	31,669	44,867	44,512	57,887	35,344	33,731	444,911

Tons of Coal Discharged at San Francisco over State Wharves for the Fiscal Year—July 1, 1907, to June 30, 1908.

Wharves.		1907.						1908.						Total.
No.	Location.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	
	Center Street							7,853						7,853
42 and 44	Pacific Mail Docks													
34	Fremont Street													
32	Beale Street	5,536	19,407	10,387	17,727	21,748	22,002	15,645	17,216	17,560	7,035	10,726	6,824	171,813
28	Main Street									1,881	4,495		172	6,548
24	Spear Street													
20	Steuart Street	500												500
16	Harrison Street						16		825	6	50			897
14	Folsom Street No. 2	22,433	11,346	15,652	23,374	19,115	14,095	15,049	10,669	24,406	12,291	13,670	19,591	201,691
8	Howard Street No. 2			150				2,505	8,129	5,358	7			16,149
6	Howard Street No. 1		4,926		50		2,554		68	2,900				10,498
4	Mission Street No. 2	6,362		12,218	15,984	11,624	10,499	9,912	10,832	14,114	10,800	14,611		116,956
2	Mission Street No. 1													
3	Washington Street													
5	Jackson Street													
9	Broadway No. 1		609	7,502				5,335	2,337	3,021	2,858	4,352	788	26,802
13	Vallejo Street				2,223		3,955				3,775	892		10,845
15	Green Street										232	119		351
17	Union Street No. 1											175		175
19	Union Street No. 2								200					200
21	Filbert Street						2,045							2,045
	Section 3, Seawall										260			260
	Section 2, Seawall											3,760		3,760
	Section 1, Seawall				2,335									2,335
	Southern Pacific (discharged over State wharves)	4,194	3,879	3,948	4,136	4,742	2,567	5,332	4,758	3,909	2,267	2,775	4,033	46,540
	Totals	39,025	40,167	49,857	65,829	57,229	57,733	61,631	55,034	73,155	44,070	51,080	31,408	626,218

RECAPITULATION BY MONTHS.

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	Total.
Total for 1906–07	42,260	18,918	31,706	40,985	25,350	37,682	31,669	44,867	44,512	57,887	35,344	33,731	444,911
Total for 1907–08	39,025	40,167	49,857	65,829	57,229	57,733	61,631	55,034	73,155	44,070	51,080	31,408	626,218
Grand totals	81,285	59,085	81,563	106,814	82,579	95,415	93,300	99,901	117,667	101,957	86,424	65,139	1,071,129

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to July 30, 1908.

STEAMERS.

Nationality.	Name.	Net Tonnage, Lloyd's.	Net Tonnage, American.
American	A. G. Lindsay	678	694
American	Aberdeen	394	
American	Acapulco	1,759	
American	Acme	269	
American	Alameda	1,939	
American	Alaskan	5,621	
American	Albion	268	
American	Alcatraz	194	
American	Alcazar	202	
American	American	3,643	
American	Arcata	416	
American	Arctic	277	
American	Argo	112	
American	Argyll	1,880	
American	Arizonan	5,621	
American	Asuncion	1,328	
American	Atlas	1,243	
American	Aurelia	233	
American	Aztec	2,298	
British	Aeon	2,759	3,025
British	African Monarch	2,593	2,865
British	Appalachee	2,426	
British	Asia	2.936	
British	Aymeric	2,789	3,555
French	Amiral Duperre	3,144	
French	Amiral Exelmans	3,144	
French	Amiral Fourichon	3,186	
French	Amiral Hamelin	3,188	
French	Amiral Jaurequiberry	3,144	
French	Amiral Olry	3,564	
German	Abessinia	3,691	5.799
German	Abydos	1,957	
German	Alexandria	3,648	5.747
German	Amasis	2,938	
German	Ammon	2,944	
German	Anubis	3,089	3,853
German	Assuan	3,081	
Japanese	America Maru	3,460	
Norwegian	Admiral Borresen	2,621	2,923
American	Bandon	592	350
American	Barracouta	1,749	
American	Bee	375	
American	Beluga	409	
American	Berkeley	342	
American	Bonita	383	
American	Bowhead	243	
American	Breakwater	793	
American	Brooklyn	216	
American	Brunswick	349	
American	Buckman	1,237	
British	Bankfields	2,399	3,391
British	Barkston	2,744	2,916
British	Belle of Ireland	2,772	3.071
British	Bessie Dollar	2,798	3,682
British	Blackheath	1,708	
British	Boveric	2,841	3,722
British	Buckley	2,466	2.651
American	Californian	3,717	
American	Capistrano	362	
American	Carmel	401	
American	Cascade	339	
American	Casco	359	
American	Celia	115	
American	Centralia	324	
American	Charles Nelson	397	

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

STEAMERS.

Nationality.	Name.	Net Tonnage, Lloyd's.	Net Tonnage, American.
American	Chehalis	421	
American	Chetco	98	
American	Chico	390	
American	Chilkat	98	
American	China	3,186	
American	City of Panama	1,046	
American	City of Para	2,505	
American	City of Peking	3,129	
American	City of Pueblo	1,713	
American	City of Sydney	1,965	
American	City of Topeka	746	
American	Coaster	353	
American	Columbia	1,746	
American	Columbian	5,599	
American	Coquille River	265	
American	Corona	966	
American	Coronado	381	
American	Coos Bay	404	
American	Costa Rica	1,166	
American	Curacoa	895	
American	Czarina	793	
British	Cacique	1,951	
British	Cambrian King	2,315	2,544
British	Camphill	2,846	
British	Capac	1,951	
British	Cape Breton	2,501	
British	Celtic Monarch	1,982	
British	Como	3,313	4.724
British	Condor	1,958	
British	Coptic	2,744	
British	Craighall	2,867	3,159
British	Craigvar	2,874	3,669
French	Caravellas	1,991	
French	Ceylan	5,216	5,211
American	Daisy Freeman	436	
American	Daisy Mitchell	395	
American	Delhi	582	
American	Del Norte	280	
American	Despatch	539	
British	Dakotah	2,593	
British	Daring	135	
British	Doric	2,936	
British	Drumcliffe	2,600	
British	Dumeric	1,210	1,210
German	Denderah	1,960	1,960
American	Edith	1,495	
American	Elizabeth	284	
American	Enterprise	1,681	
American	Eureka	1,399	
American	Eureka	312	
American	Excelsior	261	
British	Earl of Douglas	2,761	3,536
Norwegian	Eir	2,448	2.687
Norwegian	Elsa	2,304	2,549
Norwegian	Erna	957	
American	F. A. Kilburn	458	
American	Fair Oaks	533	
American	Fairhaven	437	
American	Francis H. Leggett	975	
American	Fulton	265	
British	Fitzclarence	2,589	2,947
British	Foreric	2,591	3,119
British	Franklyn	3,161	3.440
Japanese	Fukui Maru	3,087	
Norwegian	Finn	2,707	

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

STEAMERS.

Nationality.	Name.	Net Tonnage, Lloyd's.	Net Tonnage, American.
American	G. C. Lindauer	287	--------
American	George Loomis	402	--------
American	George W. Elder	1,225	--------
American	George W. Fenwick	1,193	--------
American	Governor	2,401	--------
American	Grace Dollar	289	--------
American	Grays Harbor	374	--------
American	Greenwood	144	--------
American	Gualala	158	--------
British	Glenlogan	3,740	5,118
British	Gymeric	2,598	3,144
German	Germanicus	2,575	3,177
American	Hanalei	502	--------
American	Harold Dollar	607	--------
American	Hawaiian	3,651	--------
American	Helen P. Drew	178	--------
American	Hilonian	1,819	--------
American	Homer	331	--------
American	Hoquiam	440	--------
American	Hornet	403	--------
American	Humboldt	689	--------
British	Hatasu	2,160	2,678
British	Hazel Dollar	2,803	3,581
British	Housatonic	2,575	--------
German	Hathor	2,998	--------
German	Hermonthis	3,096	--------
Japanese	Hong Kong Maru	3,447	--------
Norwegian	Haldis	1,193	--------
Norwegian	Hercules	2,439	--------
Norwegian	Hornelen	2,413	2,660
American	Iaqua	459	--------
American	Indiana	2,561	--------
American	Isthmian	3,469	--------
British	India	4,185	--------
British	Indian Monarch	2,818	3,036
British	Inveric	3,113	3,387
British	Irish Monarch	2,792	--------
German	Ilse	929	--------
German	Istria	2,684	--------
German	Itauri	2,941	2,941
American	J. B. Stetson	521	--------
American	J. Marhoffer	334	--------
American	James S. Higgins	249	--------
American	Jeanette	218	--------
American	Jim Butler	343	--------
American	Johan Poulsen	423	--------
Norwegian	Jethou	2,781	3,569
American	Karluk	248	--------
American	Katherine	292	--------
American	Korea	5,651	--------
American	Kvichak	611	--------
British	Kalibia	3,149	3,374
British	Kalomo	3,209	4,058
British	Kelvinbank	2,998	2,998
British	Knight of St. George	2,766	--------
Japanese	Koan Maru	2,145	--------
American	Lakme	404	--------
American	Lansing	3,429	--------
American	Lehua	130	--------
American	Leelanaw	1,377	--------
German	Luxor	2,357	--------
American	M. F. Plant	941	--------
American	Mackinaw	2,050	--------
American	Manchuria	8,750	--------
American	Mandalay	266	--------

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

STEAMERS.

Nationality.	Name.	Net Tonnage, Lloyd's.	Net Tonnage, American.
American	Mariposa	1,939	
American	Marshfield	294	
American	Mauna Kea	940	
American	Maverick	1,118	
American	Mayfair	420	
American	Melville Dollar	921	
American	Meteor	1,565	
American	Mexican	5,598	
American	Minnie E. Kelton	503	
American	Missouri	5,077	
American	Mongolia	8,750	
American	Montara	1,695	
British	M. S. Dollar	2,674	2,699
French	Malte	5,223	
German	Marcellus	2,142	2,675
German	Memphis	2,450	
German	Mera	3,087	
Norwegian	Mathilda	2,623	3,258
American	Nann Smith	1,196	
American	Narwhal	390	
American	National City	221	
American	Navarro	171	
American	Nebraskan	2,824	
American	Nevadan	2,824	
American	Newburg	333	
American	Newport	206	
American	Nome City	597	
American	North Fork	244	
American	Northland	560	
American	Norwood	492	
American	Noyo	229	
American	Nushagak	479	
British	Needles	2,995	
German	Nauplia	2,698	
German	Neko	2,358	2,358
German	Nicaria	2,705	
German	Nicomedia	2,803	3,747
Holland	Nederland	2,588	3,032
Japanese	Nippon Maru	3,442	3,442
Norwegian	Norman Isles	2,190	
American	Ohio	2,072	
American	Olson & Mahony	779	
American	Olympic	454	
American	Oregonian	3,651	
British	Oceano	3,050	3,735
British	Oriana	2,882	4,146
Norwegian	Otta	2,088	
American	Pasadena	236	
American	Peru	2,540	
American	Phœnix	160	
American	Point Arena	172	
American	Pomo	235	
American	Pomona	952	
American	Prentiss	267	
American	President	2,393	
British	Persia	2,744	
British	Pinna	4,099	4,267
American	Queen	1,672	
American	Quinalt	426	
British	Queen Christina	2,804	2,974
American	R. D. Inman	427	
American	Rainier	519	
American	Ramona	671	
American	Ravalli	777	
American	Raymond	471	

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

STEAMERS.

Nationality.	Name.	Net Tonnage, Lloyd's.	Net Tonnage, American.
American	Redondo	586	462
American	Rival	203	--------
American	Roanoke	1,655	--------
American	Robert Dollar	533	--------
American	Roma	2,164	--------
American	Rose City	2,154	--------
American	Rosecrans	1,719	--------
British	Riverdale	2,752	2,905
British	River Forth	2,883	3,652
German	Radames	3,032	3,206
German	Ramses	2,304	--------
Mexican	Ramon Corral	957	--------
Norwegian	Reidar	2,276	--------
Norwegian	Rygja	2,492	3,628
American	Saginaw	400	--------
American	St. Helens	779	--------
American	Samoa	237	--------
American	San Gabriel	312	--------
American	San Jose	1,538	--------
American	San Juan	1,496	--------
American	San Mateo	1,926	--------
American	San Pedro	359	--------
American	Santa Ana	485	--------
American	Santa Barbara	527	--------
American	Santa Cruz	361	--------
American	Santa Maria	3,346	--------
American	Santa Monica	318	--------
American	Santa Rita	3,862	--------
American	Santa Rosa	1,336	--------
American	Santiago	928	--------
American	Saratoga	1,973	--------
American	Scotia	132	--------
American	Sea Foam	205	--------
American	Sehome	615	--------
American	Senator	1,835	--------
American	Sequoia	258	--------
American	Shasta	473	--------
American	Shoshone	341	--------
American	Shua Yak	452	--------
American	Siberia	5,655	--------
American	Sibyl Marston	647	--------
American	Sierra	3,756	--------
American	Signal	392	--------
American	Sintram	1,495	--------
American	Sonoma	3,936	--------
American	South Bay	279	--------
American	South Coast	225	--------
American	Spokane	1,289	--------
American	State of California	1,260	--------
American	Svea	370	--------
British	Saint Helena	2,708	3,083
British	Scottish Monarch	3,267	3,544
British	Selsdon	2,451	--------
British	Seminole	3,797	--------
British	Sheila	2,236	--------
British	Stanley Dollar	2,674	--------
British	Strathavon	2,830	3,008
British	Strathclyde	2,842	--------
British	Strathdon	2,840	3,006
British	Strathfillan	2,816	--------
British	Strathnairn	2,812	3,008
British	Strathord	2,842	3,016
British	Strathspey	2,852	3,018
British	Strathtay	2,850	--------
British	Strathyre	2,841	--------

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

STEAMERS.

Nationality.	Name.	Net Tonnage, Lloyd's.	Net Tonnage, American.
British	Suveric	4,011	6,150
German	Sais	2,668	--------
German	Sakkarah	3,010	3,928
German	Salatis	3,070	4,453
German	Serak	3,015	3,800
German	Serapis	3,068	3,933
German	Setos	3,084	4,492
Japanese	Soyo Maru	2,904	2,904
Norwegian	Sark	2,304	2,549
American	Tahoe	419	--------
American	Tallac	1,103	--------
American	Tamalpais	422	--------
American	Tampico	1,451	--------
American	Temple E. Dorr	453	--------
American	Texan	5,636	--------
American	Thomas L. Wand	413	--------
American	Thrasher	502	--------
British	Tonowando	2,182	--------
British	Tuscarora	3,925	4,439
German	Theben	2,963	--------
German	Tiberius	2,703	2,991
German	Tolosan	2,089	2,195
Japanese	Tenyo Maru	7,265	--------
Norwegian	Tellus	1,612	--------
Norwegian	Terje Viken	2,304	2,543
Norwegian	Thode Fagelund	2,826	3,364
Norwegian	Thor	3,020	--------
Norwegian	Thyra	2,419	2,649
Norwegian	Titania	2,315	--------
Norwegian	Tordenskjold	2,295	2,527
American	Umatilla	2,168	--------
American	Unimak	158	--------
German	Uarda	3,654	3,853
American	Vanguard	228	--------
American	Ventura	3,936	--------
American	Virginian	5,077	--------
British	Vermont	2,722	--------
British	Visigoth	2,613	--------
American	W. S. Porter	3,524	--------
American	Washcalore	303	--------
American	Washington	1,267	--------
American	Wasp	360	--------
American	Watson	1,237	--------
American	Wellesley	665	--------
British	Wellington	1,267	--------
American	Westerner	369	--------
American	Westport	154	--------
American	Whitesboro	144	--------
American	Whittier	798	--------
American	Willapa	347	--------
American	William Bayliss	291	--------
American	William Murphy	673	--------
American	Winnebago	786	--------
American	Yellowstone	456	--------
American	Yosemite	525	--------
American	Yucatan	2,307	--------
British	Yeddo	2,974	3,230
American	Zopo	173	--------

List of Bay and River Steamers of Over 100 Tons Net Registered Measurement Plying Between the Port of San Francisco and Up River Points, and Ferryboats Plying Between East and North Shores.

Name.	Net Tonnage.	Name.	Net Tonnage.
River Steamers.			
A. C. Freese	120	Reform	347
Alvira	253	Resolute	161
Alviso	113	San Joaquin No. 2	134
Arrow	133	San Joaquin No. 3	139
Argonaut	127	San Joaquin No. 4	276
Aurora	222	San Jose	113
Captain Weber	349	Sonoma	177
Caroline	94	St. Helena	222
Champion	240	T. C. Walker	469
City of Dawson	206	Valletta	368
City of Stockton	470	Victory	103
Columbia	456	Zinfandel	204
Constance	194		
Dauntless	349	*Ferryboats.*	
Diamond	117	Bay City	648
F. M. Smith	101	Berkeley	978
Fort Bragg	264	Cazadero	897
General Frisbie	289	Claremont	570
Gold	184	Fernwood	570
Grace Barton	119	Garden City	730
H. J. Corcoran	418	James M. Donohue	400
H. E. Wright	342	Newark	833
Herald	147	Oakland	902
Isleton	331	Ocean Wave	263
J. D. Peters	502	Piedmont	908
Juliette	102	San Francisco	578
Leader	220	San Jose	588
Mary Garratt	458	San Pablo	881
Monticello	90	Sausalito	903
Napa City	126	Tamalpias	929
Onisbo	331	Thoroughfare	667
Onward	260	Tiburon	634
Pride of the River	391	Transit	1,079
Potrero	320	Ukiah	1,206

NOTE.—The bay and river steamers listed above make many trips to San Francisco, some of them averaging a trip daily.

The ferryboats belong to transportation companies operating to transbay points, and make appoximately 170 trips and carry over 100,000 passengers daily.

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908.

SAILING VESSELS.

Nationality.	Name.	Ships, Net Tonnage.	Barks, Net Tonnage.	Barkentines, Net Tonnage.	Brigs, Net Tonnage.	Schooners, Net Tonnage.
American	A. B. Johnson					460
American	A. F. Coats					541
American	A. J. Fuller	1,673				
American	A. J. West					483
American	A. M. Baxter					430
American	Abbie					139
American	Advance					265
American	Advent					399
American	Agate		595			
American	Albert		624			
American	Albert Meyer					398
American	Alden Besse		813			
American	Alexander Gibson	2,043				
American	Alex. T. Brown					654
American	Alice Cooke		288			
American	Alice Knowles					605
American	Alice McDonald		624			
American	Allen A.					267
American	Aloha					743
American	Alpena					833
American	Alpha					274
American	Alumna					644
American	Alvina					687
American	Amazon			1,105		
American	Americana					839
American	Amy Turner		901			
American	Andrew Hicks		863			
American	Andrew Welch					188
American	Andy Mahoney					495
American	Annie Johnson		977			
American	Annie Larsen		288			
American	Annie M. Campbell		977			
American	Antelope		1,380			
American	Arago			476		
American	Archer			845		
American	Ariel					684
American	Aryan	1,939				
American	Aurora			1,070		
British	Adderley		1,147			
British	Alice A. Leigh		2,817			
British	Allerton	1,938				
British	Altair		2,287			
British	Annesley		1,591			
British	Antiope		1,380			
British	Arracan		2,222			
British	Arrow		2,971			
Chilean	Andromeda		1,176			
French	Alice	2,192				
French	Alice Marie		1,959			
French	Andre Theodore	2,418				
French	Anne de Bretagne		1,571			
French	Armen		2,016			
French	Asnieres		2,715			
German	Adolf	1,630				
American	B. P. Cheney	1,200				
American	Balboa					651
American	Balclutha	1,554				
American	Bangalore	1,560				
American	Bangor					399
American	Benjamin F. Packard	2,014				
American	Berlin	1,416				
American	Bertie Minor					231
American	Berwick					95
American	Bessie K.					93

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

SAILING VESSELS.

Nationality.	Name.	Ships, Net Tonnage.	Barks, Net Tonnage.	Barkentines, Net Tonnage.	Brigs, Net Tonnage.	Schooners, Net Tonnage.
American	Beulah					339
American	Big Bonanza		1,399			
American	Bohemia	1,529				
American	Borealis					683
British	Balmoral		2,449			
British	Barfillan	2,108				
British	Battle Abbey		1,465			
British	Beacon Rock	1,789				
British	Blackbraes	2,116				
French	Belen		1,987			
French	Biarritz	2,252				
French	Boieldieu		1,981			
French	Bossuet		1,954			
French	Bonchamp		1,949			
French	Brenn		1,950			
French	Bretagne		1,914			
French	Brizeux		1,963			
Italian	Blanche	1,485				
American	C. A. Thayer					391
American	C. D. Bryant		823			
American	C. S. Holmes					409
American	C. T. Hill					133
American	Camano					631
American	Carondolet		1,292			
American	Carrier Dove		635			
American	Cecilia Sudden					545
American	Centennial			1,139		
American	Charles E. Falk					246
American	Charles E. Moody	1,915				
American	Charles B. Kenny		1,014			
American	Charles F. Crocker					763
American	Charles Hansen					183
American	Charles R. Wilson					328
American	Charmer		1,728			
American	Chehalis		642			
American	Churchill					600
American	City of Papeete			370		
American	Columbia	1,328				
American	Columbia					58
American	Commerce					62
American	Compeer					30
American	Coquelle					9
American	Comet					36
American	Coronado			1,007		
American	Czarina					21
British	Carmanian		1,773			
British	Caradog		1,351			
British	Castle Rock	1,787				
British	Celtic-burn		2,500			
British	Clan Galbraith		1,983			
British	Comet		2,890			
British	Crown of Germany		2,154			
British	County of Inverness		1,613			
French	Cambronne		1,633			
French	Charles Gounod		1,960			
German	Christel	1,698				
Swedish	Clan Macfarlane	1,436				
American	David Evans					74
American	Defender					38
American	Diamond Head		952			
American	Dora Bluhm					31
British	Daylight		3,599			
British	Donna Francisca		2,163			
British	Drummuir		1,798			

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

SAILING VESSELS.

Nationality.	Name.	Ships, Net Tonnage.	Barks, Net Tonnage.	Barkentines, Net Tonnage.	Brigs, Net Tonnage.	Schooners, Net Tonnage.
British	Dunearn		1,533			
British	Dunfremline		2,773			
British	Durbridge	2,121				
British	Dynomene	1,809				
French	Duquesne	1,926				
American	E. B. Jackson					615
American	E. K. Wood					447
American	Echo			650		
American	Edward May		860			
American	Edward R. West					762
American	Edward Sewell	2,916				
American	Electra		940			
American	Emily F. Whitney	1,207				
American	Emily Reed	1,466				
American	Emma Claudina					186
American	Encore			573		
American	Endeavor					485
American	Ensign					522
American	Eric					498
American	Espada					686
American	Esther Buhne					245
American	Ethel Zane					408
American	Euterpe		1,247			
American	Eva					263
American	Expansion					91
British	Earl of Dunmore		2,205			
German	Edmund		2,914			
Italian	Elisa	1,463				
American	F. M. Slade					650
American	F. S. Redfield					371
American	Falls of Clyde		1,748			
American	Fanny Dutard					252
American	Ferris S. Thompson		480			
American	Fortuna					138
American	Forest Home					682
American	Fort George		1,705			
American	Fred J. Wood					601
American	Fresno		1,149			
American	Fullerton			1,494		
British	Fulwood	1,986				
French	Francois d'Amboise		1,741			
American	G. W. Watson					397
American	Galilee				329	
American	Gamble					626
American	Gardiner City			451		
American	Gazelle					151
American	George Curtis		1,680			
American	George C. Perkins			369		
American	George E. Billings					1,103
American	Georgiana			870		
American	Gerard C. Tobey		1,389			
American	Gleaner			393		
American	Glen					121
American	Glendale					281
American	Glory of Seas	1,939				
American	Golden Shore					626
American	Gotoma					189
American	Governor Robie	1,481				
American	Guide					137
British	Gantock Rock	1,556				
British	Garnet Hill		2,149			
British	Glenmark		1,250			
British	Grenada		2,106			
French	Gael		1,949			

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

SAILING VESSELS.

Nationality.	Name.	Ships, Net Tonnage.	Barks, Net Tonnage.	Barkentines, Net Tonnage.	Brigs, Net Tonnage.	Schooners, Net Tonnage.
French	General de Boisdeffre		1,960			
French	General de Negrier		1,946			
French	General Faidherbe		1,904			
French	General Foy		1,973			
French	Guerver		2,228			
German	Gertrud	1,627				
Mexican	General Banning					169
American	H. C. Wright					276
American	H. D. Bendixen					571
American	H. K. Hall					1,105
American	Halcyon					279
American	Harriet G.			188		
American	Hawaiian Isles	1,974				
American	Hecla		1,435			
American	Helene					828
American	Henry Failing	1,824				
American	Henry Villard	1,453				
American	Henry Wilson					403
American	Hieano					93
American	Himalaya		976			
American	Homeward Bound		1,987			
American	Honoipu					520
American	Hugh Hogan					355
British	Howard B. Troop	2,080				
British	Hutton Hall	1,989				
British	Hyderabad	2,110				
French	Helene Blum	2,154				
American	Ida McKay					179
American	Ida Schnauer					205
American	Inca					902
American	Indiana	1,413				
American	Invincible					1,365
American	Irmgard			615		
American	Isaac Reed		1,489			
American	Ivy					135
American	J. B. Brown		1,407			
American	J. H. Lunsmann					952
American	J. M. Weatherwax					365
American	Jabez Howes	1,494				
American	James A. Garfield					300
American	James Drummond	1,415				
American	James H. Bruce					476
American	James Johnson			993		
American	James Nesmith		1,633			
American	James Rolph					517
American	Jeanette					217
American	Jessie Minor					220
American	John A.					235
American	John C. Meyer			794		
American	John D. Spreckels					254
American	John F. Miller					170
American	John G. North					320
American	John Palmer			1,080		
American	John Smith			526		
American	John & Winthrop		321			
American	Joseph L. Eviston			662		
American	Joseph Russ					235
British	Juteopolis		2,652			
French	Jane Guillon		1,717			
French	Jean		1,944			
French	Jean Bart		1,981			
French	Joinville		1,946			
American	Kaiulani		1,430			
American	Kenilworth	2,147				

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

SAILING VESSELS.

Nationality.	Name.	Ships, Net Tonnage.	Barks, Net Tonnage.	Barkentines, Net Tonnage.	Brigs, Net Tonnage.	Schooners, Net Tonnage.
American	King Cyrus					631
American	Klikatat			438		
American	Kohala			776		
American	Koko Head			1,011		
American	Kona					643
British	Kentmere		2,347			
British	Kildalton		1,591			
British	Kilmeny		1,469			
British	Kynance	1,799				
American	Lahaina			994		
American	Lehua					129
American	Lettitia					234
American	Levi G. Burgess	1,475				
American	Lillebonne					208
American	Lily					135
American	Lizzie Prien					91
American	Lizzie Vance					383
American	Llewellyn J. Morse	1,271				
American	Louis					819
American	Lucile	1,298				
American	Ludlow					643
American	Lurline				336	
American	Lyman D. Foster					602
British	Latimer	1,649				
British	Leyland Brothers	2,238				
British	Lord Templeton		2,048			
British	Lyndhurst		2,249			
French	L'Hermite		1,946			
French	La Banche		2,100			
French	La Perouse		1,913			
French	La Rouchefoucauld		1,949			
French	La Rouchejaquelein		1,954			
French	La Tour d'Auvergne		1,948			
French	Leon Blum		2,316			
American	Mabel Gale					619
American	McLaurin	1,313				
American	Makaweli			821		
American	Manga Reva		2,052			
American	Manila					647
American	Marconi					638
American	Marion Chilcott	1,511				
American	Martha W. Tuft					165
American	Mary Dodge					231
American	Mary E. Foster					839
American	Mary Winkelman			482		
American	Mathilda					(scow) 92
American	Melrose					542
American	Mildred					412
American	Minnie A. Caine					779
American	Mohican		785			
American	Mono					(scow) 126
American	Monterey					1,694
American	Muriel					483
British	Madagascar		1,996			
British	Milverton	2,070				
British	Monkbarns	1,771				
British	Musselcrag		1,871			
French	Marechal de Turenne		1,939			
French	Marie Madeleine		1,285			
French	Marie Molinos		1,715			
French	Michelet		1,965			
German	Magdalene		3,686			
Norwegian	Mashona		2,303			
Swedish	Medea		1,021			

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

SAILING VESSELS.

Nationality.	Names.	Ships, Net Tonnage.	Barks, Net Tonnage.	Barkentines, Net Tonnage.	Brigs, Net Tonnage.	Schooners, Net Tonnage.
American	Newark					115
American	Nokomis					462
American	North Bend					358
American	Novelty					584
French	Neuilly		1,923			
French	Notre Dame d'Arvor		2,232			
American	O. M. Kellogg					331
American	Oakland					383
American	Oceania Vance					385
American	Okanogan					606
American	Oliver J. Olsen					596
American	Olympic		1,354			
American	Omega			522		
American	Oregon					304
American	Orient					297
American	Oriental	1,551				
American	Ottilie Fjord					248
Russian	Ocean		1,239			
American	Pactolus		1,564			
American	Palmyra		1,223			
American	Paramita	1,444				
American	Phillipine					491
American	Planter			499		
American	Polaris					717
American	Premier					292
American	Prosper					513
American	Prosper					229
British	Palgrave	3,078				
British	Pass of Killiecrankie		1,609			
British	Poltalloch		2,139			
British	Pythomene	1,796				
French	Pierre Antonine		2,030			
Norwegian	Prince George	1,768				
Norwegian	Prince Robert		2,654			
American	Queen					240
British	Queen Victoria		1,587			
American	R. C. Slade					601
American	R. P. Rithet		1,043			
American	R. W. Bartlett					474
American	Radfield					371
American	Repeat					411
American	Retriever			471		
American	Reuce	1,601				
American	Rita Newman					120
American	Robert R. Hind					520
American	Robert Lewers					669
American	Rosamond					985
American	Roderick Dhu					1,453
American	Roy Somers					299
American	Ruby					306
American	Rufus E. Wood		1,301			
British	Radiant	1,845				
British	Rhuddlan Castle	1,993				
French	Rene		1,976			
French	Rochambeau		2,311			
German	R. C. Rickmers		4,696			
Italian	Regina Elena		2,148			
American	S. D. Carleton	1,671				
American	S. G. Wilder			558		
American	S. N. Castle			465		
American	S. T. Alexander					695
American	Sailor Boy					316
American	St. David	1,476				
American	St. James		1,453			

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

SAILING VESSELS.

Nationality.	Name.	Ships, Net Tonnage.	Barks, Net Tonnage.	Barkentines, Net Tonnage.	Brigs, Net Tonnage.	Schooners Net Tonnage.
American	St. Katherine		1,090			
American	St. Paul	1,824				
American	Salem					698
American	Salvatore					386
American	San Buenaventura					172
American	Santa Clara	1,454				
American	Santa Paula					632
American	Santiago		928			
American	Sausalito					626
American	Sea King		1,361			
American	Sea Witch	1,172				
American	Sequoia					324
American	Servia	1,736				
American	Shasta					(scow) 91
American	Shenandoah	3,154				
American	Sintram	1,495				
American	Skagit			443		
American	Snow & Burgess					1,529
American	Solano					692
American	Sophie Christenson					570
American	Soquel					698
American	Sotoyome					398
American	Spokane					571
American	Standard	1,461				
American	Stanley					253
American	Star of Alaska	1,554				
American	Star of Bengal		1,694			
American	Star of Chile		874			
American	Star of England		1,705			
American	Star of France	1,522				
American	Star of India		1,247			
American	Star of Italy	1,474				
American	Star of Peru		976			
American	Star of Russia	1,898				
American	Susie M. Plummer					808
British	Samoena	1,869				
British	Scottish Glens	1,999				
French	Surcouf		1,947			
Italian	Speme		1,134			
American	Tacoma	1,672				
American	Tam O'Shanter			562		
American	Thomas P. Emigh			923		
American	Tidal Wave		497			
American	Transit					497
American	Triton					150
American	Tropic Bird			330		
American	Two Brothers*	1,263				
British	Talus	1,954				
British	Tweedsdale		1,402			
French	Touraine		1,778			
American	U. S. C. Justin†	2,249				
American	Videtta		566			
American	Vine					222
American	Virginia					541
American	Volante					119
French	Vendee		1,765			
French	Versailles		1,740			
French	Ville du Havre		2,446			
American	W. B. Flint		746			
American	W. H. Dimond			376		
American	W. H. Marston					1,110
American	Wallacutt					674

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* Now a barge.

† United States collier.

List of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

SAILING VESSELS.

Nationality.	Name.	Ships, Net Tonnage.	Barks, Net Tonnage.	Barkentines, Net Tonnage.	Brigs, Net Tonnage.	Schooners, Net Tonnage.
American	Watson A. West					747
American	William G. Irwin			331		
American	William H. Smith	1,785				
American	William Olsen					491
American	William Renton					377
American	Willie R. Hume			589		
American	Willscott		1,856			
American	Wing & Wing					135
American	Winslow					497
American	Wrestler			409		
British	Walden Abbey	1,754				
British	Wanderer		2,717			
British	Waterloo	1,792				
British	Wayfarer	1,935				
British	Whitlieburn	1,875				
British	Wiscombe Park	2,075				
British	Wray Castle	1,791				
British	Wynford		1,859			
American	Zampa					322

Summary of Ocean Vessels Docking at the Port of San Francisco from July 1, 1906, to June 30, 1908.

Nationality.	Total Number of Steamers.	Percentage of Foreign Shipping Compared to American.	Total Tonnage.	Percentage of Foreign Tonnage Compared to American.
American	233	60.83	274,710	39.96
British	76	19.83	207,250	30.15
French	9	2.35	31,800	4.62
German	34	8.87	93,791	13.64
Holland	1	0.28	2,588	0.37
Japanese	7	1.82	25,750	3.75
Mexican	1	0.28	957	0.14
Norwegian	22	5.74	50,627	7.37
Totals	383	100.00	687,473	100.00

Nationality.	Ships.	Barks.	Barkentines.	Brigs.	Schooners.	Total.	Total Tonnage.	Percentage of Foreign Tonnage Compared to American.
American	48	55	40	2	182	327	253,153	48.64
British	29	38				67	134,058	25.76
Chilean		1				1	1,176	0.23
French	5	45				50	98,961	19.02
German	3	3				6	16,251	3.12
Italian	2	2				4	6,230	1.20
Mexican					1	1	169	0.03
Norwegian	1	2				3	6,725	1.29
Russian		1				1	1,239	0.24
Swedish	1	1				2	2,457	0.47
Totals	89	148	40	2	183	462	520,419	100.00

NOTE.—It must be understood that the above report does not show the total number of arrivals during the term specified, as the large majority of these vessels are steadily plying to San Francisco. The object of the list is to show the nationality and the tonnage of all vessels arriving here, accrediting to each vessel one arrival only.

The following table is a complete list of the United States men-of-war, torpedo boats, colliers, tugs, transports, and revenue cutters arriving at the Port of San Francisco for the two years ending June 30, 1908:

List of United States Government War Vessels Entering the Port of San Francisco from July 1, 1906, to June 30, 1908, including Class and Date of Arrival.

Name.	Class.	Date of Arrival.
Milwaukee	Armored cruiser	July 19, 1906
Milwaukee	Armored cruiser	July 29, 1906
Boston	Protected cruiser	Aug. 17, 1906
Marblehead	Cruiser	Sept. 11, 1906
Chicago	Protected cruiser	Sept. 26, 1906
Charleston	Protected cruiser	Oct. 10, 1906
California	Armored cruiser	Oct. 13, 1906
Wisconsin	Battleship	Oct. 18, 1906
Princeton	Gunboat	Oct. 21, 1906
Chicago	Protected cruiser	Oct. 21, 1906
California	Armored cruiser	Oct. 22, 1906
Boston	Protected cruiser	Nov. 5, 1906
California	Armored cruiser	Nov. 7, 1906
California	Armored cruiser	Nov. 12, 1906
South Dakota	Armored cruiser	Dec. 23, 1906
Yorktown	Gunboat	Jan. 27, 1907
Princeton	Gunboat	Feb. 7, 1907
Milwaukee	Armored cruiser	Apr. 5, 1907
Milwaukee	Armored cruiser	Apr. 27, 1907
Boston	Protected cruiser	May 21, 1907
Milwaukee	Armored cruiser	May 27, 1907
Milwaukee	Armored cruiser	June 3, 1907
Princeton	Gunboat	June 13, 1907
Albany	Protected cruiser	Aug. 17, 1907
St. Louis	Protected cruiser	Sept. 2, 1907
Raleigh	Protected cruiser	Sept. 6, 1907
Chicago	Protected cruiser	Sept. 15, 1907
Milwaukee	Armored cruiser	Sept. 18, 1907
Charleston	Protected cruiser	Sept. 19, 1907
Pennsylvania	Armored cruiser	Sept. 27, 1907
Maryland	Armored cruiser	Sept. 27, 1907
West Virginia	Armored cruiser	Sept. 27, 1907
Colorado	Armored cruiser	Sept. 27, 1907
Yorktown	Gunboat	Oct. 8, 1907
West Virginia	Armored cruiser	Nov. 27, 1907
Pennsylvania	Armored cruiser	Nov. 27, 1907
Maryland	Armored cruiser	Nov. 27, 1907
Colorado	Armored cruiser	Nov. 27, 1907
California	Armored cruiser	Dec. 8, 1907
Nebraska	Battleship	Dec. 11, 1907
St. Louis	Protected cruiser	Dec. 11, 1907
Milwaukee	Armored cruiser	Dec. 11, 1907
California	Armored cruiser	Dec. 11, 1907
California	Armored cruiser	Jan. 7, 1908
Nebraska	Battleship	Jan. 9, 1908
Buffalo	Scout cruiser	Jan. 11, 1908
California	Armored cruiser	Jan. 19, 1908
Nebraska	Battleship	Feb. 18, 1908
Nebraska	Battleship	Feb. 20, 1908
West Virginia	Armored cruiser	Feb. 20, 1908
Maryland	Armored cruiser	Feb. 20, 1908
Washington	Armored cruiser	Feb. 20, 1908
Tennessee	Armored cruiser	Feb. 20, 1908
Yankton	Tender	Mar. 9, 1908
St. Louis	Protected cruiser	Mar. 13, 1908
Charleston	Protected cruiser	Mar. 13, 1908
Milwaukee	Armored cruiser	Mar. 13, 1908
California	Armored cruiser	Mar. 29, 1908
Washington	Armored cruiser	Mar. 29, 1908
Tennessee	Armored cruiser	Mar. 29, 1908

List of United States Government War Vessels Entering the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued*.

Name.	Class.	Date of Arrival.
Albany	Protected cruiser	Apr. 3, 1908
Relief	Hospital ship	Apr. 7, 1908
South Dakota	Armored cruiser	Apr. 18, 1908
Buffalo	Scout cruiser	Apr. 12, 1908
Relief	Hospital ship	Apr. 25, 1908
Panther	Repair ship	Apr. 29, 1908
Nebraska	Battleship	May 1, 1908
California	Armored cruiser	May 4, 1908
Colorado	Armored cruiser	May 4, 1908
Maryland	Armored cruiser	May 4, 1908
Pennsylvania	Armored cruiser	May 4, 1908
South Dakota	Armored cruiser	May 4, 1908
Tennessee	Armored cruiser	May 4, 1908
West Virginia	Armored cruiser	May 4, 1908
Washington	Armored cruiser	May 4, 1908
Relief	Hospital ship	May 5, 1908
Connecticut	Battleship	May 6, 1908
Kansas	Battleship	May 6, 1908
Louisiana	Battleship	May 6, 1908
Vermont	Battleship	May 6, 1908
Georgia	Battleship	May 6, 1908
Virginia	Battleship	May 6, 1908
New Jersey	Battleship	May 6, 1908
Rhode Island	Battleship	May 6, 1908
Minnesota	Battleship	May 6, 1908
Ohio	Battleship	May 6, 1908
Maine	Battleship	May 6, 1908
Missouri	Battleship	May 6, 1908
Alabama	Battleship	May 6, 1908
Illinois	Battleship	May 6, 1908
Kentucky	Battleship	May 6, 1908
Kearsarge	Battleship	May 6, 1908
Nebraska	Battleship	May 6, 1908
Wisconsin	Battleship	May 6, 1908
Culgoa	Supply ship	May 6, 1908
Glacier	Supply ship	May 6, 1908
Panther	Repair ship	May 6, 1908
Relief	Hospital ship	May 6, 1908
Yankton	Tender	May 6, 1908
South Dakota	Armored cruiser	May 16, 1908
Yorktown	Gunboat	May 24, 1908
Missouri	Battleship	May 26, 1908
Ohio	Battleship	May 29, 1908
Buffalo	Scout cruiser	May 29, 1908
Minnesota	Battleship	May 31, 1908
Connecticut	Battleship	May 31, 1908
Kansas	Battleship	May 31, 1908
Louisiana	Battleship	May 31, 1908
Vermont	Battleship	May 31, 1908
Relief	Hospital ship	May 31, 1908
West Virginia	Armored cruiser	June 14, 1908
Maryland	Armored cruiser	June 14, 1908
Washington	Armored cruiser	June 15, 1908
South Dakota	Armored cruiser	June 15, 1908
Tennessee	Armored cruiser	June 15, 1908
California	Armored cruiser	June 15, 1908
Georgia	Battleship	June 20, 1908
Illinois	Battleship	June 23, 1908
New Jersey	Battleship	June 26, 1908
Wisconsin	Battleship	June 26, 1908
Nebraska	Battleship	June 28, 1908
Kentucky	Battleship	June 28, 1908
Paul Jones	Torpedo boat destroyer	July 29, 1906
Paul Jones	Torpedo boat destroyer	Sept. 22, 1906
Preble	Torpedo boat destroyer	Sept. 26, 1906
Paul Jones	Torpedo boat destroyer	Oct. 21, 1906
Paul Jones	Torpedo boat destroyer	Oct. 22, 1906
Paul Jones	Torpedo boat destroyer	Nov. 12, 1906

List of United States Government War Vessels Entering the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

Name.	Class.	Date of Arrival.
Preble	Torpedo boat destroyer	Feb. 1, 1907
Paul Jones	Torpedo boat destroyer	Apr. 21, 1907
Preble	Torpedo boat destroyer	June 4, 1907
Preble	Torpedo boat destroyer	Dec. 13, 1907
Perry	Torpedo boat destroyer	Mar. 12, 1908
Preble	Torpedo boat destroyer	Mar. 14, 1908
Whipple	Torpedo boat destroyer	May 6, 1908
Hopkins	Torpedo boat destroyer	May 6, 1908
Hull	Torpedo boat destroyer	May 6, 1908
Lawrence	Torpedo boat destroyer	May 6, 1908
Truxton	Torpedo boat destroyer	May 6, 1908
Steuart	Torpedo boat destroyer	May 6, 1908
Farragut	Torpedo boat	June 10, 1908
Perry	Torpedo boat destroyer	June 10, 1908
Preble	Torpedo boat destroyer	June 10, 1908
Iroquois	Tug	Mar. 2, 1907
Fortune	Tug	May 3, 1908
Saturn	Collier	Aug. 10, 1906
Saturn	Collier	Sept. 21, 1906
Saturn	Collier	Jan. 21, 1907
Saturn	Collier	Feb. 11, 1907
Saturn	Collier	Feb. 23, 1907
Saturn	Collier	April 30, 1907
Saturn	Collier	Sept. 3, 1907
Saturn	Collier	Nov. 15, 1907
Pinta	Collier	Nov. 15, 1907
Justin	Collier	Nov. 23, 1907
Saturn	Collier	Dec. 15, 1907
Saturn	Collier	Jan. 22, 1908
Justin	Collier	Feb. 16, 1908
Saturn	Collier	Mar. 13, 1908
Justin	Collier	Mar. 21, 1908
Alexander	Collier	April 12, 1908
Culgoa	Collier	April 27, 1908
Ajax	Collier	May 6, 1908
Saturn	Collier	June 3, 1908
Justin	Collier	June 6, 1908
Sherman	Transport	July 14, 1906
Sheridan	Transport	July 27, 1906
Thomas	Transport	Aug. 18, 1906
Sherman	Transport	Sept. 29, 1906
Lawton	Transport	Oct. 14, 1906
Logan	Transport	Oct. 17, 1906
Thomas	Transport	Nov. 11, 1906
Sheridan	Transport	Nov. 22, 1906
Buford	Transport	Nov. 22, 1906
Slocum	Transport	Nov. 22, 1906
Sherman	Transport	Dec. 27, 1906
Logan	Transport	Jan. 15, 1907
Thomas	Transport	Feb. 13, 1907
Sherman	Transport	Mar. 16, 1907
Dix	Transport	April 3, 1907
Logan	Transport	April 13, 1907
Thomas	Transport	May 15, 1907
Sherman	Transport	June 8, 1907
Logan	Transport	July 17, 1907
Buford	Transport	July 28, 1907
Warren	Transport	Aug. 3, 1907
Crook	Transport	Aug. 5, 1907
Thomas	Transport	Aug. 11, 1907
Sherman	Transport	Sept. 16, 1907
Logan	Transport	Oct. 15, 1907
Buford	Transport	Oct. 28, 1907
Crook	Transport	Oct. 28, 1907
Thomas	Transport	Nov. 22, 1907
Sherman	Transport	Dec. 13, 1907
Buford	Transport	Jan. 17, 1908
Thomas	Transport	Feb. 13, 1908

List of United States Government War Vessels Entering the Port of San Francisco from July 1, 1906, to June 30, 1908—*Continued.*

Name.	Class.	Date of Arrival.
Sherman	Transport	Mar. 17, 1908
Buford	Transport	April 19, 1908
Crook	Transport	May 8, 1908
Thomas	Transport	May 10, 1908
Sherman	Transport	June 25, 1908
Hugh McCulloch	Revenue cutter	Oct. 26, 1906
Thetis	Revenue cutter	Nov. 24, 1906
Hugh McCulloch	Revenue cutter	Jan. 6, 1907
Thetis	Revenue cutter	Feb. 19, 1907
Daniel Manning	Revenue cutter	Sept. 28, 1907
Bear	Revenue cutter	Feb. 24, 1908
Daniel Manning	Revenue cutter	Mar. 19, 1908
Hugh McCulloch	Revenue cutter	Mar. 23, 1908
Daniel Manning	Revenue cutter	May 31, 1908
Daniel Manning	Revenue cutter	June 16, 1908
Daniel Manning	Revenue cutter	June 28, 1908

List of Foreign War Vessels Arriving at the Port of San Francisco from July 1, 1906, to June 30, 1908.

Name.	Nationality.	Date of Arrival.
Dogalie	Italian	August, 1906
Dogalie	Italian	October, 1906
Almirante Grau	Peruvian	April, 1908

PART III

OFFICIAL REPORTS.

REPORT OF THE ASSISTANT STATE ENGINEER.

San Francisco, California, October 27, 1908.

To the Honorable the Board of State Harbor Commissioners,
Ferry Building, San Francisco, California.

Gentlemen: Prior to June 1, 1908, the engineering work of the portion of the harbor of San Francisco which is under the jurisdiction of the Board of State Harbor Commissioners was in charge of a Chief Engineer, who was appointed by the Board. On the above date the work was put in charge of an Assistant State Engineer, who is appointed by the State Engineer, under the authority vested in him by act, approved March 11, 1907, which creates a department of and for the State of California, known as the Department of Engineering.

For the purpose of this report, I shall divide the work into the following heads:

1. Seawall.
2. Bulkhead Wharves.
3. Piers.
4. East Street.
5. Belt Railroad.
6. Dredging.

Seawall.—On June 1, 1907, there existed along the water front of San Francisco 10,600 feet of seawall. All of this seawall, with the exception of Section 13, is north of Mission Street, and extended from that point to the foot of Jones Street. Section 13, which is 600 feet in length, extends from Second Street northerly.

On June 13, 1907, the contract for constructing Section 12, extending northerly 1,000 feet from the north end of Section 13, was let, and same was completed June 4, 1908.

At the writing of this report plans and specifications were being drawn for the construction of Section 11, to extend 600 feet northerly from the northerly end of Section 12.

All of the above seawall is constructed on the same plan with the exception of Sections 8*a* and 8*b*, which form part of the foundations of the Union Depot and Ferry House at the foot of Market Street.

The method of construction is as follows:

First a trench about 100 feet in width is dredged to the hard bottom, or as near it as practicable. Then into this trench rock is dumped, said rock varying in weight from five pounds to several tons, for the core or main portion of the wall. Then on top and on the water side of this core is placed an armor of larger rock varying in size from one to four cubic feet, this armor being hand laid above low water.

This kind of a seawall is not entirely satisfactory. Its principal faults being that it allows the free flow of the tide through it which carries away the fill behind the wall, and makes it difficult to maintain the thoroughfare thereon. It also is faulty from the fact that it is difficult to obtain a foundation which will prevent the settlement of the wall by the method described above. All of the seawall with the exception of Sections 8*a* and 8*b* have settled considerably, taking down with it the wharves which it supports and causing much inconvenience and unsightliness. It will be my policy to recommend the construction in future of a seawall which shall be impervious to the tides, and shall have a foundation in which no settlement will occur.

Bulkhead Wharves.—Upon the seawall above described, bulkhead wharves are constructed. Up to 1907 these bulkhead wharves were constructed of creosoted piles spaced ten feet apart in both directions, upon which are placed heavy caps and stringers, and upon the stringers heavy planking was laid.

The planking where it is exposed to the wear of traffic is extremely shortlived, and the expense of maintenance is therefore very great.

To overcome this difficulty I have recommended, and the Board has adopted, a type of concrete and steel bulkhead, having an asphalt wearing surface. About 200 feet of this construction was placed on the seawall between Piers 19 and 21 at the foot of Union Street. The seawall at this point was constructed thirty years ago, and it is safe to assume has reached the limit of settlement. A contract has been let for the construction of 600 feet of similar bulkhead on Section 12 of the seawall.

Piers.—There are practically two kinds of piers in existence on the water front of San Francisco. One is the pier resting on creosoted piles and comprises the remains of the old work, completed previous to the use of the Howard Holmes patent. The other comprises the piers resting on piles protected by concrete according to Mr. Holmes' patent. There are in all twenty-eight piers on the water front, about evenly divided between the two classes of construction.

Those of the first kind are very hard to maintain, and it has been the policy of the Board for a long time to construct all new piers on the patented piles. Consequently, the remaining old piers are in a bad condition, only being repaired in such a manner as to keep them in a usable state until it is feasible to replace them with more permanent structures. The piers of the second kind are nearly all in good condition. In a few cases the wooden superstructure is beginning to succumb to age, and in a few instances the concrete cylinder piers have failed and fallen from their position. This latter failure is undoubtedly due to the practice of placing the concrete for a considerable portion of the bottom of the cylinder under water, without any special device to prevent a separation of the ingredients.

Mr. Holmes' method of supporting piers consists of piles and protecting same from the sea worms by a large concrete cylinder. There are several faults to be found with this method as it has been applied on the water front of San Francisco, which I have tried to remedy in the new work projected.

1. The dependence for vertical support on a pile with a large concrete protecting cylinder is, I think, bad. In cases where there is no hard bottom within a reasonable distance from the surface, the large and heavy concrete cylinder loads the pile greatly before the superstructure is added, thereby decreasing its efficiency.

In cases where there is a hard stratum at not too great a depth, which the concrete cylinder can rest upon, the pile becomes superfluous. In the design of each pier the conditions obtaining at the particular point where it is to be located should be ascertained, and the structure proportioned in accordance therewith. There can be no one design which will be suitable for all the varying conditions along the water front of San Francisco. Consequently, in the design of the new piers, 38 and 40, which are now under way, exhaustive soundings were taken at the site. These showed that at a depth of about fifty feet below the proposed floor of the piers there occurred a stratum of stiff clay and sand which is very difficult to penetrate with a pile. It was decided that this soil was capable of safely supporting a load of 10,000 pounds per square foot, and the pier foundations were proportioned accordingly. Actual test loads have been applied, which show that the soil will support 30,000 pounds without settlement. This assures us that there will be no settlement of the foundations.

2. The practice of placing concrete under water, above mentioned, is overcome by excavating the mud and water from the entire depth of the cylinder which has been sunk to the hard stratum. The concrete is then placed in the cylinder under conditions which insure a good result.

3. Heretofore the tops of the cylinders have had no lateral bracing. and trouble has been caused by the movement of the cylinders. In the new design there is a heavy knee brace connecting the cylinder to the superstructure, giving lateral stiffness to the structure.

4. In all the present piers the girders supporting the floor have either been wood or steel protected from the elements. In the new design these will be steel protected by concrete.

5. All of the present wharves have a wooden floor. In two instances this floor is protected by a wearing surface of bitumen or asphalt. The floor without protection wears out very rapidly, making its maintenance expensive. When it is protected by an asphalt wearing surface, the maintenance is very slight, and the planking is preserved to some extent; but there is the drawback of the very slippery surface for teaming. This is serious for the necessity for starting heavy loads. In Piers 38 and 40 the floor is reinforced concrete slab, protected by an asphalt wearing surface on the sides of the pier, and having a broad roadway for teams, paved with vitrified paving brick.

6. The sheds for these new piers are to be steel frames enclosed with reinforced concrete walls and roof, and to have rolling steel shutters for all door openings. This makes them entirely fireproof.

Belt Railroad.—Prior to June 1, 1907, the roadbed of the Belt Railroad consisted of various weights of rails, the heaviest being 65 pounds per yard. These were laid on ties without ballast, and were a continuous source of annoyance and expense. Owing to the fact that the Belt Railroad main tracks extend along East Street, a street which is necessarily subjected to a great deal of heavy traffic, it was necessary to plank the roadbed on account of the impossibility of paving up to a low rail, such as was in use. Also, the increasing weight of cars, and the increase of traffic, necessitating heavier engines, made it imperative that a heavier track be adopted. Therefore, I recommended the adoption of a heavy grooved rail of sufficient depth to allow paving blocks to be laid against it, same to be laid on ties having for their support a bed of crushed rock eight inches in depth. This construction was adopted by the Board, and up to the close of the fiscal year about 3,000 feet of track has been rebuilt. The work of rebuilding the balance is progressing, and in a short time all of the track which extends along East Street will have been completed.

The motive power in use on the Belt Railroad consists of three locomotives. Previous to 1907 these locomotives were using coal for fuel. Early in that year the same were changed to oil burners, thus effecting great economy in the cost of fuel and in time necessary for coaling. A reinforced concrete oil tank, with a capacity of 72,000 gallons, was constructed as a storage place for the necessary fuel.

East Street.—Previous to 1907 the paved portion of the water front thoroughfare, known as East Street, extended from Folsom Street on the south to Dupont Street on the north. The paving has been extended northerly to the foot of Taylor Street, giving easy access at all seasons to Sections A, B, 1 and 2 of the seawall and the property adjacent thereto. In addition to the new paving, all of the old paving has been raised to grade and relaid, insuring good drainage for the street.

Dredging.—The dredging plant belonging to the State consists of two towboats, six bottom dump mud scows, and three dredging machines. Of the dredging machines one is a small dredger handling a 1¼-yard bucket; one is larger, handling a 2-yard bucket; and the third is a modern machine, handling a 3½-yard bucket. It was found that, with three machines working at perhaps widely separated points on the water front, the two towboats could not serve them properly, and much time was lost by the dredgers waiting for the boats.

The extension of the water front, and the construction of new piers and seawall adding greatly to the dredging necessary, it became imperative to increase in some way the capacity of the plant. This was accomplished by discontinuing the use of the smaller machine, which cost as much to operate as the large one and only handled about one half as much material, and installing on the towboats and on the largest dredger electric light plants, and working this machine twenty-four hours every day instead of eight hours as heretofore. This plan has proven very efficacious and the dredging on the water front is now well in hand.

Respectfully submitted.

RALPH BARKER,
Assistant State Engineer.

REPORT OF W. H. DAVIS, ATTORNEY FOR THE BOARD OF STATE HARBOR COMMISSIONERS.

SAN FRANCISCO, CALIFORNIA, July 1, 1908.

To the Honorable the Board of State Harbor Commissioners,
Ferry Building, San Francisco, California.

GENTLEMEN: I beg leave to submit herewith my report as Attorney for the Board of State Harbor Commissioners for the period beginning July 1, 1906, and ending June 30, 1908.

It has been my custom, while I have been acting as Attorney for the Board, to attend all of its meetings and thus expedite, as much as possible, the general business which has been brought to the Board's attention.

During the past two years I have rendered many opinions upon a great variety of subjects which have been presented for my consideration, and upon many more questions I have given my verbal opinion. The multiplicity of legal questions arising makes a knowledge of the general business affairs of the water front indispensable to the Board's Attorney, and therefore I have to a considerable extent kept in close touch with the policies of the Board and its administrative details.

I have referred in my previous reports to the practical impossibility of giving accurate and detailed statements of all matters presented to me, and I shall refer herein to only the most important of such questions.

Sewers Across East Street.—The question arose whether or not the Board was, under the law, compelled to maintain the city sewers crossing under East Street from the west line thereof to the Bay of San Francisco.

The Board of Public Works requested the Board of Harbor Commissioners to make certain needed repairs. I gave the Board my opinion that under the law it was not compelled to do so. This opinion was later concurred in by the City Attorney.

Fire Insurance.—The rates of fire insurance were generally raised by the insurance companies after the conflagration of 1906, and for a time it seemed impossible to renew the insurance upon the property of the State under your jurisdiction, which was about to expire, at the rate provided by law, to wit: two per cent for a three-year term. I advised you that you could not legally pay a greater rate. The matter, however, has been satisfactorily adjusted by the renewal of this insurance at the above specified rate.

Collapse of a Portion of Lombard Street Wharf.—R. D. Hume & Company made a claim for loss of merchandise by reason of the collapse of the above wharf on the 27th of December, 1906. I advised you that you were not liable for this damage under the circumstances as presented to me. The claim has never been renewed.

Contest Over the Office of Harbor Commissioner.—In the latter part of October, 1906, John G. Mattos, Jr., presented a commission from the Governor of the State, purporting to appoint him as a member of this Board in place of John D. Mackenzie. Mr. Mackenzie brought an action against said John G. Mattos, Jr., Charles H. Spear, and Henry J. Crocker, in which a permanent injunction was asked enjoining them from recognizing the validity of the appointment of Mr. Mattos. The temporary injunction, which was issued at the time of the filing of the complaint, was on November 13, 1906, by Hon. J. M. Seawell, Judge of the Superior Court of the State of California in and for the City and County of San Francisco, made permanent on the ground that the term of office of Mr. Mackenzie had not expired.

Transfer of Assignments of Property or Space Upon the Water Front. The transfer of assignments of space upon the water front without the consent or authority of the Board has been of frequent occurrence, and the question of the validity of such transfers was presented to me. I rendered an opinion to the effect that all transfers of assignments of space and all trafficking in privileges granted by the Board are void.

India Basin Act.—The Legislature of the State, by act approved March 12, 1907, passed what was known and designated as the "India Basin Act." The question as to the constitutionality of this act was presented to me. Owing to the omission of certain words in Section 5 of said act relating to the creation of a sinking fund for the payment of principal and interest, the language therein was plainly unintelligible, and the act in itself did not provide ways and means to pay and discharge the principal of the indebtedness which the act created. I was forced to render my opinion that on this account the act was unconstitutional and void. This omission or defect was the oversight of those who had charge of the passage of the bill before the Legislature. An identical act was, however, reënacted with the necessary corrections at the extra session of the Legislature in 1907. The opinion of your Attorney was concurred in by the Attorney-General.

Woodward Act.—Complaints were made to the Board in September, 1907, that dealers in fish on Fisherman's Wharf were discriminating against certain intending purchasers. I gave the Board my opinion that such discriminations were illegal. After numerous hearings the matter was regulated to the satisfaction of all concerned, and no further complaints have been made.

Controversy With the State Department of Engineering.—In November, 1907, the State Engineer presented bills to the Board for services of draughtsmen in connection with the work on plans for the ferry booth and also plans for altering the south wing of the Ferry Building. I gave to the Board my opinion that under the act creating the Department of Engineering these bills should be paid by said Department of Engineering.

Improvements in Central Basin.—The shipbuilding interests of the city which have been accustomed to use the waters of Central Basin for launching of vessels protested against the building of wharves therein, upon the ground that such construction would interfere with the safe launching of vessels constructed at the various shipping yards in that locality; and furthermore made the claim that it was the intention of the Legislature that this Basin should be used solely for such purposes, and that the improvements contemplated by the Board were illegal. I rendered my opinion to the effect that the claims of the shipbuilding interests were untenable, and that there was no legal objection to the improvement of Central Basin by constructing wharves, even though such construction inconvenienced the shipbuilding interests existing in that locality.

Extension of Fairway.—At your request I have prepared rules providing for the extension of what is known as the "fairway," or that portion of the bay within which the anchoring of vessels is prohibited.

Oil in the Bay.—The increase in the use of oil as fuel upon steamers navigating the waters of the bay has led to many complaints being made that fuel oil is dumped into the bay, and that some portion of the oil thus floating adheres to the piling and wharves and increases the danger of fire on the water front. The laws, as they exist, provide for the punishment of offenses of this character, and the cases which were investigated have indicated to the offenders that future violation of the law in this respect will be severely dealt with. The prompt action on the part of the Board in taking cognizance of such violations of the law has caused the discontinuance of this practice.

Regulation of East Street.—During the early part of 1908 the Board undertook to enforce regulations providing for the uninterrupted approach to the Ferry Building, and exit therefrom, of those using this portion of the State's property. An attempt to enforce this regulation against newsboys, vendors, and others was met with resistance, and the regulations of the Board were openly defied, particularly by the newsboys. The city police, aided the special officers employed by the Board to the fullest extent possible, but neither the District Attorney of the City and County of San Francisco nor the police courts gave any aid whatever: in fact, these two departments of the city government openly expressed their disapproval of the action of this Board in attempting to provide for the comfort and safety of the users of the Ferry Building in this respect. To the end that there might be no ground on the part of the police courts and the District Attorney for refusal to aid the Board in this direction, your Attorney, at your request, prepared and presented to the Board of Supervisors an ordinance regulating peddlers, hucksters, and vendors of various sorts doing business within close distance of ferries, railway stations, and other public places. This proposed ordinance was referred to the Police Committee of the Board of Supervisors and was reported favorably, with however a minority report. Upon the consideration of the proposed ordinance by the Board of Supervisors itself, the same met with overwhelming defeat. The evening newspapers of the City and County of San Francisco were active in their opposition of this proposed ordinance, with the above result. Without such, or a similar ordinance of the City and County of San Francisco, or without the enactment of some laws by the Legislature of the State, it seems impossible to enforce regulations of the character herein referred to.

Belt Railroad.—Your Attorney is occasionally called upon to defend employés of the Board upon the Belt Railroad for manslaughter on account of fatal accidents attending the operation of the Belt Railroad. During the last two years there have been but two fatal accidents, and in both instances the employees of the Board were dismissed by the police courts of the city.

Dumping Refuse Into the Bay.—The practice of dumping refuse into the bay had become quite common, and a great many arrests for so doing were made, with the result that a few convictions served to put a stop to the practice.

Free Market.—The contractor for the construction of the Free Market, the Bamford Building Company, met with difficulty in settling with the laborers and materialmen under said contract. In consequence thereof, the moneys due thereunder were, by this Board, held beyond the time prescribed in the contract for the payment of said sums. After numerous consultations with the creditors and their attorneys, the matter was adjusted by all agreeing to pro rate their claims, with the result that the Board was freed of all liability under said contract and all proceedings in court were obviated.

Channel Street Jurisdiction.—In December, 1907, by direction of the Board, I brought action in the name of the People of the State, upon the relation of the Board, against Southern Pacific Company, City Savings Bank of Santa Cruz, and the Estate of Harvey C. Somers, deceased, to determine whether or not the Board has jurisdiction over a strip of land thirty feet wide adjoining the waterway on the north side of Channel Street, between Fifth and Sixth Streets.

These actions are now at issue and will be brought to trial shortly.

General Litigation.—During the past two years but one action has been brought against the Board. Walter G. Hopkins and Clarence R. Gillcrest, on October 26, 1906, brought an action against the Board, asking that the Board be enjoined from interfering with the use by them of a portion of Mission Street Wharf. The action was without merit, and was dismissed before any appearance was made by the Board.

Respectfully submitted.

W. H. DAVIS,
Attorney for the Board.

REPORT OF EXPERT ACCOUNTANT.

San Francisco, California, October 24, 1908.

To the Honorable the Board of State Harbor Commissioners,
Ferry Building, San Francisco, California.

Gentlemen: The examination of the books and accounts of the Board of State Harbor Commissioners has been made by me for the two years ending June 30, 1908, and I find the general condition of accounts as follows:

CASH ACCOUNT.

On the early morning of July 1, 1908, I balanced the cash and found—

Cash receipts		$79,362 84
Pay roll items unpaid		147 75
		$79,510 59
Coin disbursements for urgent repair	$1,363 81	
Cash remitted to State Treasurer	74,052 36	
Coin and exchange	3,305 37	
Pay rolls, part payment	510 00	
Credit toll not collected	10 65	
Sundry paid accounts not entered	268 40	
		$79,510 59

SAN FRANCISCO HARBOR IMPROVEMENT FUND.

June 30, 1906, to June 30, 1908.

Cr.

June 30, 1906—Balance in the fund		$295,209 20
June 30, 1908—Total monthly remittances to State Treasurer, 24 months		2,245,071 42
Loan voted by State Legislature		250,000 00
Draft returned and canceled		183 90
		$2,790,464 52

Dr.

June 30, 1908—Sight drafts drawn on State Treasurer 2 years to date	$2,312,266 10	
Deferred payment drafts paid	196,328 18	
Monthly transfers to San Francisco Depot Sinking Fund of $4,631, 24 months	111,144 00	
Monthly transfers to San Francisco Seawall Sinking Fund	48,037 33	
Part principal on State loan of $250,000	50,000 00	
Interest paid State at 4%—One year	10,000 00	
		2,727,775 61
Balance on hand June 30, 1908		$62,688 91

I am indebted to the State Controller, A. B. Nye, for a statement giving the balance of this account:

June 30, 1908—State Controller's balance	$53,257 98
Add part of June receipts remitted in July	26,070 24
	$79,328 22
Less long standing difference of	04
	$79,328 18
Less outstanding drafts	16,639 27
	$62,688 91

SAN FRANCISCO DEPOT SINKING FUND.

Only the monthly transfers for the account of this fund appear on the books of this department, and I am indebted to the State Treasurer, W. R. Williams, for a statement of its condition, of which the following is a synopsis:

Cr.

July 1, 1906—By total transfers from San Francisco Harbor Improvement Fund for account of principal and interest	$709,591 00
July 1, 1906—Total interest on United States bonds	96,500 00
July 1, 1908—Total interest on United States bonds	32,650 00
United States 4 per cent bonds, 1907, matured	70,000 00
July 1, 1908—Total transfers for principal and interest, 24 months at $4,631	111,144 00
	$1,019,885 00

Dr.

July 1, 1906—To total principal and interest paid to this date	$699,144 63	
Nov. 13, 1906—To purchase of United States 4% bonds of 1925	90,000 00	
Nov. 13, 1906—To premiums at 132	28,800 00	
Nov. 13, 1906—To expense of purchase	498 50	
Sept. 20, 1907—To purchase of United States 4% bonds of 1925	85,000 00	
Sept. 20, 1907—To premiums at 127½	23,375 00	
Sept. 20, 1907—To expense of purchase	124 10	
May 22, 1908—To purchase of United States 4% bonds of 1925	24,500 00	
May 22, 1908—To premiums at 120½	5,022 50	
May 22, 1908—To expense of purchase	103 00	
June 30, 1908—To total interest paid, 24 months	48,000 00	
		$1,004,567 73
Balance not invested		5,317 27
United States 4% bonds of 1925 on hand		464,500 00
Total held for account of principal of bonds $600,000, due January 1, 1912		$469,817 27

SAN FRANCISCO SEAWALL FUND.

Cr.

March 22, 1906—By sale of 250 bonds, face value of $1.000		$261,850 00

Dr.

June 30, 1908—To amount of drafts drawn from beginning to date		101,317 29
Balance in fund		$160,532 71
Sacramento balance per favor of State Controller	$161,169 46	
Less draft No. 30 outstanding	636 75	
		$160,532 71

SAN FRANCISCO SEAWALL SINKING FUND.

The subjoined is also data furnished by the State Treasurer, not being contained in the books of this Department:

Cr.

June 30, 1906—By balance on hand		$7,672 28
Jan. 17, 1908—By interest on bonds purchased		449 50
June 30, 1908—By 24 installments for account of principal and interest		48,037 33
		$56,159 11

Dr.

Oct. 25, 1907—To Oakland city 4½% bonds purchased	$20,000 00	
Oct. 25, 1907—To accrued interest on same	251 50	
Oct. 25, 1907—To premiums on same	310 40	
June 24, 1908—To San Diego city, 4½% bonds purchased	10,000 00	
June 24, 1908—To accrued interest on same	27 50	
June 30, 1908—To interest on bonds sold, paid quarterly	20,000 00	
		50,589 40
Balance on hand		$5,569 71
Interest on bonds purchased due but uncollected		449 00

INVESTMENTS.

City of Oakland municipal improvement 4½% bonds	$20,000 00
City of San Diego municipal improvement 4½% bonds	10,000 00

Bonds sold, $250,000, redeemable by lot December 31, 1914, up to January 2, 1924.

Remarks.—It must be understood that the Sinking Funds are under the sole control of the State Treasurer, this Department being only party to the monthly transfers from the San Francisco Harbor Improvement Fund to defray interest and installments of principal as called for by acts of the State Legislature.

In the matter of the $600,000 bonds floated for account of the San Francisco Depot Sinking Fund, the baneful effects of a carelessly drafted act of the Legislature has been from time to time strikingly apparent, *i. e.*, making no provision for redeeming bonds before the maturity, January 2, 1912, and making it imperative that the installments of principal be invested in United States bonds, which command a high premium. These evils have occasioned a heavy loss—vide statement of this fund wherein premiums of

$1.32 on	$90,000	$28,800 00
$1.27½ on	85,000	23,375 00
$1.20½ on	24,500	5,022 50
	$199,500	$57,197 50

Compare also these figures with the statement of the Seawall Sinking Fund, wherein the investment of monthly accumulations is made in bonds of California cities bearing 4½% interest. Take as a basis of calculation the amount of United States bonds now in the fund, $464,500 bearing 4% interest, and say an arbitrary average of difference between United States bonds and California cities of 20%, brings the amount of loss up to $92,900; but the shrinkage in value of United States 1925 bonds between the present date and the time of maturity, January 2, 1912, will easily make it over $100,000.

On the date of the maturity of the $600,000 bonds, January 2, 1912, I estimate that the San Francisco Depot Sinking Fund will stand as follows:

June 30, 1908—Amount invested in United States bonds, 1925	$464,500 00
June 30, 1908—Cash balance on hand	5,317 27
June, 1908, to January 2, 1912—Interest on bonds, 42 months at 4%	65,030 00
Jan. 2, 1912—42 monthly installments of principal of $2,631	110,502 00
Estimated premium on $464,500 bonds—say 15%	69,675 00
	$716,024 27
Amount of bonds sold	600,000 00
Surplus on January 2, 1912	$116,024 27

The other financial statements embodied in your biennial report have been carefully examined by me, and I find they are in strict consonance with the books and accounts of the department.

I am, gentlemen,

Yours faithfully,

JULIAN B. HARRIES,
Certified Public Accountant.

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REPORT AND RECOMMENDATIONS

OF THE

JOINT COMMITTEE ON HARBORS

APPOINTED BY THE

LEGISLATURE OF THE STATE OF CALIFORNIA

MARCH 14, 1907

With an Appendix Containing Reports from the Harbors of the State

SACRAMENTO:
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING.
1908.

COMMITTEE:

Senator LEROY A. WRIGHT
Senator E. I. WOLFE
Senator T. J. KENNEDY
Assemblyman WALTER LEEDS
Assemblyman PERCY JOHNSON
Assemblyman LOUIS STROHL

REPORT.

To the Legislature of the State of California:

On March 14, 1907, the Legislature adopted the following Senate Concurrent Resolution No. 3:

> Whereas, The constant increasing commerce of the ports of California demands greater facilities for the handling of shipping; and
>
> Whereas, The interests of the entire State are affected by the harbors of the State, be it
>
> *Resolved*, That a special committee of six members be appointed from the Legislature of the State of California, consisting of three members from the Senate, to be appointed by the President thereof, and three members from the Assembly, to be appointed by the Speaker thereof, to investigate the conditions of the harbors of the State and to make recommendations for legislation necessary to be enacted at the next session of the Legislature;
>
> *Resolved*, That it is the sense of the Legislature that the report should be comprehensive in all respects, and that it should include not only existing conditions and facilities, but also recommendations for financing future permanent improvements;
>
> *Resolved*, That the said joint committee shall have the power to subpœna witnesses and to send for persons and papers, and to issue subpœnas when necessary;
>
> *Resolved*, That the necessary traveling and incidental expenses of said joint committee shall be paid out of the contingent expenses of the respective houses.

At the sixth semiannual meeting of the Counties Committee of the California Promotion Committee, held at Coronado, San Diego County, on December 15, 1906, a resolution was adopted asking for the appointment of a legislative committee to inquire into the conditions and needs of the harbors of the State of California, and to report a comprehensive plan to the Legislature for the improvement of said harbors in order to facilitate commerce. In compliance with this action the above concurrent resolution was adopted by the Legislature of 1907, and Senators Leroy A. Wright, E. I. Wolfe, and T. J. Kennedy, and Assemblymen Walter Leeds, Percy Johnson, and Louis Strohl were appointed on such joint committee by the presiding officers of the respective houses.

All the members of the committee attended sessions held at San Francisco, Los Angeles, San Diego, Oakland, Eureka, Port San Luis, and Newport Beach, making personal examination of the present physical conditions and consulting with the officials of the various ports as to the work that can be properly done by the State in the way of permanent improvements. Joint meetings have been held with the Harbor Commissioners of San Francisco, Los Angeles, San Diego, and

Eureka, at which present conditions were exhaustively inquired into. There have also been consultations with Engineers Luther Wagoner and Col. W. H. Heuer, U. S. A., representing the Federated Harbor Improvement Association of San Francisco, and also with officials and members of commercial bodies at Oakland, San Diego, San Pedro, Port San Luis, Newport Beach, and Los Angeles. In its work of informing itself the committee has been aided by officials and residents at all the ports visited, and facts and theories have been cheerfully furnished, even at points where State assistance at the present time is not practicable.

SAN FRANCISCO.

In San Francisco, one of the important world ports, the committee found such a congestion of shipping and freight that the facilities provided through the indebtedness already incurred for the accommodation of vessels and the handling of freight, even though the moneys have been judiciously and economically expended, are entirely inadequate to provide for the rapidly increasing business with the countries across the Pacific, as well as that of the coast trade along the line of the two Americas. As the leading port on the west coast of North America, San Francisco has continued the work of the earlier years in improvements of the harbor, and only of comparatively recent date has there been the idea of permanency in the construction of piers and docks. Where world ports of less importance than San Francisco have had millions of dollars expended in permanent improvements, especially those in European countries that have been made to meet the demands of future generations, the San Francisco Harbor Commissioners have been compelled to be most frugal in their expenditures for much needed improvements, having at their command only hundreds of thousands of dollars where there should have been millions. Much has been done from the earnings, and in addition payments have been made annually on principal and interest, to lessen the amount secured by loans and the issue of bonds.

Having faith in themselves, their State, and their harbors, Californians have not realized to the fullest extent the importance of permanent improvement of their ports, and, as a consequence, much of the money expended has been for work of a temporary character, the short life of which will imperatively demand future appropriations to replace what has been done. In the matter of piers, docks, seawalls, and bulkheads there is no longer excuse for experimentation. The needs of the future, even the distant future, are known and should be anticipated.

All the piers and docks excepting two, the Pacific Mail docks, are owned and operated by the State. There are thirty-one of these projecting piers, and in addition there are 6,629 lineal feet of bulkhead wharfage, making an aggregate length of 25,229 lineal feet of wharfage. The average cost of maintenance during the past five years has been approximately $170,000 a year, not including dredging. Your committee understands the annual cost to include all fixed charges and the reduction of indebtedness. At the present time the actual indebtedness amounts to $1,525,672.95, of which sum $125,672.95 is what is known as "deferred payment," which will be cleared in 1911. Payment of $50,000, with 4 per cent interest, will clear the $250,000 borrowed from the school fund after the San Francisco disaster. The sum of $600,000, known as the depot bond issue, will expire in 1911 and disappear from the indebtedness. Of the seawall fund of $2,000,000, authorized bonds, the sum of $250,000 was issued in 1906, and in 1908 the further amount of $500,000 was issued. The remaining $1,250,000 will be issued as needed in the work of extending the seawall which is now under construction. The income of the port provides for all the fixed charges, being the current expenses and the redemption fund and interest.

Your committee will not enter into the cost of piers and docks, owing to the diversified form of construction, the variation in cost being from 50 cents to $2.90 a square foot. By referring to the answer to question 10 in the report of the San Francisco Harbor Commissioners this matter of cost can be studied in detail. It will be found, in comparing the cost and the length of life of piers, that the cheaper kind is the more expensive. One kind has an average life of only a few years, while the concrete structures have indefinite durability extending into generations. The concrete docks and piers are in good condition, needing but little in the way of repair, while the wooden ones are in range, as to condition, from good to the verge of collapse, according to the few years they have been in use.

The present dockage is inadequate. The seawall should be immediately extended from the union depot to pier 42, a distance of 5,160 feet, which work is being built under the $2,000,000 bond issue already authorized. One thousand feet of this wall extending northerly from pier 42 is nearing completion. There should follow the reconstruction of at least twelve of the old piers, and an addition of four new ones. That these should be constructed of cement follows from the mere fact that existing piers are now ready to be replaced by new ones. This work will eventually cost $5,000,000. In addition to the accommodation of shipping, with its attendant income, there will follow the reclaiming of seawall lots and property valued at more than $2,000,000. It will be noticed that of the $2,000,000 in bonds authorized for the extension of the seawall there remains at the present time the sum of $1,250,000 that is yet to be sold as required.

The pierhead line should be redrawn to include the whole of China Basin, followed by twelve or more piers to serve the Potrero and Mission sections. The old piers north of the ferry house must be modernized at a cost of over $2,000,000. A seawall should be extended westerly from Taylor and East streets to the government reservation at Black Point, thus acquiring valuable seawall lots and pier sites, demanded by the commercial extension along North Beach. The whole of this work done in a permanent manner will cost approximately $20,000,000.

The dockage charges at San Francisco are moderate, and compare favorably with those of any other port in the world (see answers to questions 20 and 21 in report of San Francisco Harbor Commissioners).

It has been said that San Francisco is one of the important ports of the world. This may be seen from the imports and exports for the fiscal year ending June 30, 1907. There were shipped to foreign ports 1,613,822 tons of freight; to domestic ports, 2,744,776 tons, making a total of 4,358,648 tons during the year. The average imports for five years amounted to 3,506,395 tons a year. During the year ending December 31, 1907, 6,900 steam and 748 sail vessels docked at the port of San Francisco, having a total of 4,615,603 tonnage. Of these vessels 3,963 steam and 729 sail were deep seagoing.

One feature in the dockage system of San Francisco deserves especial notice—the ownership by the State of the belt railroad connecting the numerous warehouses and factories around the bay front with the transbay railroads. During the year 1907 over 50,000 cars were handled by the belt line, a uniform rate of $2 having been charged for this service. As shippers know, the average railroad charge for switching at terminal points is in the neighborhood of $5 a car. The extension of the seawall will naturally demand the enlargement of the belt line facilities, as new piers and warehouses will necessitate the extension of the rails of communication.

The Harbor Commissioners of San Francisco call attention to a state of affairs requiring legislative action. Existing laws hold the Harbor Commissioners responsible for any abuse of State property, but do not give that board sufficient control over the same for the abatement of nuisances. The Harbor Commissioners also call attention to the necessity for the enactment of laws compelling the Pilot Commission to make its report to the Governor of the State, or to the State Legislature, and also to the wisdom of a material reduction of pilot charges. It has been suggested that pilots be placed on monthly salaries instead of fees, and that a nominal charge be made against incoming and outgoing vessels. The present pilot charges are as follows:

"All vessels under 500 tons, $3 per foot draught; all vessels over 500 tons, $3 per foot draught and 3 cents per ton for each and every ton

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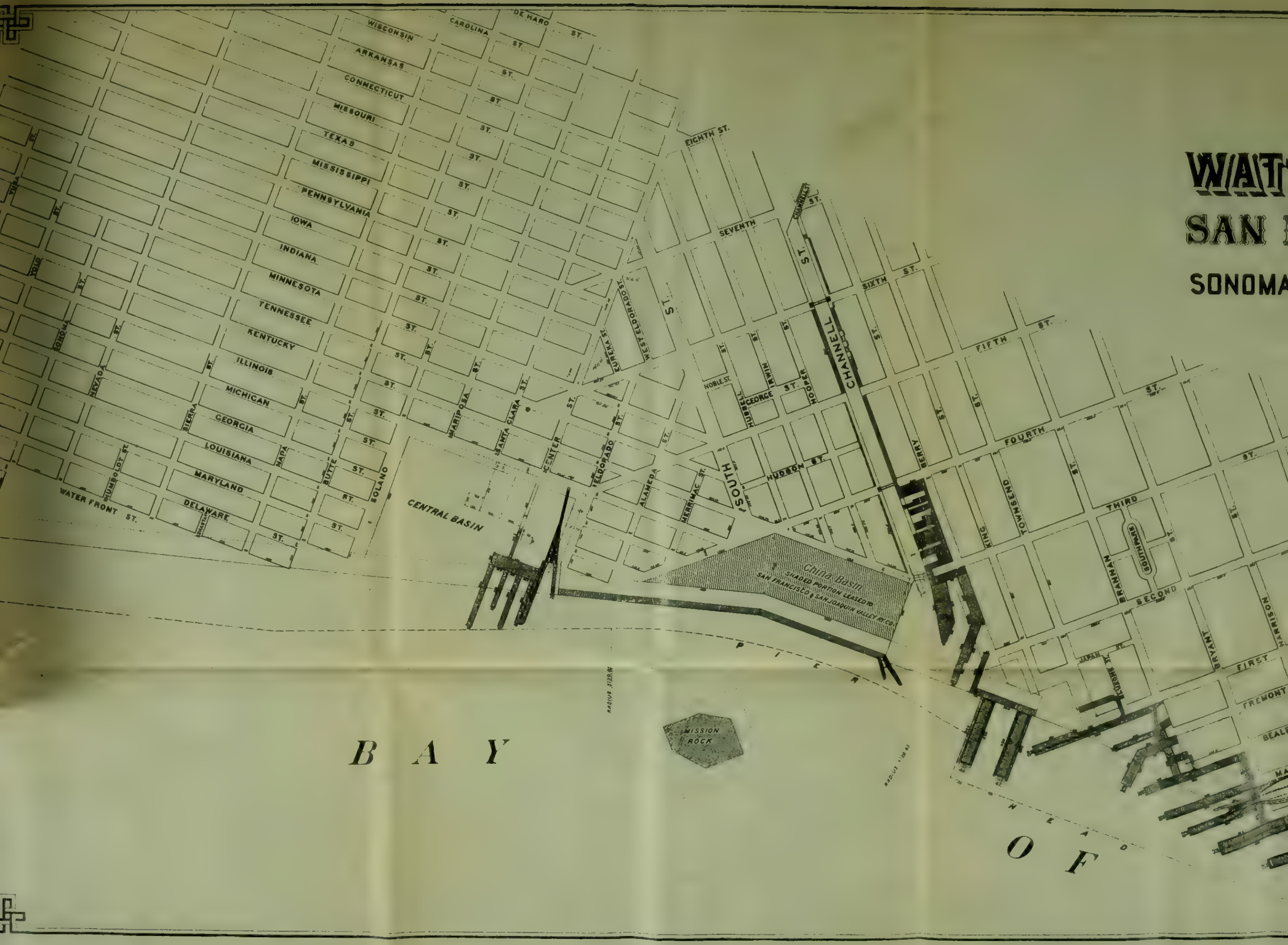
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MARYLAND
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YUBA
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SONOMA
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EIGHTH ST.
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THIRD
SECOND
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CHANNELL
NOBLE ST.
HUBBELL
GEORGE
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TOWNSEND
BRANNAN
SOUTH PARK
JAPAN ST.
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China Basin
SHADED PORTION LEASED TO SAN FRANCISCO & SAN JOAQUIN VALLEY RY. CO.
P I E R
H E A D
MISSION ROCK
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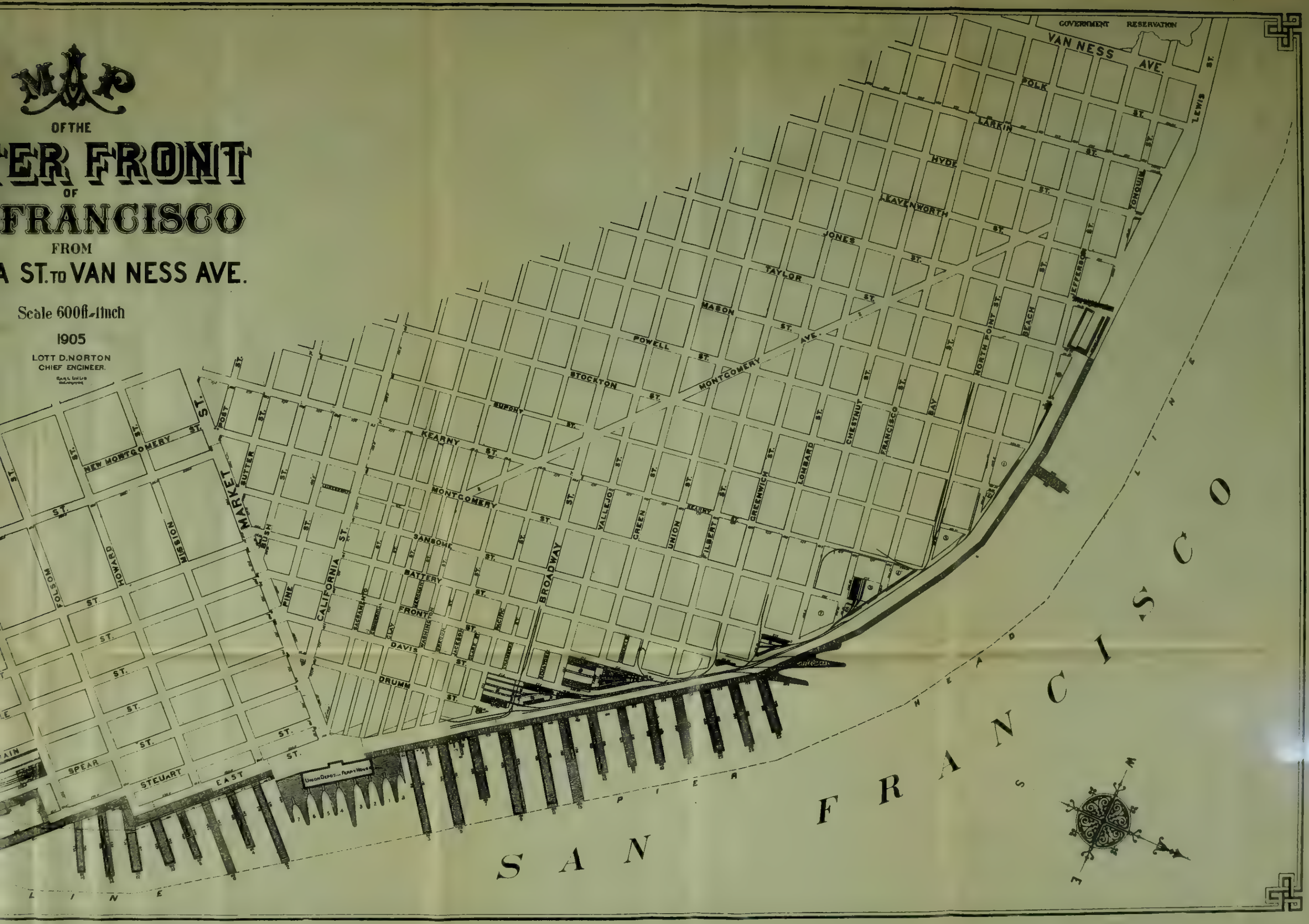
MAP
OF THE
ER FRONT
OF
FRANCISCO
FROM
A ST. TO VAN NESS AVE.

Scale 600ft.-1inch

1905

LOTT D. NORTON
CHIEF ENGINEER.

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registered measurement. In all cases where inward bound vessels are not spoken until inside the bar the rates of pilotage herein provided shall be reduced 50 per cent. Vessels engaged in the whaling or fishing trade shall be exempt from all pilotage, except where a pilot is actually engaged.''

The Legislature of 1903 made a reduction in pilotage charges. The payment of monthly salaries to pilots would be the means of still further reduction, and any decrease in the charges upon shipping will naturally tend to increase the commerce of the port.

Attention is called to the high rate that vessels docking in San Francisco have to pay for the water they use. Attention is also called to the absence of warehouse facilities along the water front, and to the total lack of facilities for the handling of bulk freight. This overcharge and these lacking facilities naturally increase merchandise cost, to the detriment of California, for as the importance of the port of San Francisco is increased throughout the world the State of California is benefited. Increased commerce and the prosperity of California at large, even while a single port may receive the direct benefits, are inseparable. The fixed charges under the control of the State Harbor Commissioners at the port of San Francisco are reasonable and bear favorable comparison with those of any of the ports of the world. The wisdom of permitting them to remain as they are until the improvements contemplated are all made should at once be apparent.

SAN DIEGO.

San Diego Bay is also destined to become one of the great shipping points of California, and is already one of the leading ports of call for the steamer lines plying between the Tehuantepec Railroad in the south and point further north. Having an anchorage area of 9½ square miles in the bay, with a depth of from 30 to 50 feet, and a depth of 28 feet over the bar at low tide, San Diego Bay, which is always a safe port under all weather conditions, only awaits the completion of the Eastern railway lines, a second one of which is now under construction, to become the ocean port of a vast country reaching to the Mississippi River and to the Gulf of Mexico. While the State owns and controls the tide lands, conservatively appraised at $1,691,884, the nine large and ten small docks and piers are owned by private parties, excepting a small wharf at Fort Rosecrans, which is owned by the Federal Government. San Diego now has coal bunkers of sufficient capacity to supply all freight and passenger steamers, and when the Federal coaling station with 40,000 tons capacity, under construction, shall have been completed, this port will have received the recognition due it as the rendezvous for all war vessels on the Pacific when on southern duty.

The construction of a seawall will bring into immediate use much and valuable reclaimed tide lands, which will be utilized for commercial purposes, for warehouses and spurs of railroads, and will be the direct means of considerable revenue to the State. Add to these reclaimed lands the contemplated State wharves, which will have 30 feet of water, and San Diego will have ample facilities for the handling of an immense commerce. The present State revenue from the nine large private wharves is in the form of rentals for franchise privileges. This revenue is not large from the fact that eight of the nine wharves are devoted principally to the business of the corporations and companies owning them. All the piers are constructed of wood, and only two can be said to be in good condition, these two having the piles protected by cement covering. The piling at the Federal coaling station is of a more permanent character, being, like all other Government work, constructed for the future as well as for the present, even though the first cost is so much the greater.

So far as berth room is concerned, the present dock facilities are sufficient for immediate business demands, but there is need for structures of more permanent character, and especially is there need for a State pier that might be used by all not having wharf facilities of their own. Upon completion of the San Diego and Arizona Railroad, now being built, the shipping demands will be largely increased. The construction of a State wharf, it is believed, would greatly increase the value of this port as a shipping point. A new wharf for the State would cost approximately $100,000, but this amount would be much smaller if the State builds a seawall and utilizes its own tide lands. The Federal Government is at the present time constructing a naval coaling station at a cost of about $250,000, and a bill is before Congress providing for a dry dock. In addition to this expenditure by the Federal Government it is more than possible that a naval training station will be established at some point on the bay. While these improvements may not directly cause increased commerce, they will naturally have a bearing upon the future business of the port.

There is room at the docks for twenty-four vessels, and the dockage charges are one cent per ton for 200 tons or less, three fourths cent per ton for balance, net register tonnage. Freight is unloaded from ship and loaded into cars at a cost of 50 cents per ton for merchandise, 75 cents per thousand feet for lumber, and 60 cents per thousand feet for ties. Warehouse charges are subject to contract, making evident the desirability of and the necessity for a State wharf and State warehouses. No demurrage charges are made.

During the year 1907 there were 73,057 tons of freight, not including coal and cement, received by vessel, and 64,688,700 feet of lumber

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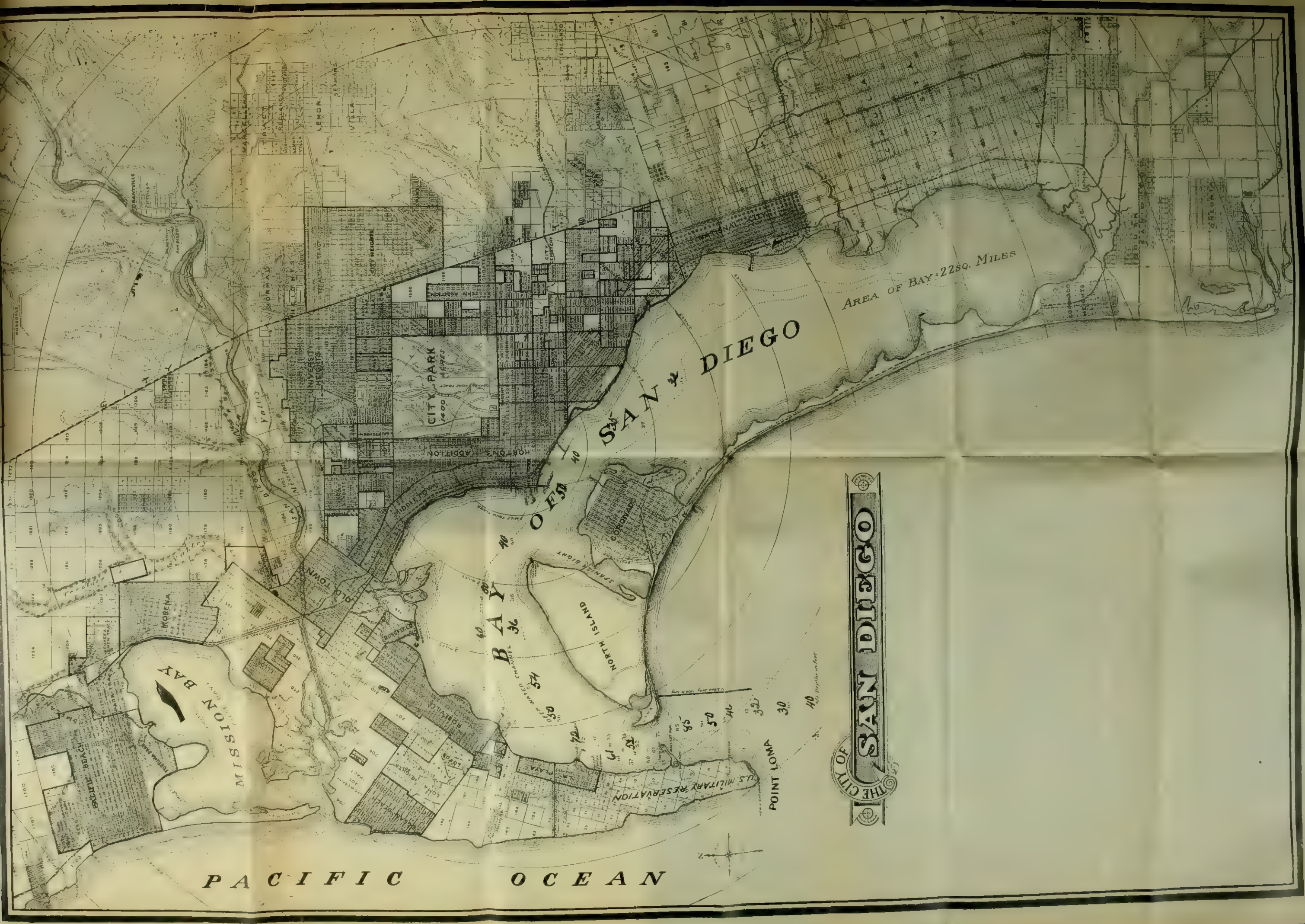
THE CITY OF SAN DIEGO
BAY OF SAN DIEGO
AREA OF BAY 22 SQ. MILES
PACIFIC OCEAN
MISSION BAY
POINT LOMA
NORTH ISLAND
CORONADO
SPANISH BIGHT
U.S. MILITARY RESERVATION
CITY PARK 1400 ACRES
HORTON'S ADDITION
MIDDLETOWN
OLD TOWN
UNIVERSITY HEIGHTS
NORMAL HEIGHTS
CITY HEIGHTS
NATIONAL CITY
CORONADO HEIGHTS
OTAY
MORENA
ROSEVILLE
LA PLAYA
PACIFIC BEACH
LEMON
VILLA
MARKELLEN
DEEP WATER CHANNEL
SAN DIEGO RIVER

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received by vessel and raft. During the same period over 40,000 tons of coal and nearly 15,000,000 pounds of cement were received at the docks. The receipts during ten months of the year 1908 prove that these amounts will be greatly exceeded during the year 1909, while in the matter of lumber the amount will be nearly if not quite doubled. The records for 1907 show that 10,976 tons of freight were shipped out, consigned to both foreign and domestic ports.

There were 423 steamers and 80 sailing vessels that entered this port during the year 1907, not counting those engaged in the fishing trade. War vessels of this and other nations are not included among those figured above.

The principal articles of import were coal, coke, pig iron, cement, domestic animals, copper matte, hides, guano, bran, onyx, firebrick, lumber, flour, feed, structural iron, iron pipe, machinery, groceries, dry goods and leather goods. The leading exports were honey, tallow, hides, pelts, fish, wool, oranges, lemons, and grain.

The commerce of the port of San Diego is rapidly growing, owing to the development of southern California and the increase of imports from Europe and New York via Tehuantepec Railroad over the isthmus, and from Baja California. There is at the present time but one transcontinental railway entering this port, but the preliminary work has been done for a second that should be in operation within two years. Even before the completion of the Panama Canal a considerable business has been established in connection with the Tehuantepec Railroad, this being the port of call for all steamers receiving freight from that Mexican line and operating in conjunction with the several Atlantic lines. The commerce by this line is constantly growing, the last steamer to dock at the Oriental wharf having discharged at the port of San Diego 1,900 tons of freight for distribution throughout the southwest territory.

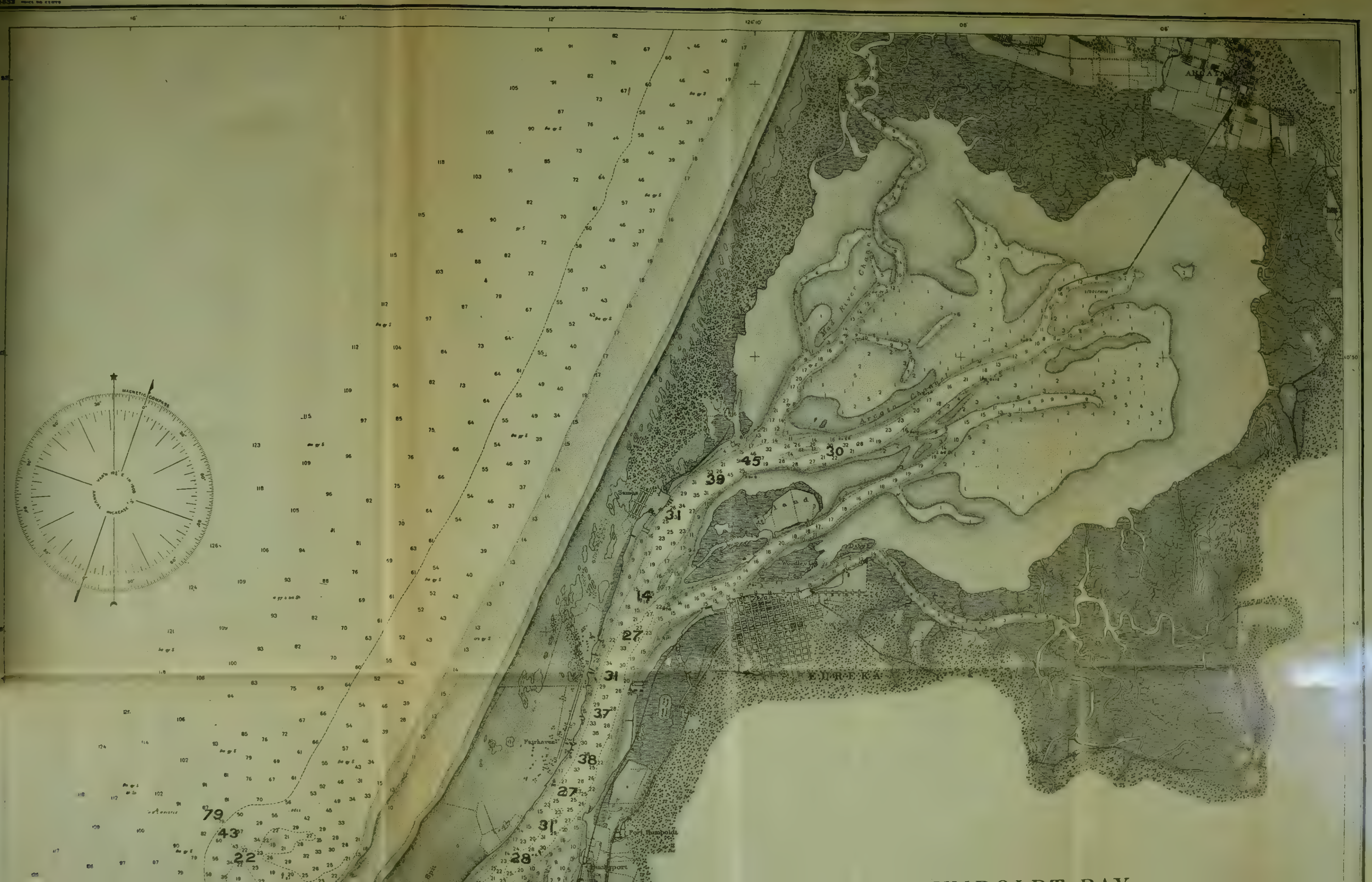
At present south bound steamers do not call at this port. Late this year an experimental shipment of oranges and lemons was made from the port of San Francisco for the purpose of determining if San Diego could be made an important fruit shipping point for east bound fruits. Oranges and lemons produced in southern California were bought in the open market at San Francisco and shipped East by the Tehuantepec line. The oranges landed in New York in first class condition, but the lemons were badly damaged. The officials of the Tehuantepec line, however, are of the opinion that the damaged condition of the lemons was wholly due to the fact that they were bought in the open market, having been intended for home consumption, and were not properly picked and packed for Eastern shipment. The last south bound steamer took eighty tons of freight which originated in the San Diego territory and billed to New York. As soon as the territory offers a minimum of two hundred tons for each steamer San Diego will be made a port of call for south bound steamers. Inasmuch as the territory tributary to San Diego produced oranges and lemons last year of the total value of $23,000,000, on which the railroads were paid for freight approximately $14,000,000, it will readily be seen that if oranges and lemons can be shipped with safety by the Tehuantepec steamship line a very large commerce will grow up in the shipment of these and other fruits through the port of San Diego to the East. As there is a saving of at least one third in freight rates on both east and west bound shipments by steamship line over the railroads, the importance of the establishment of this line of steamers will be at once apparent. It will be seen that there will be such an increase of shipping that greater facilities than at present obtain here will be necessary.

In spite of the efforts of private individuals to secure water front rights that they would make perpetual, if possible, the Harbor Commissioners have rigidly preserved the integrity of State ownership. The last legislature having appropriated $10,000 for that purpose, they have taken steps that will enable them to enforce all the claims of the State to the tide lands, having instituted suits and made provision to perpetuate the testimony of witnesses in a competent court. As these tide lands of the State extend nearly the length of the bay, and front all the deep water, there is need for definite action, especially as the future demands and valuations will be such a large increase over the present.

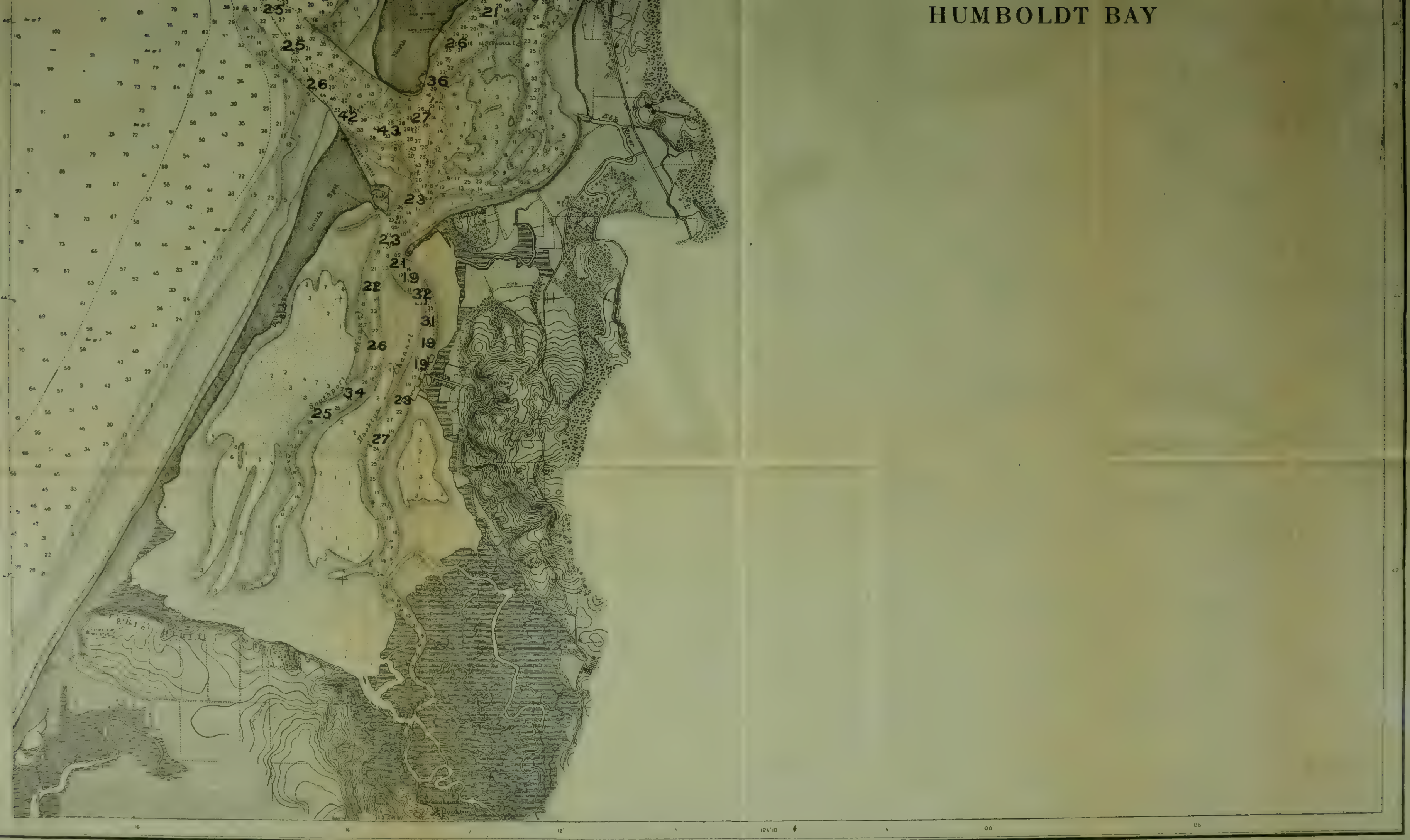
There is a total of 1.265.46 acres of these tide lands, having an assessed valuation of $1,691,884. The following table, taken from the report of the Harbor Commissioners, will show that the assessments are not excessive, being based on present conditions rather than on future possibilities:

	Acres.	Assessed Value per Acre.	Total Value.
Tract No. 1	435.24	$600 00	$261,144 00
Tract No. 2	16.50	3,000 00	49,500 00
Tract No. 3	53.60	10,000 00	536,000 00
Tract No. 4	102.20	2,000 00	204,040 00
Tract No. 5	57.20	3,000 00	171,600 00
Tract No. 6	104.00	500 00	52,000 00
Tract No. 7	171.00	200 00	34,200 00
Tract No. 8	218.00	300 00	65,400 00
Tract No. 9	72.00	800 00	57,600 00
Totals	1.229.56	....	$1,431,484 00
Filled by private individuals, but claimed for State—			
Tract No. 10	21.30	$4,000 00	85,200 00
Tract No. 11	14.60	12,000 00	175,200 00
Grand totals	1.265.46	....	$1,691,884 00

No. 5832 PRICE 60


16'
14'
12'
124°10'
08'
06'
10'50
ARCATA
Mad River Chan.
Arcata Chan.
Samoa
Island
Woodley Is.
EUREKA
Fairhaven
Fort Humboldt
Buckport
Spit
MAGNETIC COMPASS
VAR'N 18° E IN 1908
ANNUAL INCREASE 3'

HUMBOLDT BAY



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(Humboldt Bay) C&G.S. 5832

Government Work.—The Federal Government has expended up to the present time $665,214 in the improvement of San Diego Bay, which has been in the way of dredging, deepening the channel across the bar, and the construction of jetties. Capt. Amos A. Fries, of the Corps of Engineers, under date of May 7, 1907, made a report to the Navy Department in which he made recommendation that the further sum of $125,000 be appropriated for dredging a deep channel 600 feet wide and 30 feet deep from the bar at the entrance of the harbor (over which there is at the present time a channel 28 feet deep at low tide), and 400 feet wide and 30 feet deep through the middle ground in the harbor, so that the sharp turns of the present channel may be avoided. This recommendation, taking its regular course to the Navy Department, has been approved by Lieut. Col. John Biddle, Corps of Engineers, Division Engineer; Col. D. C. Lockwood, Corps of Engineers, senior member of the Board; Wm. S. Cowles, Chief of Bureau of Equipment; C. McR. Winslow, Acting Chief of Bureau of Navigation; Admiral George Dewey, President General Board; J. E. Pillsbury, Chief of Bureau of Navigation; V. H. Metcalf, Secretary Navy Department. There is now nothing in the way to prevent the appropriation asked for, especially as it is for the benefit of the war vessels that will come here to coal, as well as for all vessels carrying foreign commerce which draw up to 27½ feet of water.

HUMBOLDT BAY.

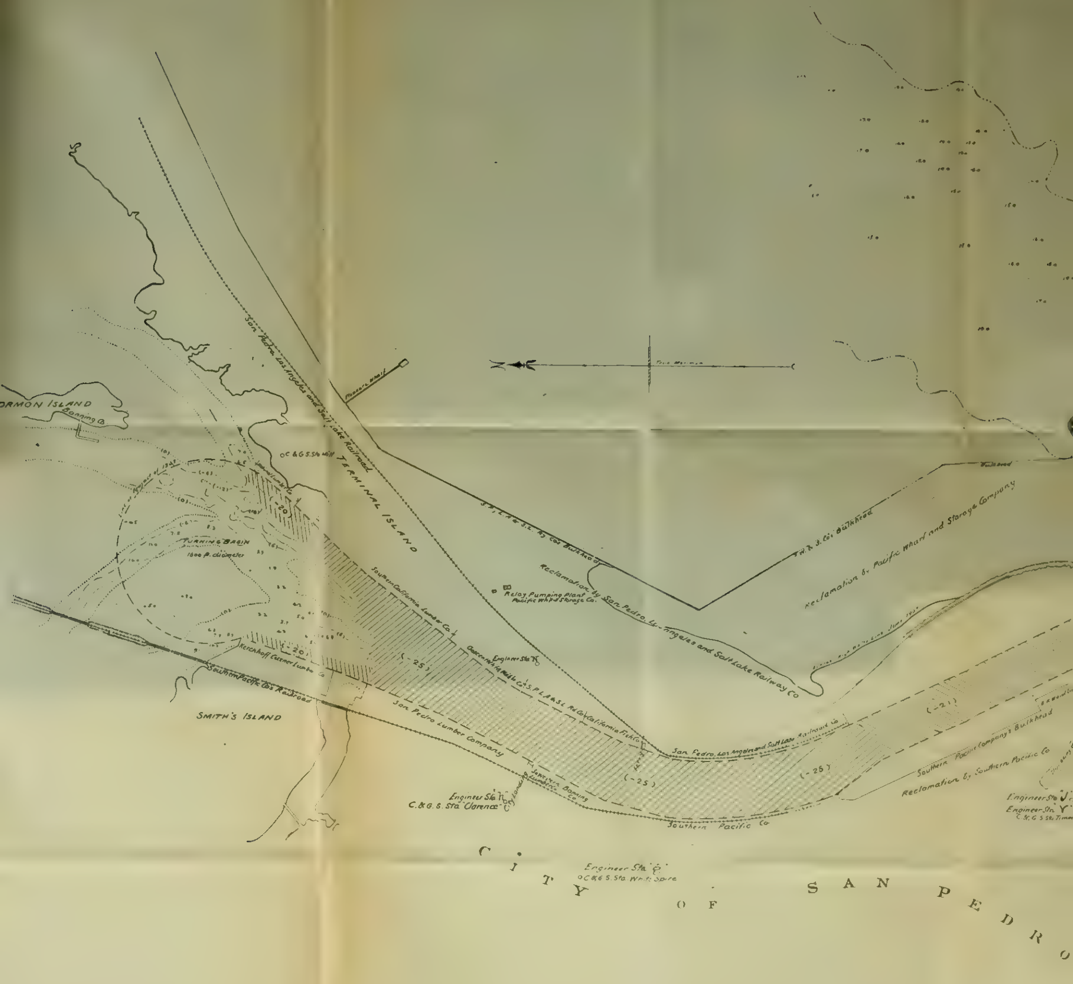
A careful personal inspection of Humboldt Bay reveals the possibilities of that port if there is proper assistance by the Federal Government and the State. The former is already doing efficient work in the way of dredging, but much more needs to be done. There are a number of deep basins having from 27 to 49 feet of water, and even more in places, that are separated by shallow "hogbacks" on which from 9 to 18 feet of water is found. The expense of dredging these will not be great, but private parties, after having deepened the water at their wharves, can not undertake the work. This port (Eureka) has now a business worth $15,000,000 annually, and while in time its character may be changed, the amount will continue to increase. The commerce of Humboldt Bay is principally with coast points, lumber constituting the greater portion of it, but there is a growing trade with the Hawaiian Islands, the Central American States, South America, England, and Australia. The products other than lumber are constantly increasing in volume and value as well. The amount needed to properly prepare this bay to care for the largest vessels afloat need not necessarily be large, but there must be an expenditure in order to secure the greatest facilities for shipping.

The port of Eureka is the most important one on the Pacific Coast between San Francisco and Seattle. Humboldt Bay has an area of about 23½ square miles, and is the most important center of the lumber industry in the State of California. It is also the most important shipping point for dairy products on the Pacific Coast, these for the past year having exceeded $1,500,000 in value.

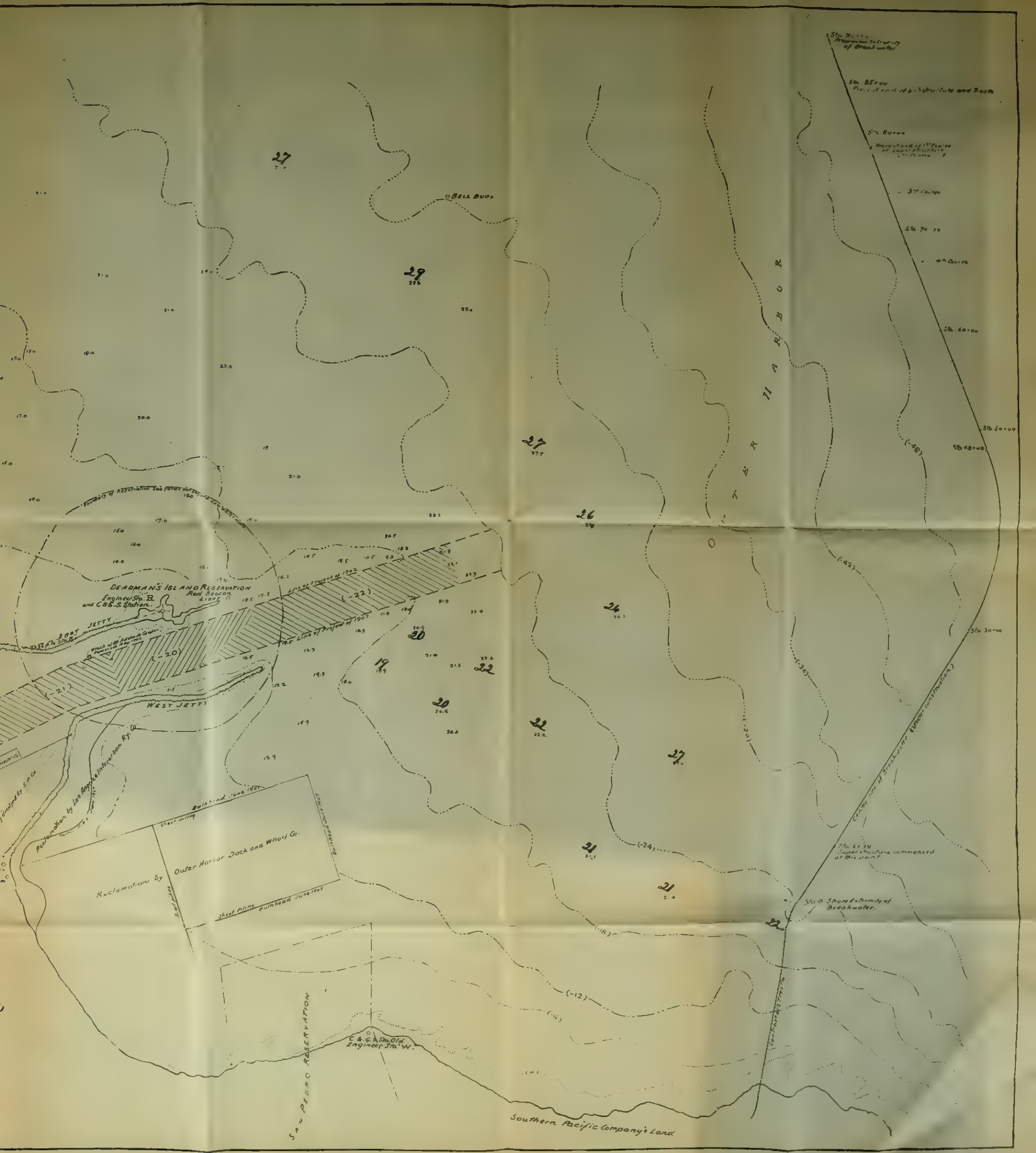
For the purpose of making the entrance to the bay safe to all vessels the Federal Government has constructed twin jetties into the ocean at an expenditure of over $2,000,000. By reason of the sandy ground upon which they rest, and the effect of heavy storms, these jetties have been considerably damaged and the entrance to the bay has also shoaled. Shortly after the completion of the jetties there was a uniform depth of 30 feet at the entrance, and all vessels entered with perfect safety. The channel at the entrance has shifted considerably, so that deep draft vessels must now enter from the northward instead of going straight in from the sea. As the ocean is often rough, a few laden vessels have been injured by striking the bar in passing out and in. It is, therefore, important that the Federal Government should make additional appropriations for the purpose of repairing and extending the present jetties. Congressman F. W. Englebright has persistently urged upon Congress the necessity of this work, and has reason to believe that the necessary steps will be taken to complete it within the near future.

At the present time the only commercial connection between Eureka and the outside world is by vessel through Humboldt Bay. There remains a gap of about 100 miles on the Northwestern Pacific Railroad to be completed along the Eel River to connect Eureka by railroad with San Francisco and the outside world. At the present time Eureka has a population of about 15,000 people. It has one of the most equable climates on the Pacific Coast, and its business men are as enterprising as any to be found in the State of California. It is now, and will continue to be, one of the most important ports on the California coast, and its interests should be zealously guarded.

Practically all the tide lands in front of the city of Eureka were sold by the city at less than one dollar per front foot to private individuals under act of the legislature of 1857. It is doubted whether under the act of congress admitting California into the Union the State could legally authorize the issuance of such deeds. If void when issued the title to these tide lands is still in the State.



TERMINAL ISLAND
San Pedro, Los Angeles and Salt Lake Railroad
Pleasure Wharf
MORMON ISLAND
Banning Co
OC&G.S.Sta Hill
TURNING BASIN
1600 ft. diameter
(-20)
(-25)
(-21)
Southern California Lumber Co
Kerckhoff Cuzner Lumber Co
Southern Pacific Co's Railroad
SMITH'S ISLAND
San Pedro Lumber Company
Engineer Sta
S.P.L.A.&S.L. Rd Co
California Fish Co
Relay Pumping Plant Pacific Whf & Storage Co.
S.P.L.A.& S.L. Ry Co's Bulkhead
Reclamation by San Pedro, Los Angeles and Salt Lake Railway Co
P.W. & S. Co's Bulkhead
Reclamation by Pacific Wharf and Storage Company
Bulkhead
San Pedro, Los Angeles and Salt Lake Railroad Co
Southern Pacific Company's Bulkhead
Reclamation by Southern Pacific Co
Southern Pacific Co
Banning Lumber Co
Engineer Sta
C.&G.S. Sta "Clarence"
City Landing
Engineer Sta "J"
Engineer Sta "Y"
Engineer Sta "Q"
OC&G S. Sta. White Spire
CITY OF SAN PEDRO


OUTER HARBOR
BELL BUOY
DEADMAN'S ISLAND RESERVATION
Engineer Sta. R and C.&G.S. Station.
Red Beacon Light
EAST JETTY
WEST JETTY
Line of Project of 1902
(-22)
(-20)
(-21)
Boundary of Reservation 300 feet out beyond Low Water mark
Reclamation by Los Angeles Interurban Ry.
Dredged by S.P. Co.
Reclamation by Outer Harbor Dock and Wharf Co.
Bulkhead June 1907
Sheet Piling
SAN PEDRO RESERVATION
C. & G.S. Sta. Old Engineer Sta. W.
Southern Pacific Company's Land
Sta. 90+00 Proposed extremity of Breakwater
Sta. 85+00 Present end of substructure and Rock
Sta. 80+00
Sta. 70+00
Sta. 60+00
Sta. 50+00
Sta. 48+00
Sta. 30+00
Sta. 6+74 Superstructure commenced at this point.
Sta. 0 Shore Extremity of Breakwater.
Center line of Breakwater (under construction)
3rd Course
4th Course
(-48)
(-42)
(-36)
(-30)
(-24)
(-18)
(-12)
(-6)
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SAN PEDRO.

With an outer harbor of 700 acres inside the breakwater, 300 acres having an average depth of 40 feet, 400 acres having an average of 30 feet, and 3,000 front feet owned by the city in the inner harbor having an average depth of 24 feet, there are at the present time no facilities for deep ocean going vessels at San Pedro. The Federal Government is doing effective work in dredging the channel in the inner harbor, and all difficulties in securing deep water may soon be overcome. In addition to the 3,000 feet of frontage owned by the city, most of which has been leased to private parties, San Pedro owns over 20,000 feet, which includes the outer harbor frontage, on which no franchise has been granted. On the west side of the harbor the city owns 214 acres of submerged lands with a frontage of about 8,000 feet on the outer harbor, which can in time be utilized after having been filled in. While the city has leased much of its water front, it has reserved in one place a strip 1,480 feet long and 200 feet deep for dock and warehouse purposes.

There are nine docks, with an aggregate length of 15,000 feet, owned and operated by private parties. While sixty vessels can work at one time at the docks, the dockage of the inner harbor is barely sufficient for the present business. In the outer harbor there are no docks as yet, although they can be constructed in from 30 to 40 feet of water. As conditions now exist, the larger vessels must anchor in the outer harbor and discharge by lighter a portion of their cargoes before they can enter the inner harbor. This constitutes a great drawback to the commercial possibilities and needs of San Pedro as a port. The Federal Government has expended $3,000,000 on the breakwater, and in addition over $1,000,000 for dredging in the inner harbor. The business men of San Pedro feel that the most needed improvement at the present time is the construction of docks in the outer harbor at an estimated cost of $2,500,000.

The 1,217 steamers and 385 sail vessels entering this port during the year 1907 brought in trade from all the coast ports and also a considerable amount from foreign ports. San Pedro is an important port for the shipment of oil, 491,323 barrels having been sent out during 1907 to coast points and foreign ports. Being a distributing point for Los Angeles and a number of lesser cities, the receipts of lumber have been large, there being recorded 466,405,000 feet of lumber and 178,844,000 shingles, with great quantities of other building material of wood for the year 1907. The foreign receipts and shipments aggregate a considerable amount and are constantly growing factors in the shipping business of San Pedro.

Your committee held two sessions to consider the needs of San Pedr harbor. That city was visited by the committee early in 1908, whe a meeting was held and the needs of the harbor discussed. At that tim public sentiment had not crystallized, and there was a great differenc of opinion as to whether there should be a State Harbor Commission and improvements made at the expense of the State, or the city retain control. A second meeting was held at the Chamber of Commerce in the city of Los Angeles on Monday, the 16th day of November of this year, at which the city of San Pedro was represented by Senator Savage and members of the Chamber of Commerce. Wilmington was represented by its city attorney, and Los Angeles by the Los Angeles Harbor Commission and members of the Los Angeles Chamber of Commerce.

Senator Savage contended for a State Harbor Commission, and the control of San Pedro Bay by such commission. The members of the Los Angeles Harbor Commission, as well as the Chamber of Commerce, representatives from Wilmington and one or two representatives from San Pedro opposed State control, and contended that the State should not interfere with conditions at San Pedro. Some time since the City Council of Los Angeles by ordinance created a harbor commission of three members. This commission, in conjunction with the Chamber of Commerce, has been working to bring about a consolidated city government under the borough system, which shall include San Pedro, Wilmington, and other beach cities. It is their purpose, then, to have the city vote bonds to the extent of several million dollars, and build municipal docks and wharves at San Pedro.

While the record title to a greater portion of the water front at San Pedro is vested in private corporations, suit was filed in the month of October of this year for the purpose of testing the validity of these titles. All the private ownerships are based upon titles obtained between March 5, 1880, and January 16, 1891, under the general law of 1868, as amended in 1870, for the sale of swamp and overflow, salt marsh and tide lands. The State legislature has never passed any special act for the disposing of any part of the inner portion of San Pedro Bay, but under the interpretation of the swamp and overflow law State patents were issued to about seven eighths of the tide lands of the bay. It is now claimed that under the act of Congress admitting California to the Union, providing that all navigable waters shall be forever free, and the constitutional provision that all tide lands within two miles of any incorporated city or town of this State and fronting on the waters of any harbor or bay used for the purpose of navigation shall be withheld from grant or sale to private persons, partnerships or corporations, these State patents are illegal. As much of these tide lands has been occupied by private individuals claiming ownership for a great many

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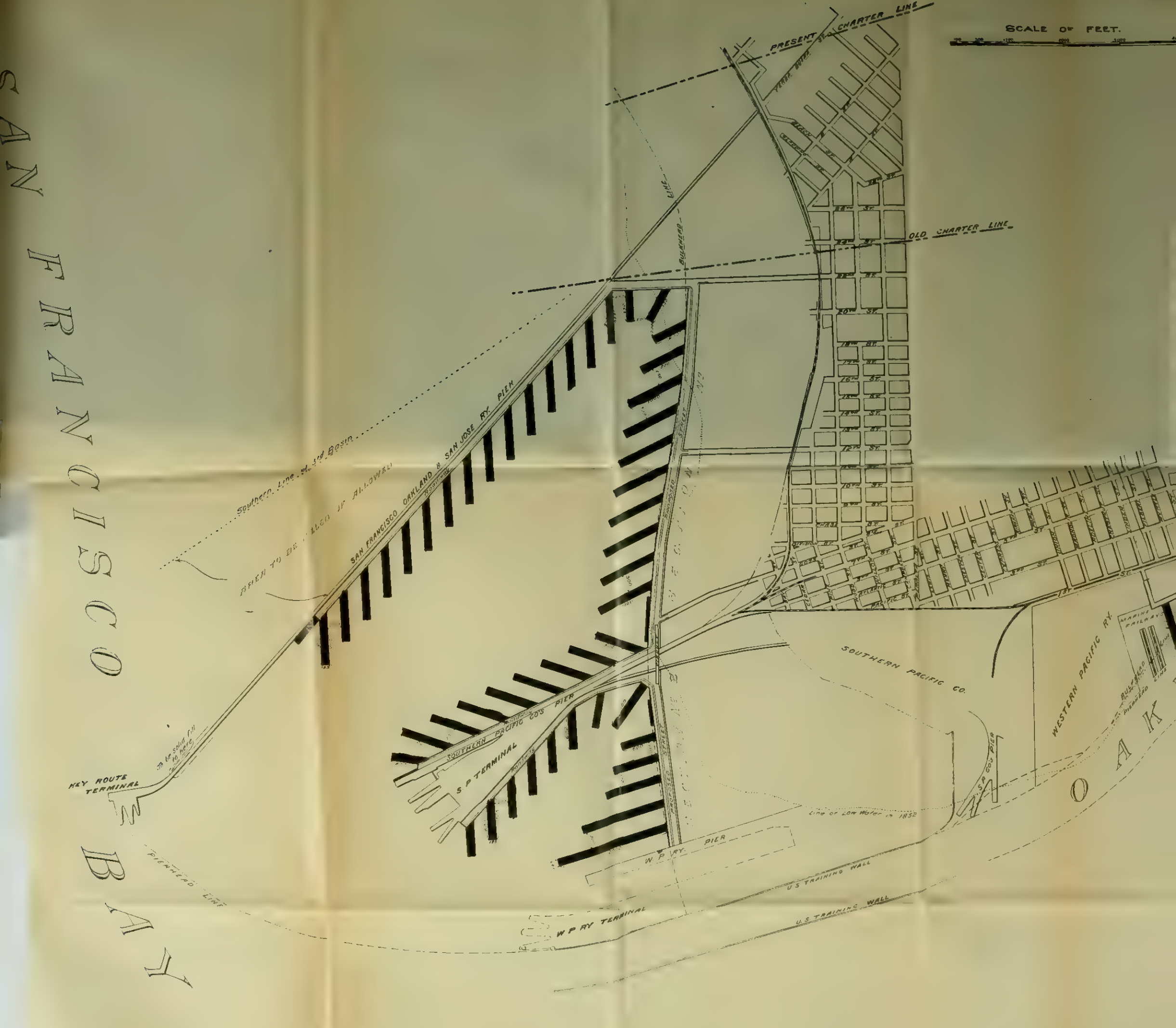
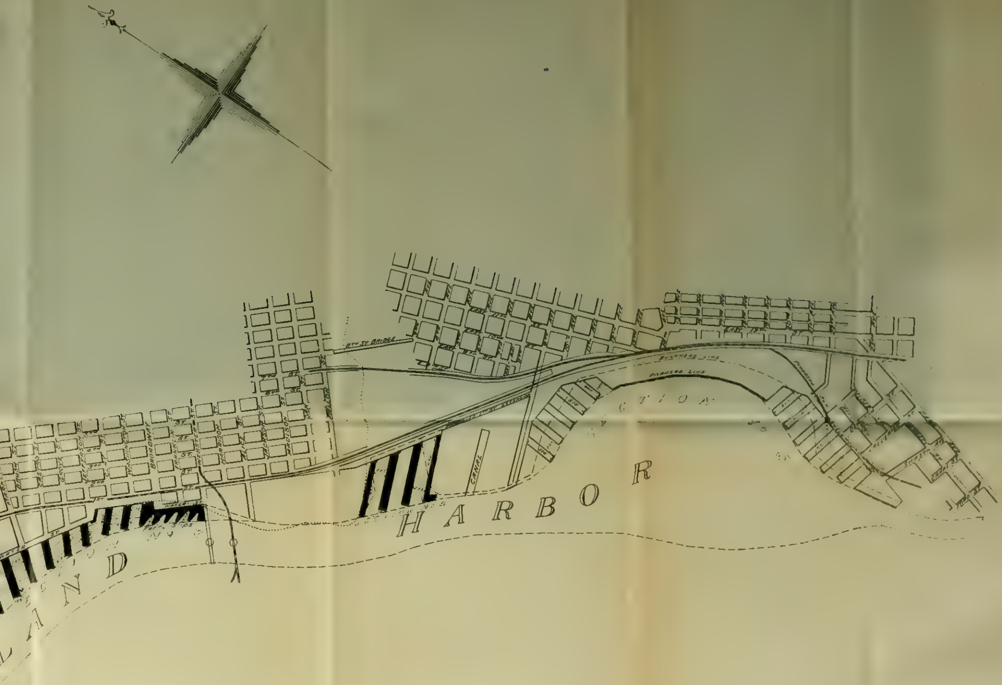
OAKLAND


SCALE OF FEET.
PRESENT CHARTER LINE
OLD CHARTER LINE
BULKHEAD LINE
SAN FRANCISCO BAY
Southern Line of 3rd Basin
FILLED TO BE FILLED IF ALLOWED
SAN FRANCISCO OAKLAND & SAN JOSE RY. PIER
KEY ROUTE TERMINAL
To be solid fill to here
SOUTHERN PACIFIC CO'S PIER
S P TERMINAL
SOUTHERN PACIFIC CO.
WESTERN PACIFIC RY.
MARINE RAILWAY
BULKHEAD LINE
S P CO'S PIER
Line of Low Water in 1852
W P RY. PIER
U S TRAINING WALL
U S TRAINING WALL
W P RY TERMINAL
PIERHEAD LINE
PROPOSED STREET
OAK

WATER=FRONT


8TH ST BRIDGE
BROADWAY
FRANKLIN ST.
WEBSTER ST.
HARRISON ST.
ALICE ST.
JACKSON ST.
MADISON ST.
JEFFERSON ST.
WASHINGTON ST.
GROVE ST.
2ND ST.
3RD ST.
4TH ST.
WATER ST.
Ferry Slips
BULKHEAD LINE
PIERHEAD LINE
CANAL
SHASTA ST.
CANAL ST.
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years, it is contended that the statute of limitation would bar the State from recovering the same, even though the State patents might have been illegally issued. In the case of *People* vs. *Kirber,* decided by our Supreme Court within the year, it is decided that tide lands are held in trust by the State for the people, and that in such cases the statute of limitation does not run against the State. The contest over these tide lands will be bitter, and contested by both sides with determination. It may be several years before they end. Your committee, therefore, is of the opinion that in view of the unsettled conditions of the tide lands at San Pedro, and the wish of a large number of people in Los Angeles and adjacent cities that the improvement of that harbor should be left to the municipality, it would be unwise to recommend the appointment of a State Harbor Commission, or the submission to the people of a bond issue for the improvement of this port.

OAKLAND.

Oakland has eighteen piers and docks, none of which are owned by the State, and which are under the jurisdiction of the city, which has expended much money in the way of improvements. In order to remedy the disadvantages of crowded docks and shallow water the city has in contemplation the issue of improvement bonds to carry on the work that is estimated will cost at least $25,000,000 when completed.

The business done at Oakland is given for three years, being from January 1, 1905, to December 31, 1907. During this period 4,513 vessels entered the port, having a total of 2,019,918 tonnage. The greatest obstacle to an increase of business is shallow water, which must be deepened, no matter what the cost may be. This is essential in order to maintain the commerce in deeper bottoms. Oakland has about four miles of berth space, which takes in all the frontage on piers and wharves. New docks are needed, those now in use being inadequate even under present conditions. The dockage charges are regulated by city ordinances, and are practically the same as those that have been fixed by the State at San Francisco. As five railroads, including the belt line, are doing business on the Oakland wharves, demands for more room will constantly be made, and will necessitate the expenditure of a greater amount of money than is contemplated in the $5,000,000 bond issue now under consideration. All new work should be of that permanent character that will last for all time.

MONTEREY BAY.

Monterey Bay is situated south of San Francisco Bay, and was one of the earliest shipping points in the State of California. The great necessity for that port is a breakwater, and earnest effort has been made to secure the building of the same by the Federal Government. It is claimed that if the breakwater were constructed in Monterey harbor fourteen million acres of farming land held by residents along Monterey Bay contiguous to that port would be enhanced in value, and that much land now vacant would be made available for farming and grazing. Speaking of Monterey Bay Captain Davis, of the United States lighthouse service, wrote:

> For twenty-five years I have been running in and out of the port of Monterey. There is no harbor on the coast where finer anchorage can be found. Monterey is the best harbor between San Francisco and San Diego. It is thoroughly protected from southwest winds, which can not be said of any other harbor on the coast.

The great obstacles to shipping in Monterey Bay are the ground-swells and undertow. The ground-swells sometimes sweep into the bay causing surging to a degree dangerous to the larger vessels, while smaller craft are seldom disturbed. The several attempts made by the people of Monterey to induce Congress to appropriate funds for the building of a breakwater have been ineffectual, as the engineering board has always reported adversely, giving as reasons that the shipping is not sufficient to justify the expenditure. Monterey has, however, become an important California port, as the tonnage which passed out of the harbor in the last year amounted to over 500,000 tons. It is true that this was largely shipments of oil, but oil is now an important factor in our commerce. The present tonnage represents an increase of over 200 per cent in the two years last past.

It is estimated that the breakwater necessary to divert the current and cut off the undertow should be built out into the bay in an easterly direction about 2,000 feet, and that it would cost approximately $1,000,000. This, it is claimed, will enhance the value of several million acres of land and assure better freight rates to a large population inhabiting the territory contiguous to Monterey Bay.

The entire water front in Monterey is owned by the municipality, and the city is determined that it shall always be free from monopoly holdings. It is to be hoped that the Federal Government can be induced at an early date to provide the necessary funds for the building of the Monterey breakwater.

PORT SAN LUIS.

Port San Luis has achieved commercial importance largely because of the immense shipments of oil, there having been 3,000,000 barrels of this product exported during the year 1907. There is a depth of 34 feet at the entrance, and an anchorage area of ten square miles with an average depth of 30 feet. The county, at an expense of $90,000, raised by bond issue, has constructed two wharves and owns one of the two docks at Port San Luis, the other being the property of private parties. The tide lands are all owned by individuals. The Federal Government has taken the preliminary steps toward completing a breakwater which has been under construction several years. The facilities for shipping are adequate for all present demands, and possibly for years to come.

SANTA BARBARA.

Santa Barbara was visited, but that city had nothing to ask, being in a very large measure a coast shipping point and pleasure resort. Although there have been moderate amounts of shipments in and out, this being a regular port of call for the Pacific coast steamers plying between San Francisco and San Diego, the one pier into the roadstead is sufficient for all the needs of the city.

NEWPORT BEACH.

Newport Bay, once a shipping point, is at the present time wholly a pleasure resort. The people living at that point justly believe the Federal Government should follow up the preliminary expenses of a survey made several years ago, and build twin jetties which would give them a safe and deeper channel into the bay, and a reasonable chance to gain back the lost trade. At the present time the bay is more an inland sea than a bay because of the little depth at the bar which renders navigation almost impossible. It is there believed that the State can influence the Federal Government to afford the necessary relief, which can come only in the way mentioned—the construction of twin jetties and a reasonable amount of dredging.

PETALUMA AND SAN RAFAEL.

These two ports are on the tide waters of San Francisco Bay, and enjoy a rapidly growing commerce. Several thousand dollars have been expended by the town of San Rafael in dredging a channel from the bay to the city giving a depth of four feet at low tide. It is estimated that $5,000 appropriated by the State would increase the capacity of the channel so as to give competing water rates with the railroad.

Petaluma is the port for a great section of country bordering on the north shore of San Francisco Bay. Several vessels arrive and depart daily, carrying great quantities of grain, dairy products, and general merchandise. An appropriation is needed to straighten the channel in the river above the head of navigation and to dredge the bar where the river empties into San Francisco Bay. It is estimated that $15,000 will suffice for this work.

NECESSITY OF HARBOR IMPROVEMENTS.

California is at present, as it were, merely a transfer station where freight is received and forwarded to Asia, Australia, Pacific island ports and the more eastern of the United States. It is true the oil fields have been instrumental in the development of a commerce with the Far East, and the fruit and other productions of the State have made their own market in all the states of the Union, and our lumber is in demand in many foreign countries, but we have not kept pace with other portions of the world in a manufacturing way. We have increased shipments into the State at the expense of our export trade, making but comparatively little use of the raw material that should greatly increase our commerce.

On the California coast are extensive deposits of iron ore, and in time great smelters will be established and our manufacturing interests will be multiplied many fold. In addition to this raw material California has a power that is but partially utilized, which should be sufficient to operate all manufacturing, lighting, and power plants that may be required within this State during the next twenty-five years. All this can the water in the mountains do if properly harnessed, and not a drop be wasted that might be required for irrigation and domestic purposes. The impounding dams of San Diego County, the great Owens River project now in progress at the expense of the people of Los Angeles, the rivers and streams in the central and northern portions of the State, represent as much energy as all the coal mined in Pennsylvania, Ohio, Illinois, Indiana, Kansas, and Arkansas, if the theories of those who have thought much on this matter be true, and its cost is a mere trifle in comparison.

Careful estimates made by the Federal engineers, made after years of study and the measurements of all the streams in the State, demonstrate that the possibilities of water power development in California far exceed that of any other state in the Union. This is due to the fact that the streams of California, having their source in the Sierras, have greater fall in their course to the sea than the streams in other sections of the United States. At the present time there is approximately 200,000 horsepower of this great possibility fully developed.

The topography of California is such as to divide the State into six drainage districts, as follows: San Francisco Bay drainage, 64,000 square miles; North Pacific Ocean drainage, 20,040 square miles; Central Pacific Ocean drainage, 11,250 square miles; South Pacific Ocean drainage, 11,490 square miles; great interior basin drainage, 32,630 square miles; Colorado River drainage, 18,950 square miles. The possible horsepower, conservatively estimated after careful measurement of all the streams, is as follows:

Stream Drainage.	Minimum Horsepower in Year.	Minimum Horsepower in Six High Water Months.	Additional Horsepower from Storage.
San Francisco Bay drainage	2,655,600	5,433,200	1,501,400
North Pacific drainage	566,730	1,033,320	....
Central Pacific drainage	880	15,740	14,390
South Pacific drainage	30,810	60,030	71,350
Interior drainage	240,680	347,790	206,870
Totals	3,492,700	7,901,080	1,794,010

Develop the iron deposits, harness the water with dams, flumes and turbines, and thousands of dynamos will create energy enough to cause the employment of tens of thousands of skilled workmen in all the seaport cities and their neighboring towns, and at our docks will be found vessels bearing the flags of all the maritime nations seeking as freight the manufactured products of California. All this is sure to come, and that, too, not more than a generation hence. Much money has been expended in the harbors of the State, not for future business, but for present demands only. The reports made to this committee all declare that "there is dockage enough for the present business," while at the same time these reports urge the necessity of improvements to meet the demands in sight for needed additional facilities for shipping.

When the time comes, and it will come right soon, that the people of this State will do as has been done in Italy and other nations, utilize all the existing water power and thus secure constant and cheap fuel, the "green coal" of the mountains, every landowner in California, no matter how remote from the seaboard, will derive especial and lasting benefits, accruing from the manufactories that will be built on the shores of every bay that can be improved sufficiently to shelter the vessels, large and small, that are sure to seek this coast from all parts of the world. The Tehuantepec Railway, shortening the route for freight between Atlantic and European ports and the great Pacific field of trade, give promise of what the business on this coast must become when the Panama Canal shall have been completed and vessels, steam and sail, of all sizes can come from the Atlantic Ocean into the ports of

San Diego, San Pedro, San Francisco, and Humboldt, as well as the several lesser ports that will claim and secure their share of business because they will all produce the manufactured products that the world must have at any cost.

This may not seem pertinent to the report of your joint committee on harbors, but the connection between a proper improvement of the harbors of the State and the increased commerce, which must come with increased manufacturing activity, is so close that we deem it advisable to call in a brief way attention to the importance of a partially unused force that can be utilized to the advantage of all. The State is not developing the water power, nor will it be called upon to do so. The State, however, will derive benefits from the liberal expenditures in this direction now being made by municipalities and corporations, which will be increased ten fold when there is a general awakening to the importance of this subject. The proper improvements made in harbor facilities will have much to do with hastening the day when California factories will be operated by the water from the mountains.

CALIFORNIA'S PRINCIPAL HARBOR—ITS PRESENT AND ITS FUTURE.

The improvements in the bay of San Francisco prove the wisdom shown by the State in the expenditure of apparently large sums of money for the construction of seawalls and wharves. The State, owning the wharves, can and does fix the charges which, while less than at some ports, cover the cost of administration, repairs, and some new work, and at the same time provide a sinking fund for the redemption of the bonds issued, together with the annual interest paid thereon. During the past year, which was a period of comparative depression, the present wharf facilities in San Francisco have apparently been ample. But periods of depression do not stay the life of wharves that were erected in the past without having in view longevity, and which must soon be replaced by modernized structures. There must also be additional docks and wharves, not only to provide for the increased tonnage that is inevitable, but also to accommodate the larger vessels that are year by year growing in size. To provide room for these new wharves there must be extension of the seawall and the reclamation of land for commercial purposes.

That it is wisdom for the State to expend money on such improvements admits of no question. Or rather, it should be stated in another way, it is wisdom for the State to loan its credit for such improvements as will not only care for present demands, but also meet all the requirements of the commercial world in the years to come.

There are two harbors to which the State can consistently loan its credit, having power to adjust the schedule of charges and to provide for the repayment of all moneys obtained on the credit of the State. These are San Francisco and San Diego. In the first named the State owns all the wharves except two, and the additional ones now necessary can be built only as property of the State, subject to its regulations. In San Diego the State does not own any of the wharves, but with the erection of a seawall there will not only be the wharves to the pier line, but there will be the reclamation of tide lands worth nearly the cost of construction; and immediately following the building of the seawall and wharves at San Diego the State charges will naturally be the basis for the regulation of all dockage charges, and eventually cause all wharves now owned by private parties and corporations to practically come under State supervision.

Great as has been the expenditure at San Francisco, that harbor has been self-sustaining. With the improvements so badly needed, costing probably $10,000,000, there will come increased revenues with the increased commerce, while there will be but little increase in administrative expenses. At the present time wharfage facilities are taxed to their utmost to care for the 9,678,792 tons of freight annually handled. The increase since the earlier days has been constant, and it requires no imagination to prove that within a few years this port will be handling 13,000,000 tons of freight annually. To meet this increased business, and to accommodate the additional shipping there is the necessity of providing greater facilities than now exist, and which can not be provided for in time from the annual revenues of the port. The report of Luther Wagoner and Wm. Heuer, U. S. A., the engineers of the Federated Harbor Improvement Association, says:

> The commerce of the port is growing, not with regularity, but with constant acceleration, and in twenty years the commerce should amount to 13,000,000 tons (annually). What increase of this acceleration will follow the completion of the Panama Canal is suggested, but not figured in the calculation. It is predicted that the proper extension of the docks and wharves would enable the port to do a commerce of 30,000,000 tons annually. This would mean the covering the ten miles of water front with docks.

There are five plans for extension presented, as follows:

A. Development of the water front continued along the bay in a southerly direction beyond what is now the boundary line between San Francisco and San Mateo counties.

B. In case a Greater San Francisco were formed, embracing other cities on San Francisco Bay, construction of other wharves on the Oakland side of the bay.

C. Cut down Yerba Buena Island and build up an adjacent shoal.

D. Acquire land now submerged and in private ownership between India Basin and what is known as Islais Creek channel, which would permit of an inner basin being formed, in which nine additional wharves may be constructed, to furnish more than four miles additional berth room.

E. Slips and solid piers may be constructed between Fort Mason and Presidio. This will furnish 19,200 lineal feet of berth room.

> Obtain permission of the Secretary of War to reëstablish the bulkhead or seawall line 150 feet bayward of its present location, and for a corresponding alteration of the pierhead line, especially at Mission Rock, to furnish 5.3 miles of additional wharf room, or 10.8 miles additional berth room between Channel street and Hunter's Point, or, including that in Paragraph D, more than 15 miles additional berth room.

The engineers' report referred to shows that with one fourth of the cost of the Liverpool harbor San Francisco's harbor could be extended to accommodate twice the business of Liverpool. It is further shown that under the recent amendment to the constitution, authorizing 75-year bonds, the cost of extension and improvement of the harbor would not in the least be burdensome, as the percentage of earnings would provide for maintenance, repair, and management, *and leave ample for interest and sinking fund for redemption of the bonds.* The engineers make a detailed statement showing the cost of the harbor complete. The estimated cost is for the erection of docks, wharves, and appliances sufficient to accommodate a traffic of 30,000,000 tons annually. The total cost, not considering the price of real estate, would amount to $43,284,195. It is estimated that the value of the present water front improvements now amounts to $10,000,000, and this added to the proposed development would make the entire cost $53,284,195. Continuing, the engineers say:

> "It is proposed to pay for these improvements with long term (75-year) bonds, a synopsis of the commerce of the port showing that the sum could easily be paid from the port itself. The Federated Harbor Improvement Association suggests that $10,000,000 long term bonds be issued for the work that is to be completed by 1920. These bonds would not all be issued before 1920. As before shown, the revenues of the port are ample to pay all harbor expenses, pay the interest, and eventually redeem the bonds."

The only too frequent congestion of freight notwithstanding the efforts of the Harbor Commissioners and their assistants, aided by the business men of San Francisco fully warrant the conclusions as to present conditions and requirements for the future, as set forth in the report of the Federated Harbor Improvement Association:

> The present wharves are inadequate for an increased commerce.
>
> New wharves and additional seawall should be constructed in advance of the immediate requirements of commerce.
>
> Harbor lines should be modified as soon as practicable. Applications to change these lines and to build several solid piers extending outside the pierhead lines should be made to the Secretary of War.
>
> Funds from existing dock revenues are not sufficient to make the improvements as rapidly as required. The present port charges should not be increased. The improvements to be made in the next ten years will cost between $10,000,000 and $11,000,000. Funds for this purpose may be obtained by an issue of $10,000,000 four per cent 75-year State bonds, sinking fund for their redemption to begin twenty-five years after their first issue.
>
> Warehouses at the head of wharves are essential. A change in the bulkhead line, in accordance with recommendations, would afford suitable warehouse sites.

Notably the most important seaport on the western coast of the United States, San Francisco, has for its territory, in a commercial way, all the land to the Atlantic Ocean. Hence it is that the great transcontinental lines are doing their utmost to reach that point, as well as the more southerly ports, for all the year the way is open to traffic on land as well as on the ocean. Taking into consideration the increase in population in the Western States during the past twenty years, and the work now being done by the Federal Government in the reclamation of desert lands, there will unquestionably be within the next twenty years millions of people where there are now hundreds of thousands. This means added production and almost numberless new manufacturing establishments throughout the West and the State of California, a largely increased commerce that will tax to the utmost the capacity of all the ports in California, and especially that of San Francisco. There will come a time when American ships will be made possible, and under the American flag will be carried the breadstuffs and manufactured articles demanded by the civilized and enlightened nations of the world. California will be the first to reap the reward of the extended commerce, for she has the things that the people of the world need and must have. To prepare for that time the ports must be made ready.

NECESSITY FOR STATE ACTION.

We found at San Diego a condition as to the water front largely in favor of the State. The building of a seawall will not only make it possible for the State to construct and own a number of wharves, but there will follow the reclamation of lands that will at once be worth almost the cost of constructing the seawall, and will be a source of revenue for all time to come. The Federal Government is making improvements in San Diego Bay that will not only necessitate the expenditure of much money in the way of deepening the channel in places, but will require a preparation for harboring the battle fleet of the Pacific when occasion requires. Not as great in area as San Francisco Bay, San Diego Bay is large enough and deep enough for the entire Pacific fleet, and not in any way interfere with commerce. Another thing that will eventually cause the business of this port to largely increase is the shorter distance to the Hawaiian Islands, Japan, China, and Australia. It will be the first port of call for vessels coming through the Panama Canal, and having two transcontinental railroad lines never disturbed by the rigors of winter or the flooding of melted snows, commerce from the middle western, eastern, and some of the southern states will naturally seek the Pacific at this point.

If present conditions alone were to be considered, San Francisco and San Diego bays would still be without wharves of any kind, for in the past "present" there was no need for innovations of that kind. In the light of the future San Diego, a most important port, having all the requirements of a safe harbor, with practically no limit to its capacity, and the State being in possession of its rights as to tide lands, there must be substantial improvements in the way of a seawall and wharves. California can not afford to neglect this important point, nor can the business done be passed over to private individuals and corporations. No reflection is cast upon private persons, for the business of San Diego harbor has been well and honestly done, to the encouragement of commerce. The Harbor Commissioners have at all times been earnest and faithful in their duties, but honesty and faithfulness do not build seawalls and wharves.

The Board of State Harbor Commissioners for the bay of San Diego recommends the building of a seawall and wharves by the State as the best way to secure low wharf charges, as well as making provision for future increased business from the ocean trade. The method of building and paying for the same as applied to San Francisco would apply to San Diego as well. The State would be merely loaning its credit, the bonds and interest to be paid from the business of the harbor.

CALIFORNIA HARBORS AND LATIN REPUBLICS.

While it is not within the province of this committee to suggest methods and means of extending trade, or the building up of a great commerce for State ports, yet the connection between improved harbors and an increased commerce is so close that your committee deems it proper to make reference to the possibilities of closer trade relations with the twelve Latin republics having frontage on the Pacific, and which are spending immense sums of money in the improvement of their ports. Mr. John Barrett, of Oregon, Director of the Bureau of American Republics, who has not only made a most exhaustive study of the resources of the republics south of the United States, but who has as well made personal examination of their trade relations, gives some valuable information. He calls attention to the wonderful development in all the Latin republics, in which business enterprises have been inaugurated that involve the expenditure of many millions of dollars. He asserts that if one twentieth of the expenditures that have been made for trade relations in Japan and China had been devoted to establishing closer relations with the Latin republics the results would have been incomparable. In illustration Mr. Barrett shows that the Argentine Republic, with 6,000,000 population, had a greater foreign trade than Japan with its 50,000,000 and China with its 400,000,000 population. And yet the United States has made but little effort to secure a fair proportion of this immense trade. That which we have neglected has been eagerly sought by England and Germany

An expenditure of $15,000,000 has been ordered by Chili for the improvement of the harbor at Valparaiso, and other ports are receiving practical attention. Heretofore, the development of Mexico has been largely limited to the more eastern and central parts of that republic, but of late years the officials of Mexico have been giving attention to the western or Pacific portion, having brought to completion improvements and enterprises that have already been of vast benefit to California ports and to the State at large as well, besides inaugurating others that California should be prepared to utilize.

One of the first steps toward an enlargement of trade and an increase of manufacturing and commercial interests is the proper improvement of the harbors of the State, even before the shipping fleet of the United States can be increased to proper proportions, as it will be. The attention of the commercial bodies of the State should be called to an almost neglected field, which promises far greater results than does the Orient. While the latter is being cultivated there is no excuse for apathy in the extension of trade relations with the Latin republics, which are so rapidly developing their natural resources. The proper improvement of the State's harbors will have much to do with the establishment of closer trade relations with republics which should be brought into a great commercial union, the United States being the leading member, and California the most important factor.

Your committee recommends to the legislature the advisability of State aid in securing for our commercial interests full information as to the natural resources of all the Latin republics, especially those bordering on the Pacific, as well as their needs for the manufactured products and commercial articles originating in this State, which should find a market in those southern countries now almost monopolized by Germany and Great Britain. It is true such information would be of general use, but California is in position to reap the greater reward owing to its almost unlimited supply of raw materials, its unlimited power for manufacturing purposes, and its harbors that, with proper improvement, can not be excelled.

ADVISORY BOARD OF HARBOR COMMISSIONERS.

Your committee recommends an amendment to the Political Code providing for an Advisory Board of Harbor Commissioners, to be comprised of the presidents of the several boards of harbor commissioners in this State. The desirability of such a board should be apparent. It might be well to add to such advisory board the Governor and the Controller, in view of the proposed increase in the expenditure of State moneys and in order to protect the people's interests. This is a matter to which serious consideration should be given, your committee having, during its researches, realized the advisability and the necessity for such a board.

CONCLUSIONS.

At the present time the accommodation for ocean freighters is in its infancy as compared with Atlantic ports, although the total number of vessels discharging cargoes during 1907 in California ports was 15,775. It has been said that facilities are sufficient for the present tonnage entering our ports, but increase of population within the State, a like increase in the states farther east, and the extension of trade territory will soon place present conveniences among the things of the past. To permit port facilities to remain at a standstill will be to acknowledge that all that has been said regarding the great anticipated growth of commerce is false, and we do not believe with our money that which we say with our mouths.

The State owns the tide lands at San Diego, and a portion of the tide lands at San Francisco, where the building of seawalls gives the State the ownership of wharf and warehouse privileges on its own reclaimed lands, a valuable acquisition that is worth millions of dollars in present values. Naturally concessions and rentals will add more millions of dollars, and eventually return to the State all that may have been expended, with interest, and still keep port charges at a minimum. Increased facilities will work to the advantage of consumer and shipper alike, while the benefits to the entire State will be inestimable.

For commercial purposes there are in State ports thirty-one wharves owned by the State, two owned by county, and thirty-eight owned by corporations and individuals. Added to these may be counted some thirty piers and docks occasionally used for commercial purposes, but which are in the main designed for pleasure or merely for private interests. Of those privately owned two are in San Francisco, nine in San Diego, nine in San Pedro, one in Santa Barbara, fifteen in Oakland, one at Port San Luis, one at Monterey, and one at Newport. The aggregate length of all the piers, State and private, has been estimated at 81,900 feet, affording accommodation for about 350 vessels at one time, a small number for the growing business being developed at all the ports. The cost of these wharves or piers is impossible of determination, varying so greatly with conditions. In San Francisco the cost varies from 50 cents to $2.90 a square foot, the character of piling and bottom being taken into consideration. At San Pedro the cost has been placed at $40 a running foot. In San Diego Bay there has been found the same conditions that prevail in San Francisco Bay as a whole, although the cost of concrete piling may be a little less. There is a demand for improvements by the State, confined principally to the building of seawalls, the construction of piers, and dredging. The approximate of aggregate ultimate cost is not less than $50,000,000.

The maintenance and repairs of all the ports aggregate for 1907 only $247,200, showing economical management, and this when the commerce in these ports represented in value hundreds of millions of dollars. This cost of maintenance, of course, is the aggregate of only those ports making report.

How shall these improvements, if decided upon, be made? Your committee has asked this question of many people, and the answer has invariably, with one exception, been, "By the issuance of long term bonds bearing a low rate of interest." The reason is obvious. As the benefits to be derived from these improvements will extend to future generations it is desirable that the expense of making the improvements should be partially borne by those who receive a portion of the benefits. This is generally understood by the people of the State of California, inasmuch as the legislature at its last session submitted to the electors of the State a constitutional amendment which provides for the issuance of 75-year bonds, and their redemption by a sinking fund which shall not begin for a period of eighteen years after their issuance. This amendment was carried by a large vote, and it was generally understood by the electors that these bonds were intended for the improvement of the harbor of the State. The legislature will, therefore, only be carrying out the will of the people in submitting to the electors of this State the bond issues recommended for the ports of San Francisco and San Diego.

RECOMMENDATIONS.

From the investigations made, as set forth in the foregoing report, the Joint Legislative Committee recommend as follows:

San Francisco.—That there be submitted to the electors of the State of California, under constitutional amendment adopted at the 1908 election authorizing 75-year bonds, a bond issue of three million dollars for the purpose of building a seawall and appurtenances for the port of San Francisco; a bond issue of six million five hundred thousand dollars for the purpose of building wharves and docks at the port of San Francisco; a bond issue of fifty thousand dollars for the purpose of extending, repairing, and improving the belt line railroad at the port of San Francisco; a bond issue of one million dollars for the acquisition of land at or near Islais Creek Basin; and a bond issue of four hundred thousand dollars for dredging in the port of San Francisco.

We further recommend that provision be made for the sale of these bonds, when authorized, by the State Treasurer upon direction of the Governor of the State of California, after a resolution requesting such sale shall have been made and adopted by the State Harbor Commissioners. Such bonds to be sold only as the funds are needed for the specified improvements.

San Diego.—We recommend for the port of San Diego a bond issue of one million dollars for the purpose of building a seawall and its appurtenances, and a bond issue of five hundred thousand dollars for the purpose of building wharves and docks at said port, under the same terms and conditions as contained in the recommendation for the bond issue for the port of San Francisco.

Humboldt Bay.—We recommend that a direct appropriation of twenty-five thousand dollars be made for the purpose of removing by dredging the hogbacks or sand deposits which are at the present time a destruction to shipping in Humboldt Bay.

Oakland.—As a majority of the people of Oakland prefer municipal control of harbor improvements at that point and advocate an issue of municipal bonds to pay for the same, we recommend that the State take no action so far as the improvement of the water front at Oakland is concerned.

San Pedro.—Inasmuch as the title to the tide lands at San Pedro is in litigation, and as the people of Los Angeles, and a portion of the inhabitants of San Pedro and Wilmington desire municipal control of that port, the committee recommends that the building of walls and docks at San Pedro be left entirely to the municipality.

Petaluma and San Rafael.—We recommend that a direct appropriation of fifteen thousand dollars be made for the purpose of dredging the channel and also dredging across the bar at Petaluma, and that the sum of five thousand dollars be appropriated for dredging the channel to the city at San Rafael.

LEROY A. WRIGHT,
E. I. WOLFE,
T. J. KENNEDY,
WALTER LEEDS,
PERCY JOHNSON,
LOUIS STROHL,
Joint Committee on Harbors.

REPORTS

OF THE

PRINCIPAL HARBORS ON THE CALIFORNIA COAST

FOR THE YEAR 1907

Prepared for the Joint Legislative Committee Appointed
Under Senate Concurrent Resolution No. 3.

1908.

REPORT

OF THE

BOARD OF STATE HARBOR COMMISSIONERS

SAN FRANCISCO, CALIFORNIA.

San Francisco, Cal., March 2, 1908.

Answers to questions proposed by the Joint Committee appointed at the last session of the Legislature regarding harbors in the State of California, Senator Leroy A. Wright, Chairman:

1. What is the depth of water over the bar at the entrance to harbor?

The average depth is five and one half (5½) fathoms, and there is a commodious channel having a minimum depth of nine (9) fathoms.

2. What is the average depth of channel in the harbor, and what is the area of anchorage ground?

The average depth of the channel is nine and one half (9½) fathoms. The area of anchorage ground in the immediate vicinity of the city, and now used as such, is twenty-four (24) square miles, exclusive of fairways, which occupy seven (7) square miles. In addition to this, there is available for anchorage in San Francisco Bay forty-eight (48) square miles, and in the adjoining extension of this inland sea, known as San Pablo Bay, twenty-one (21) square miles; a total anchorage ground of exactly one hundred (100) square miles.

3. What is the average depth inside the bay at piers and docks, or where piers and docks may be constructed?

The average depth inside the bay at piers and docks is twenty-three (23) feet; although at some places the depth is thirty-three (33) feet, which will allow the largest ships being safely docked.

4. How many piers and docks in your harbor are owned and operated by the State?

All of the piers and docks in the port of San Francisco are owned and operated by the State with the exception of two, viz.: the docking facilities of the Union Iron Works and those of the Western Sugar Refining Company.

5. How many piers and docks owned by the State are leased to private persons or corporations?

The Pacific Mail Steamship Company have a fifteen-year lease on piers 42 and 44, commonly known as the Pacific Mail docks. This lease was executed and became effective February 2, 1907, and $371,673 rental was paid in advance. The piers are each 650 feet long and 140 feet wide.

The Atchison, Topeka and Santa Fe Railway Company have a lease for a period of 168 months, executed and effective March 14, 1907, on what is commonly known as China Basin wharf, for which they paid in advance the sum of $24,930 rental. This wharf is 720 feet long and 60 feet wide.

The Atchison, Topeka and Santa Fe Railway Company have a lease for a period of 72 months, commencing November 23, 1904, on what is commonly termed the Fourth Street Car Ferry Slip, located at the intersection of the water front line and the northerly line of the China Basin property, also leased to the said company. The sum of $30,000 rental was paid in advance.

The Atchison, Topeka and Santa Fe Railway Company have a lease for a period of 96 months, effective February 17, 1904, on the addition to what is known as the Little Main Street Wharf, for which they paid in advance the sum of $19,897 rental.

The Loop Lumber Company are to have a fifteen (15) year lease on dockage facilities on Central Basin, which will become effective upon the completion and acceptance of the wharves which are now under construction. They have paid in advance for this privilege the sum of $44,760 rental.

6. How many piers and docks are owned and operated by private individuals or corporations?

The Union Iron Works and the Western Sugar Refining Company own their own docks and piers.

7. What is the cost of each of such docks and piers, and what revenue do they produce to the State?

The dockage facilities used by the Union Iron Works are not operated for commercial purposes, and therefore produce no revenue to the State. They are used solely for the building and launching of vessels, and their cost is unknown.

The Western Sugar Refining Company use the docks and piers, which were built by them, as an adjunct to their business, viz.: the importation and refinement of sugar. They produce no revenue to the State and their cost is unknown.

By the extension of the seawall, as is proposed, both of these docking facilities will come under the jurisdiction of the State, and will then be subject to tolls and wharfage rates, the same as other State docks.

8. What is the total number of piers and docks in your bay, how are they constructed, and what are their estimated lives?

The docking facilities of the harbor consist of thirty-one (31) projecting piers, in addition to which there is 6,629 lineal feet of bulkhead wharf.

The older piers, of which there are nineteen (19), are constructed of preserved piles with wooden caps, joists, and floorings; twelve (12) of more modern construction rest on huge concrete cylinders, eight (8) of which have wooden caps, joists, and flooring, and four (4) of which have heavy steel caps over the cylinders.

The estimated lives of the piers built on preserved piling and having wooden superstructures is from seven (7) to eight (8) years, after the expiration of which time extensive repairs are necessary. The life of a pier built on concrete cylinders is indeterminable and of indefinite length, some having been put in over thirteen (13) years ago are still standing and are apparently as good as ever as regards foundation.

9. What is the aggregate length of the piers and docks now in use?

The aggregate length of the piers and docks now in use is 18,600 feet, exclusive of the 6,629 feet of bulkhead wharf above mentioned.

10. What has been the cost of construction of your piers and docks?

Owing to the diversified forms of construction employed in the erection of docks and piers it has been deemed best to classify the answer to this question according to the mode of construction used, as follows:

A dock constructed of unpreserved or green piles will cost approximately fifty ($0.50) cents per square foot.

If constructed on preserved piling the cost will be about eighty ($0.80) cents per square foot.

If constructed on cylinder piers with wooden caps, joists, and flooring the cost will be about one and ($1.25) 25-100 dollars per square foot.

If constructed on cylinder piers with steel caps and wooden joists and flooring the cost will be between one and ($1.60) 60-100 dollars and two and ($2.20) 20-100 dollars per square foot.

An amount of approximately thirty ($0.30) cents per square foot should be added to the above prices if the pier is to be covered with a wooden shed.

A dock constructed on cylinder piers with steel caps and having a reinforced concrete flooring and an iron fireproof shed, will cost approximately two and ($2.90) 90-100 dollars per square foot.

It is to be understood, of course, that the prices given above are subject to variaion, according to the demands of labor and the cost of material.

11. What is the present condition of your docks and piers?

The docks and piers constructed on concrete cylinder piers, that is, on piles protected by concrete piers, are in good condition; those on preserved piles are in every condition from good to that of being on the verge of collapse.

12. Are your dock facilities adequate for all demands of the trade at any season of the year?

The dockage facilities of this port are inadequate in so far as they do not permit of specific assignment of wharves to regular lines of steamers, which is deemed desirable.

13. What pier improvements are needed in your harbor?

The seawall must be extended from the Union Depot Ferry House to Pier 42, a distance of 5,160 feet. One thousand feet of this wall extending northerly from Pier 42 is now nearing completion. Abutting this wall there will be built three of the most modern type of concrete fireproof piers. This work should be followed by the reconstruction of at least twelve of the old piers and the addition of four new ones, all extending to the pierhead line. This work will cost ultimately $5,000,000, and will acquire in seawall lots alone property worth at least $2,000,000. The pierhead line should be redrawn to include the whole of China Basin, followed by twelve or more piers to serve the Potrero and Mission sections.

All of the old piers north of the ferry house must be modernized as dilapidation demands at a cost of over $2,000,000. A solid wall pier should be built to the pierhead line from the neighborhood of the foot of Taylor street to protect modern docks required between Lombard and Taylor streets. The seawall should be extended westerly from Taylor and East streets to the Government reservation at Black Point, thus acquiring valuable seawall lots and pier sites demanded by commercial extension along North Beach.

Ultimately Central Basin must be enclosed by the seawall, with a drawbridge as provided in the law, and thence extend to the intersection of Islais Creek.

14. What would be the approximate cost of such needed improvements?

The work above outlined, if done in permanent manner, will cost approximately $20,000,000.

15. What improvements, if any, are expected to be made by the Federal Government; state character and probable cost of same?

The Federal Government will probably cause the removal of two small rocks near Mission Rock.

16. What steps, if any, has the Federal Government taken towards making such improvements?

The Federal Government has made surveys and estimates of this work, but the results are not obtainable.

17. What is private enterprise doing toward developing the shipping facilities of your port, and building up its commerce?

Private enterprise is doing nothing toward developing shipping or commerce, except the Western Pacific Railway Company, who contemplate the construction of terminal facilities along Islais Creek. To date there has been approximately 14,000 yards of material placed for a mole. The aforesaid company own approximately $6,000,000 worth of property in this section of the city, and contemplate its development for an Oriental terminal. Ultimately this will mean the expenditure of an enormous sum of money, and as a natural consequence the shipping of the port will receive an impetus.

18. What has been the annual cost of maintenance of your docks and piers?

The average annual cost of maintenance for the docks and piers in San Francisco Bay for the last twenty-five years has been approximately $170,000 per year. This amount does not include dredging.

19. If wood and piling have been used in the construction of piers and docks, what is the average life of the piling?

Piers and docks constructed on preserved piles last seven (7) or eight (8) years. On green piles from three (3) to six (6) years.

20. What are your dockage charges?

The port charges in San Francisco are extremely moderate and bear favorable comparison with those of any port in the world.

The following dockage charges are quoted from "Harbor Rules, Regulations, and Rates, adopted by the Board of State Harbor Commissioners, San Francisco, 1906," and to which reference is hereby made:

RATES OF DOCKAGE.

Each rate is for a day of twenty-four (24) hours, or any part thereof, including Sundays, holidays, and rainy days.

61. For all ocean vessels, steam or sail, and all sail vessels, steamboats, and barges navigating the bay of San Francisco and the rivers and other waters flowing into it, of two hundred net registered tons or under, 2 cents per ton; for all such vessels of over two hundred net registered tons, $4 for the first two hundred tons, and three quarters of a cent for each additional ton.

Full rates shall be charged as follows:

62. (1) Vessels with cargo on board docking at wharf while discharging cargo.

(2) Vessels with cargo on board docking at wharf while discharging or taking on passengers and baggage.

(3) Vessels with no cargo on board docking at wharf while discharging passengers and baggage.

(4) Vessels with cargo on board docking at wharf while taking on stores, supplies, or fuel oil for fuel for such vessel.

(5) Vessels with cargo on board docking at wharf while lying idle.

(6) Vessels that are engaged in towing.

(7) Vessels that are not engaged in carrying freight and passengers.

Half rates shall be charged as follows:

63. (1) Vessels with no cargo on board docking at a wharf while loading cargo.

(2) Vessels with no cargo on board docking at a wharf while receiving passengers or receiving stores, supplies, or fuel oil for fuel of such vessel.

(3) Vessels with cargo on board docking at a wharf while taking on a reasonable amount of cargo, exclusive of stores, supplies, or fuel oil for fuel for such vessel.

(4) Vessels with no cargo on board while lying idle at a wharf.

(5) Vessels while receiving or discharging ballast or receiving stiffening.

(6) Vessels either discharging, loading, or lying idle while occupying outside berths.

(7) Vessels while moored in docks, slips, basins, or canals.

(8) Vessels engaged in towing and vessels not engaged in carrying freight and passengers not entitled to half rates.

64. When the per diem dockage of a vessel, as above described, is not a multiple of five, it must be reduced or increased, as the case may be, to the nearest such multiple; *provided*, that if it be equally near to two such multiples, it must be increased to the first such multiple above.

65. All bills for dockage must be paid when due, whether approved by the master or not. Failure to pay said bills on presentation will subject the vessels to be placed on the delinquent list, and to the penalties provided by law. Errors, if any, will be rectified by the Board.

66. When a vessel of any kind is charged or has paid dockage at a wharf for any day, she may use the same or any other wharf during that day without further charge, no matter how often she may leave and return; *provided*, a receipt for payment or transfer card from the Wharfinger at the first wharf be produced; and on application of the master the Wharfinger is required to issue such transfer card.

RATES OF DOCKAGE ON LIGHTERS.

66*a*. A lighter is understood to be a vessel which has neither power nor steering equipment.

67. A dockage rate of 1 cent per ton net tonnage per day will be charged on all lighters in the following cases:

(1) When discharging or loading at a wharf.

(2) When discharging into or loading from a vessel lying at a wharf or in a slip with or without cargo on board.

(3) When transporting from a wharf to a vessel, or from a vessel to a wharf, but one dockage charge will be made per day.

21. What is the cost of handling freight per ton?

For an answer to this question, the following is quoted from the "Harbor Rules, Regulations," etc., above mentioned:

RATES OF TOLLS.

Both a discharging and a loading toll shall be imposed on all merchandise (including vessels' stores and supplies and fuel oil for such vessel) except where otherwise specified, and must be paid by the vessel discharging or loading same.

68. A ton is by weight 2,000 pounds, unless otherwise specified; by measurement, 40 cubic feet.

69. Merchandise, for the purpose of tolls or wharfage, must be computed by weight or measurement, as the one mode or the other will give the greater number of tons.

70. Of the following articles 2,240 pounds constitute a ton: coal, railroad iron, pig iron, gypsum, asphaltum, ores, crude or boiled sulphur, paving stones, sand, and ballast.

TOLLS PER TON.

71. On merchandise (except where otherwise specified) including vessels' stores and supplies and coal and fuel oil for such vessel, per ton, 5 cents.

On flour, grain, and millstuffs, 5 cents.

On 400 pounds or less, 1 cent.

On 800 pounds or less and more than 400 pounds, 2 cents.

On 1,200 pounds or less and more than 800 pounds, 3 cents.

On 1,600 pounds or less and more than 1,200 pounds, 4 cents.

On 2,000 pounds or less and more than 1,600 pounds, 5 cents.

Tolls on merchandise when measured or charged a higher rate, to be collected according to the foregoing subdivisions.

TOLLS CHARGED OTHERWISE THAN BY THE TON.

72. On the following articles tolls must be paid as follows:

On fir, redwood, spruce, and all softwood lumber, per 1,000 feet, board measure, 10 cents.

On oak, hickory, ash, and all hardwood lumber, per 1,000 feet, board measure, 20 cents.

On lumber or timber discharged in the water in any slip, dock, basin, or canal, the same as if discharged on a wharf.

On piles discharged on any slip, dock, basin, or canal, per pile, 6 cents.

On fence posts, per 100, 10 cents.

On railroad ties, per 1,000 feet of lumber, board measure, contained therein (32 or 24 feet to a tie, according to size), 10 cents.

On shingles, per 40 bundles, 10 cents.

On laths, per 60 bundles, 10 cents.

On shakes, per 100 bundles, 10 cents.

On empty barrels (merchandise), each, ¼ cent.

On empty sugar barrels, each, ¼ cent.

On cord wood, per cord, 5 cents.

On tan bark and stave bolts, per cord, 5 cents.

On fire bricks, per 1,000, 15 cents.

On bricks (other than fire bricks) discharged on, or loaded from any wharf, per 1,000, 10 cents.

On bricks (other than fire bricks) discharged from any vessel lying at any wharf, or in any slip, dock, or basin, into another vessel, or received into any such vessel, per 1,000, 5 cents.

On wool or cotton in sacks, per sack, 1 cent.

On wool or cotton in bales, strapped, per bale, 1½ cents.

On hops in bale, per bale, 1 cent.

On hides of cattle (green or dry), per hide, ¼ cent.

On skins, per skin, 1-16 cent.

On cattle, horses, and mules, per head, 5 cents.

On colts and calves, under a year old, per head, 2½ cents.

On sheep and hogs, per head, 1 cent.

On hay, per ton, 5 cents.

On crushed rock (long ton), 5 cents.

On reapers, mowers, horse rakes, hay presses, gang plows, cultivators, and wheeled vehicles, set up, each, 10 cents.

On headers and separators, set up, each, 20 cents.

On charcoal, per 35 sacks (of 55 pounds each), 5 cents.

On cement, 5 barrels to the ton, 5 cents.

On lime, 8 barrels to the ton, 5 cents.

On beef, pork, or fish, 6 barrels to the ton, 5 cents.

On sugar or syrup, 6 barrels to the ton, 5 cents.

On wine or liquor, per barrel, 1¼ cents.

On wine or liquor, per pipe, 5 cents.

On cocoanuts, per 1,000, unhusked, 15 cents.

On cocoanuts, per 1,000, husked, 10 cents.

On bananas, per bunch, ¼ cent.

On salmon, per ton of 2,000 pounds, 5 cents.

Crude oil (whether in barrels or bulk), per ton of 2,000 pounds (7¾ pounds to gallon), 5 cents.

Crude oil, naphtha, gasoline, etc., conveyed either inward or outward, over or through any wharf, bulkhead, or other State structure, or loaded or discharged in any slip, basin, or channel, per ton of 2,000 pounds (7¾ pounds to gallon), 5 cents.

73. (The weight of crude oil contained in tanks or vessels or conveyed to or from shipping, to be computed on the basis of 7¾ pounds per gallon, if actual weight is not obtainable.)

74. On empty packages, being returned to the owner, who uses them to send commodities to market, no tolls will be charged.

75. Grain, flour, millstuffs, beans, and seeds will be subject at all wharves to the same rules and rates of tolls and wharfage as are imposed on other merchandise.

Amendment to Rule 75: Grain, flour, millstuffs, beans, and seeds may remain on the wharves at Sections No. 1 and No. 2 of the seawall until 5 o'clock P. M. on the third day after discharge, free of wharfage charge; for the next five days, or any part thereof, there shall be a wharfage charge of 5 cents per ton; for each additional day thereafter the wharfage charge shall be 5 cents per ton; *provided*, that where any owner or consignee fails or refuses to pay, on demand, bills rendered for wharfage, or refuses to comply with other rules and regulations of the Board of State Harbor Commissioners, the provisions of Rule 82 shall apply and become immediately effective as to such owner or consignee.

76. The term "grain" is intended to and does include wheat, barley, oats, corn, and rye; the term "flour" includes only the flour of wheat, and "millstuffs" includes only bran, middlings, shorts, and ground feed.

78. No tolls will be charged on donkey engines or stevedores' tools when taken on the wharf for the purpose of loading or discharging a vessel; nor on milk, butcher, baker, ice, or laundry supplies furnished daily to vessels.

79. Merchandise landed on a wharf and not removed therefrom, may be reshipped from the same wharf without payment of further toll, but the wharfage, if any due thereon, must be paid.

80. Merchandise, except bricks (other than fire bricks), discharged from a vessel lying at any wharf or within any slip, into lighters or other vessels, is subject to the same rates of tolls as if discharged on or loaded from a wharf.

81. When the tolls have been paid on merchandise, on its being discharged from a vessel it may be landed thence on a wharf, or discharged into another vessel, without the payment of further tolls; except bricks (other than fire bricks), which shall be charged as follows: On bricks, 5 cents per one thousand.

In addition to the above specified tolls a charge for stevedoring should be added amounting to between thirty ($0.30) cents and forty-five ($0.45) cents per ton.

22. What warehouse charges are made on the piers and docks?

Reference is again made to "Harbor Rules, Regulations," etc., from which the following is quoted:

WHARFAGE.

82. Merchandise must be removed from the wharf before 5 o'clock P. M. on the day following the one on which it was placed thereon; but wharfingers are hereby authorized, when the owners or consignees of merchandise desire it, and it can be done without interfering with the business of the wharf, to allow merchandise to remain on the wharf after the prescribed time, at a wharfage charge equal to an additional toll for every forty-eight hours or part thereof. If merchandise be not removed within twenty-four hours after notice by the wharfinger, it shall be liable to the penalties of Section 2524 of the Political Code.

Exception to Rule 82: Lumber discharged from vessels carrying 500,000 feet, board measure, or over, and from vessels of no lesser capacity, may remain on wharf until 5 o'clock P. M. of the third day following its discharge. Then and thereafter all provisions of Rule 82 shall be effective and must be enforced. This exception to Rule 82 to become effective July 31, 1907, and to continue in force until further notice.

23. What are the demurrage charges for the first twenty-four hours?

This question is answered by Rule 82 above quoted.

24. How many vessels can secure dockage facilities at one time?

This question is not entirely clear, the answer depending entirely upon the tonnage of the vessels. Certain piers in this port will accommodate four large ships, while the same pier will accommodate several steam schooners. It is estimated, however, that from one hundred and eighty to two hundred vessels can secure berth room.

25. Are dockage facilities ample, or nearly so, for the present demands?

Owing to present national financial conditions, and local shipping labor conditions, the dockage facilities of this port are at the present time ample for needs of trade. The demands of commerce made on this port, however, are so excessive that to comply with them would take years of time and millions of money. By constant rearrangement of berth space, the facilities of this port are now accommodating the commerce. This answer should not, however, be taken as a criterion of future development of trade.

26. Are your tide lands owned by the State or private individuals?

The State owns no tide lands in San Francisco Bay whatever, except the land acquired by the construction of the seawall, commonly termed seawall lots. The tide lands of the bay were sold by the State under the Tide Lands Act.

27. If portions of your tide lands are owned by individuals, give the area as nearly as possible of private ownership and its location?

The approximate area of private ownership of tide lands is four (4) square miles, and extends along the entire water front to the Presidio.

28. What are the dockage and shipping charges proposed by owners of private docks and piers?

No dockage or shipping charges are proposed by owners of private docks and piers, as the facilities under private ownership are used solely in connection with the business of the owners.

29. From what ports is freight received, foreign and domestic?

From all ports in the United States and the world.

30. What is the amount of freight in tonnage shipped to domestic and foreign ports? Give aggregate in each case.

During the year ending June 30, 1907, there was shipped from San Francisco to foreign ports 1,613,872 tons of freight. During the same period there was shipped to domestic ports 2,744,776 tons.

31. What is the amount of tonnage annually received?

The average tonnage for the past five years has been 3,506,395 tons per year.

32. What is the amount of tonnage annually shipped?

The average tonnage shipped for the past five years has been 3,476,395 tons per year.

33. How many steam vessels entered your port during the year 1907? Give tonnage.

During the year ending December 31, 1907, there were docked at the port of San Francisco 6,900 steam vessels, with a total tonnage of 3,895,454. Of this number 2,937 were bay and river craft, and the balance, or 3,963, were deep seagoing vessels. This does not include the ferry boats which ply between the city of San Francisco and transbay points, which make 170 trips daily and carry 100,000 passengers.

34. How many sail vessels with tonnage entered your port during the same period?

For the calendar year ending December 31, 1907, there were docked at the port of San Francisco 748 sail vessels, with a total tonnage of 720,149. Of this number 729 were deep seagoing vessels and 19 bay and river craft of over ninety tons registered measurement.

35. What are your leading imports?

The leading imports of the port of San Francisco are cereal products, coal, iron, lumber, cement, gravel, shingles, shakes, laths, bricks, glass, hemp, sugar, cotton, tobacco, pelts, whale oil, petroleum and products, tropical fruits, hardwoods, nitre, and all other general merchandise.

36. What are your leading exports?

Manufactured products of all kinds, flour, hay, malt liquors, wines, canned goods, canned and dried fruits, fresh and citrus fruits, etc.

37. Where private parties own the water front land, can the title be secured by the State at reasonable prices without condemnation?

It is not necessary for the State to secure title to tide lands of private ownership, as the construction of the seawall creates the State's own water front.

38. What railroads have spurs to or on the piers and docks, and to what extent is there interference with the convenience of the public?

The Southern Pacific Company have spurs on Piers 42 and 44. The Atchison, Topeka and Santa Fe Railway Company have spurs on Piers 26 and 28. The public is interfered with only to the extent that traffic is sometimes delayed by switching cars across the street in front of these docks.

39. What interior territory in this or adjoining states may be economically served by shipping to or from your port?

All of the Sacramento and San Joaquin valleys from Shasta on the north to Bakersfield on the south; every navigable river in the State; and the entire state of Nevada.

40. What are the immediate prospects of an increase of the shipping of your port?

The immediate prospects are good, and a lively increase in shipping may be expected within the next month or two, and to continue indefinitely.

41. What are your warehouse and railroad facilities for handling freight?

The warehouse facilities have recently been augmented by the erection of a grain warehouse 1,000 feet long by 80 feet wide. Exception to Rule 75, above quoted, applies to grain discharged at this point. As stated above, the sheds on the wharves are used for warehouse purposes for a stated period of time. (See answer to Question 22, Rule 82.) As an adjunct to the docks the State owns and operates what is known as the belt railroad, with four miles of trackage, connected with which are about two miles of private spurs in addition. This railroad receives car loads from transbay railroads and distributes them among the freight houses, warehouses, and factories around the water front. Over 50,000 loaded cars were handled on the belt railroad during the past year. A uniform rate of $2.50 per loaded car is charged for this service.

42. What are the prospects of an immediate enlargement of such facilities?

The construction of the seawall contemplated will enlarge the shipping field, which will, of necessity, have to be served by the belt railroad, thus demanding an enlargement of this facility.

43. What, if any, suggestions have you to make to existing laws regulating harbors?

It is to be regretted that existing laws, while holding the Harbor Commission responsible for any abuse of State property, does not give it sufficient control over the same for the abatement of nuisances. A striking illustration of this has recently been presented to the traveling public, when certain daily newspapers of this city set decency and good order at naught.

The case in question has been reported upon by Commissioner W. E. Dennison, acting as a committee of one on abuses of privileges connected with the approaches to the ferry building. Mr. Dennison submitted the following report:

"In recognition of the necessity of having free and unassailed passage through the union depot and ferry house of San Francisco, used daily by more than 100,000 people, the Board of State Harbor Commissioners on November 21, 1907, established and marked lines defining a strip 12 feet wide along the curb of the north and south wings and all of the space about the main facade to a distance at least 100 feet from the building. All vehicles standing for hire, except street cars, and all itinerant persons soliciting baggage or passengers, or selling or crying for sale wares or merchandise of every kind, including newspapers and racing programmes, were ordered to remain beyond said lines. During inclement weather only were the news vendors allowed the shelter of the building.

"For a period of fifty-six days the public enjoyed a peace and freedom at the main gateway of this city that had never before been known. No resistance was made to the regulation until the afternoon of January 16, 1908, when a mob of more than 100 crossed the lines and defied the police. The regular newsboys were reinforced and led by hoodlums from 16 to 22 years of age carrying papers. After unavailing efforts to keep back the offenders the police made a number of arrests in the most humane manner.

"When the first of these offenders was brought to trial in the police court the State's attorney for the Board was curtly denied by the district attorney the customary privilege of appearing for that official in the interests of the State. Therefore, a presentation of the case from the standpoint of this Board was not permitted. The case was dismissed without even as much as a reprimand, save for the Board of State Harbor Commissioners and its officers.

"In the absence of a fixed penalty for this particular violation of a sound regulation, made solely in the interest of a long-suffering public, the police court and the district attorney's deputy derided the efforts of the Board and through it the State of California."

The laws should be amended so that a proper end would be accomplished, and in case of conflict with municipal authorities the matter should be adjusted in the State courts.

Laws should be made compelling the Pilot Commission to make its report to the Governor of the State or the State Legislature, and the pilot charges of the port should be materially reduced. As a remedy we would suggest that the pilots be placed on monthly salaries instead of fees, and a nominal charge, if any, be made against incoming and outgoing vessels.

44. What, in your opinion, is it practical for the State to do to assist in the building up of commerce at your port?

Authorize the issuance of sufficient bonds to make the required improvements, moderately anticipating the wants of commerce.

45. If improvements are made by the State, should they, in the judgment of your business men, be made by direct appropriation or by the issue of bonds bearing a low rate of interest and covering a period of many years?

By the latter.

46. What are your pilotage charges?

The rates of pilotage into and out of the harbor of San Francisco are as follows (Section 2466, Political Code): "All vessels under 500 tons $3 per foot draught; all vessels over 500 tons $3 per foot draught, and 3 cents per ton for each and every ton registered measurement. * * * In all cases where inward bound vessels are not spoken until inside of the bar the rates of pilotage herein provided shall be reduced 50 per cent. Vessels engaged in the whaling or fishing trades shall be exempt from all pilotage except where a pilot is actually employed."

The pilotage inside the heads to the anchorage opposite San Francisco and about the harbor, or between the harbor of San Francisco and the ports of Mare Island, Vallejo, and Benicia, must be at such rates as agreed upon between the parties, not to exceed $5 per foot draught.

The legislature of 1903 amended the law reducing the rates of pilotage into and out of the harbor of San Francisco from $5 per foot draught to $3 per foot draught, and from 4 cents per ton registered measurement to 3 cents per ton.

47. What obstacles, if any, have shipping interests to contend with in your port?

The vessels docking at the port of San Francisco have to pay an extraordinarily high rate for the water they use. There is also an absence of warehouse facilities along the water front, which tends to increase merchandise cost. In addition to this there is a total lack of any facilities for handling bulk freight. A limited number of power cranes should be installed on the wharves.

48. If, in your opinion, any of the fixed charges on shipping can be reduced, please make suggestions as to the best method of accomplishing such reduction.

The shipping charges of the port are reasonable and bear favorable comparison with the shipping charges of any of the world's ports. There should be no reduction in such charges until such time as the improvements contemplated are completed.

49. Have any private persons or corporations attempted to monopolize the shipping facilities of your port or your water frontage; if so, state what persons or corporations, and what, if anything, has been done to prevent such monopoly?

We have no knowledge of any such attempt either by private individuals or corporations; in fact, it would not be possible under the law.

Respectfully submitted.

W. V. STAFFORD,
President Board of State Harbor Commissioners.

REPORT

OF THE

BOARD OF STATE HARBOR COMMISSIONERS

SAN DIEGO, CAL.

San Diego, Cal., March 2, 1908.

1. What is the depth of water over the bar at the entrance to harbor?

The channel on the bar is 250 feet wide and 28 feet deep.

2. What is the average depth of channel in the harbor, and what is the area of anchorage ground?

The channel in the harbor is from 30 to 50 feet deep. The available area of anchorage in the bay of San Diego, which I assume to be that part of the deep water within the 26-foot contour is, as near as can be determined from the small scale maps published by the Government, 9.2 square miles.

3. What is the average depth inside the bay at piers and docks, or where piers and docks may be constructed?

The depth at the pierhead line is rarely less than 25 feet, usually over 30 feet. All wharves should terminate at the pierhead line.

4. How many piers and docks in your harbor are owned and operated by the State?

The State has no wharves in the bay.

5. How many piers and docks owned by the State are leased to private persons or corporations?

The State owns no wharves in the bay, and therefore can lease none.

6. How many piers and docks are owned and operated by private individuals or corporations?

There are nine large wharves, all private ownership; there are ten small wharves, foot wharves. The Federal Government has a small wharf at Fort Rosecrans and a quarantine wharf, with buildings, at La Playa.

7. What is the cost of each of such docks and piers, and what revenue do they produce to the State?

	Cost.	Rent per Year.
Santa Fe wharf	$200,000 00	$360 00
Pacific Coast Steamship Company	50,000 00	600 00
Spreckels Bros.' Commercial Co.	150,000 00	360 00
San Diego Lumber Company	40,000 00	240 00
Russ Lumber and Mill Company	44,000 00	420 00
Jorres & Son	25,000 00	84 00
Standard Oil Company	2,500 00	240 00
Coronado Beach Company, ferry wharf	75,000 00	96 00
Coronado Beach Company, commercial wharf	25,000 00	72 00

8. What is the total number of piers and docks in your bay, how are they constructed, and what are their estimated lives?

There are nine large wharves in the bay. The piers or wharves constructed on the bay of San Diego are, without any exception, wooden structures supported on piling. The wharf known as the "Spreckels wharf" is really the only one that can be considered in good condition. The life of any timber structure upon this bay is limited to the activity of the teredo and limnora. As a general thing, no piling will last for a longer period than two years unless it be well protected with hydraulic cement concrete, or is a piling treated with creosotum, or some other preservative agent. Under the best of conditions no timber structure will last without a large amount of expenditure for maintenance.

9. What is the aggregate length of the piers and docks now in use?

1. The wharf of the Atchison, Topeka and Santa Fe Railway Company is 40 feet wide at the shore end. It extends into the bay about 2.500 feet, on an easy curve. At the extreme end it is 74 feet wide. About 500 feet from the shore a spur extends westward 800 feet long. The deep water end of the shore is 72 feet wide.

2. The wharf of the Pacific Coast Steamship Company extends into the waters of the bay 1.917 feet, and at the outer end has a head or T 115 feet wide and 415 feet long.

3. The wharf of the Spreckels Bros.' Commercial Company extends into the waters of the bay 2.000 feet. It is 75 feet wide at the outer end. The Spreckels coal bunkers are on this wharf.

4. The wharf of the San Diego Lumber Company extends into the waters of the bay 2,038 feet, and at the outer end has a head 75 feet wide by 250 feet long.

5. The wharf of the Russ Lumber and Mill Company is 500 feet wide and extends into the waters of the bay 450 feet.

6. The wharf of Jorres & Son extends into the waters of the bay about 2.050 feet. The head at the outer end is 500 feet long and 80 feet wide.

7. The wharf of the Standard Oil Company is located 2.080 feet out from the shore, and is 200 feet long and 10 feet wide. A pipe line extends from the shore to the wharf.

8. The wharf of the Coronado Beach Company is located on the Coronado side of the bay; it contains the slip for the Coronado ferry. It is 350 feet wide and extends into the bay 300 feet.

9. The commercial wharf of the Coronado Beach Company is located on the Coronado side of the bay. It is 100 feet wide and extends into the bay 200 feet.

AGGREGATE LENGTH OF WHARVES.

	Main Wharf.	Spur or Head.
Atchison, Topeka and Santa Fe Railway Company......	2.500	800
Pacific Coast Steamship Company....................	1.917	415
Spreckels Bros.' Commercial Co.....................	2.000	...
San Diego Lumber Company...........................	2,038	250
Russ Lumber and Mill Company.......................	450	...
Benson—696 feet on tide lands; 300 feet below low tide.		
Jorres & Son	2.050	500
Standard Oil Company	.....	200
Coronado Beach Company, ferry	300	2.165
Coronado Beach Company, commercial.................	200	11.455

10. What has been the cost of construction of your piers and docks?

The answer is given in the answer to Question No. 7.

11. What is the present condition of your docks and piers?

The wharves are all in good condition for traffic, except the wharf owned by Jorres & Son, which is in very bad condition, and mostly fallen down.

12. Are your dock facilities adequate for all demands of the trade at any season of the year?

The present wharf facilities seem to be sufficient for all business demands at the present time.

13. What pier improvements are needed in your harbor?

The Commissioners think that a wharf owned by the State, which might be used by all persons and companies not having wharf facilities of their own in the bay, would greatly increase the value of this port in the minds of shippers and seafaring men as a shipping point.

14. What would be the approximate cost of such needed improvements?

A new wharf for the State would cost approximately $100,000.

15. What improvements, if any, are expected to be made by the Federal Government; state character and probable cost of same?

The Federal Government is building a naval coaling station in the bay; the cost will probably be $250,000. A bill has been introduced in Congress this term appropriating $259,750 to build a dry dock and for other work in the bay.

16. What steps, if any, has the Federal Government taken towards making such mprovements?

The coaling station is now in course of construction.

17. What is private enterprise doing toward developing the shipping facilities of your port, and building up its commerce?

No answer.

18. What has been the annual cost of maintenance of your docks and piers?

The wharves in San Diego Bay cost annually about $11,700.

19. If wood and piling have been used in the construction of piers and docks, what is the average life of the piling?

Piling properly treated with creosote and cement will last fifteen to twenty years. If piling is not properly treated it will not last longer than from three to five years. The limnora and teredo destroy the piles.

20. What are your dockage charges?

Per day, one cent per ton for 200 tons or less; three quarters of a cent per ton for balance; net register tonnage.

21. What is the cost of handling freight per ton?

Freight is unloaded from ship and loaded into cars. Merchandise, 50 cents per ton; lumber, 75 cents per thousand feet; ties, 60 cents per thousand feet.

22. What warehouse charges are made on the piers and docks?

Warehouse charges on wharves depend on the commodities, time and other conditions, and are made by contract.

23. What are the demurrage charges for the first twenty-four hours?

There are no demurrage charges. Regular dockage is charged when a vessel lies alongside a wharf, whether she discharges or not.

24. How many vessels can secure dockage facilities at one time?

The full capacity of all the wharves, under favorable conditions, is twenty-four vessels at one time.

25. Are dockage facilities ample, or nearly so, for the present demands?

There is sufficient room at the wharves for all vessels that come into the bay at the present.

26. Are your tide lands owned by the State or private individuals?

The State owns nearly all the tide lands.

27. If portions of your tide lands are owned by individuals, give the area as nearly as possible of private ownership and its location?

The Coronado Beach Company owns tide lands on a portion of North Island. We have no data giving the area.

28. What are the dockage and shipping charges proposed by owners of private docks and piers?

No answer.

29. From what ports is freight received, foreign and domestic?

Imports from foreign countries are mostly from France, Germany, England, Ireland, Mexico, British Columbia, Chili, Japan, Hongkong. Imports from ports in the United States are mostly from New York and from Pacific coast ports.

30. What is the amount of freight in tonnage shipped to domestic and foreign ports? Give aggregate in each case.

No answer.

31. What is the amount of tonnage annually received?

During 1907, 73,057 tons; 64,688,700 feet of lumber.

32. What is the amount of tonnage annually shipped?

1907, 10,976 tons.

33. How many steam vessels entered your port during the year 1907? Give tonnage.

Four hundred and twenty-three.

34. How many sail vessels with tonnage entered your port during the same period?

Eighty. Of the total tonnage of vessels entering, amounting to 128,008, 73,057 tons were left at this port.

35. What are your leading imports?

The principal articles of import are coal, coke, pig iron, cement, domestic animals, copper matte, hides, guano, bran, onyx, fire brick, lumber, flour, feed, structural iron, iron pipe, machinery, groceries, dry goods, and leather goods.

36. What are your leading exports?

Honey, tallow, hides, pelts, fish, wool, oranges, lemons, and grain.

37. Where private parties own the water front land, can the title be secured by the State at reasonable prices without condemnation?

So small a portion of the water front and tide lands is owned by private parties, and this at such favorable locations, that it is very unlikely they would be willing to sell to the State.

38. What railroads have spurs to or on the piers and docks, and to what extent is there interference with the convenience of the public?

The Atchison, Topeka and Santa Fe Railway Company has tracks on its own wharf and on the Spreckels Bros.' wharf; these tracks do not inconvenience the public.

39. What interior territory in this or adjoining states may be economically served by shipping to or from your port?

San Diego Bay is the natural and best port of entry for all the territory south of Tehachapi and eastward of southern California, including Arizona, New Mexico, Utah, Colorado, and Kansas.

40. What are the immediate prospects of an increase of the shipping of your port?

The commerce of the port of San Diego is growing rapidly at present, owing to the rapid development of southern California. When the isthmian canal is opened we anticipate that very great amounts of the products of southern California will be shipped to the Atlantic coast through this port and the canal; and that great quantities of merchandise from the cities of the Atlantic coast and from Europe, which is destined for southern California and territory eastward, will be shipped through the isthmian canal and will be entered at this port; also that large quantities of the products of the Orient shipped to the United States will be entered at this port.

41. What are your warehouse and railroad facilities for handling freight?

There is at present only one transcontinental railroad reaching the shores of this bay, the Atchison, Topeka and Santa Fe. This company has a large warehouse and a large platform on its wharf.

The Pacific Coast Steamship Company has a large warehouse on its wharf and one on the shore.

The Spreckels Bros.' Company has a large warehouse on the shore near its wharf.

42. What are the prospects of an immediate enlargement of such facilities?

We do not know that there will be an increase of warehouse facilities soon. We think there will be a large increase within two or three years, when the San Diego and Arizona railroad is built.

43. What, if any, suggestions have you to make to existing laws regulating harbors?

We have no suggestions to make at the present time as to the laws governing harbors. Any suggestions and recommendations which are the results of our experience and mature thought which we may wish to make will be presented in our next biennial report, in October, 1908. [This report was printed in December, 1908.]

44. What, in your opinion, is it practical for the State to do to assist in the building up of commerce at your port?

We think that a wharf owned and controlled by the State, and the building of a portion of the bulkhead or seawall, will tend greatly to increase the business of this port.

45. If improvements are made by the State, should they, in the judgment of your usiness men, be made by direct appropriation or by the issue of bonds bearing a low ate of interest and covering a period of many years?

The business men of San Diego would prefer that bonds of long term and low ate of interest should be issued for improvements in the harbor, rather than that direct appropriation should be made for the purpose.

46. What are your pilotage charges?

No answer.

47. What obstacles, if any, have shipping interests to contend with in your port?

Excepting cheap and ready transportation to the interior of the county, there are o great obstacles to shipping interests here.

48. If, in your opinion, any of the fixed charges on shipping can be reduced, please nake suggestions as to the best method of accomplishing such reduction.

The building of a wharf by the State is probably the only practical and effective vay to secure low rates of dockage, etc., for transient or other shipping not in ossession of a wharf in this bay.

49. Have any private persons or corporations attempted to monopolize the shipping acilities of your port or your water frontage; if so, state what persons or corporations, and what, if anything, has been done to prevent such monopoly?

The Santa Fe wharf, by reason of its location and form, covers 1,900 feet of water front.

TIDE LANDS.

In the Matter of Tide Lands of the Bay of San Diego, California, the Title to Which Is Disputed as Against the State.

Witnesses who claim to have known portions of the shore line of the bay of San Diego during the past thirty years, have gone over the ground along what they claim is the original line of mean high tide (before fills were made on the tide lands) from South Twenty-first street to Atlantic street in the city of San Diego, California. A map has been made of that portion of the water front, showing the line claimed by these witnesses as the original line of mean high tide. This line is practically the same as the line laid down by Lockling in his map of Horton's Addition to San Diego, made in 1870, and filed in the office of the recorder of the county of San Diego, State of California, in June, 1871, by A. E. Horton.

The Commissioners intend to have the testimony of these witnesses perpetuated by having the witnesses examined before a court commissioner. After this matter is concluded, the Commissioners think they may be able to proceed with confidence to enforce the claims of the State to these tide lands.

HUMBOLDT BAY.

The secretary of the Eureka Board of Harbor Commissioners made a statistical report for 1907, which was sent to the joint legislative committee in lieu of the detailed report asked for. It was evidently thought that a comprehensive review of the business done, aided by a personal inspection on the part of the committee of the facilities of the port, would enable its members to arrive at a wise conclusion in the making up of its report and the accompanying recommendations.

The business done from this port was principally with coast points. There was in connection with this a valuable and constantly growing trade with the Hawaiian Islands, the Central American States, the South American ports, and with England and Australia. Naturally exports constituted the bulk of the business done by water, Eureka being the center of large manufacturing enterprises. The shipments of lumber (lumber proper, shingles and shakes reduced to lumber feet) were 341,350,188 feet, valued at $6,025,412; to this valuation should be added $1,679,386 for other forest products, making a total of $7,704,798. Were this all, Eureka might be considered an important port on the California coast, well up to the front of the list, but there is more in the way of exports. Adding the 14,589 tons of animal, dairy, farm and ranch, orchard, fish, game and miscellaneous products, valued at $2,022,991, there is a grand total of $9,727,789 in manufactures and products originating at this one port.

The importations for the year 1907 amounted to $3,680,114, and the arriving and departing passengers numbered 32,617.

Some estimate of the importance of the shipping business in Humboldt Bay may be obtained from the following figures of earnings, the true index of the carrying trade:

Lumber, domestic ports	$1,219,307
Lumber, foreign ports	146,093
Other exports	53,230
Import freight	216,477
Passenger earnings	293,553
Total	$1,928,660

The business of Humboldt Bay (Eureka) has been carried on at great disadvantage at times, so far as shipping is concerned. The bay has a depth of from 27 to 49 feet in many places, while a depth of 51 feet is often found. There is a mean depth of 34 feet in large areas of anchorage, in which there is ample room for an unlimited number of vessels, provided those of larger tonnage could reach these favored basins at all times. There are, however, several "hogbacks" in the channel, separating these basins, on which may be found a mean depth of but 14 feet of water. There are three of these "hogbacks" interfering very materially with free navigation except for vessels of light draft. A judicious amount of dredging would make all these deeper basins available for the largest ocean vessels. The Federal Government is expending $75,000 in the channel in front of the city, but more than this is required to make practical the entire harbor. The dredging of these "hogbacks," which are of comparatively few feet across, would be the means of largely increasing a business now worth more than $15,000,000 annually. There is no deep water at the piers, but this can be secured without much trouble, and will be as soon as the anchorage ground of the bay is made available by proper dredging. Business reasons would lead the owners to prepare for the larger vessels as soon as the deeper basins may have been connected, thus extending the channel.

The future of Humboldt Bay is a promising one. At the present time lumber constitutes the major portion of the business, but the exportations of other commodities are annually increasing, and as in time the manufacture of lumber will naturally be decreased, there will be an even more valuable trade take its place, as shown by the exports other than lumber during the year 1907.

SAN PEDRO.

1. What is the depth of water over the bar at the entrance to harbor?

Twenty-two feet at low water.

2. What is the average depth of channel in the harbor, and what is the area of anchorage ground?

Average depth of water along the docks of inner harbor is 24 feet at low water. The anchorage ground is in the outer harbor, where there are about 700 acres inside the breakwater available for anchorage. Of this over 300 acres has a depth of 40 feet, and there are about 400 acres with an average of 30 feet.

On the northerly city limits the city of San Pedro has water frontage of over 5,000 feet in that vicinity on which no wharf franchise has been granted, but navigable channels have to be dredged to make this frontage available for shipping. The Federal Government has already dredged a navigable channel up to this frontage, and this could be continued on in front of the city property. The Government is doing this dredging at a cost of eight cents a yard, as it owns the dredger.

No rock has to be excavated, all the excavating being done with a suction dredger and the dirt removed is used for reclaiming adjoining tide lands. On the east side of the inner harbor, in front of the city of San Pedro, the city owns a frontage of over 3,000 feet, in front of which there is now an average depth of 24 feet of water at low tide. Back of this, to the east, the Pacific Wharf and Storage Company is filling in an area of 86 acres. This work is nearing completion and will furnish the necessary grounds for railroad approach for the frontage referred to.

In the outer harbor the city owns a water frontage, including the inside of the breakwater, of over 30,000 feet, on which no wharf franchise has been granted. There are no tide lands, properly speaking, in the outer harbor; the area not available for purposes of navigation would properly be described as submerged lands. Of this class the city has granted to Randolph H. Miner the right to fill in 153 acres, but reserving the right to lay out streets over this fill wherever it may deem convenient, and has also reserved to itself a strip 1,480 feet long and 200 feet wide at the south end of the fill for dock and warehouse purposes.

The city has granted no wharf franchises with the privilege granted Miner, he simply getting a fifty years' lease on filled area.

A similar grant of 45 acres was made to H. E. Huntington on a narrow strip lying east of the Miner fill, and the conditions of the grant are practically the same in both cases.

On the west side of the harbor the city still owns about 214 acres of submerged lands, with a frontage of 8,000 feet, which could readily be filled in and made available for commercial purposes.

3. What is the average depth inside the bay at piers and docks, or where piers and docks may be constructed?

See answer to No. 2.

4. How many piers and docks in your harbor are owned and operated by the State?

None.

5. How many piers and docks owned by the State are leased to private persons or corporations?

None.

6. How many piers and docks are owned and operated by private individuals or corporations?

Nine wharves are operated by private parties and corporations, as follows:

Southern Pacific Railway Company	6,180 feet.
Wilmington Transportation Company	220 feet.
Northern Pacific Dock Company	420 feet.
San Pedro Lumber Company	1,550 feet.
Banning Wharf Company	200 feet.
Kerckhoff-Cuzner Lumber Company	809 feet.
National Lumber Company	350 feet.
Southern California Lumber Company	1,500 feet.
Crescent Wharf Company	800 feet.
Salt Lake Railway Company	3,000 feet.

7. What is the cost of each of such docks and piers, and what revenue do they produce to the State?

The State owns no wharf at San Pedro. The city of San Pedro now collects the tolls on the wharfs here, and this year they will amount to about $3,000.

8. What is the total number of piers and docks in your bay, how are they constructed, and what are their estimated lives?

The ordinary pile, unless creosoted or covered with concrete, does not last more than four or five years.

9. What is the aggregate length of the piers and docks now in use?

Fifteen thousand and seventy feet.

10. What has been the cost of construction of your piers and docks?

The average cost of a wharf in the inner harbor is about $40 per running foot.

This, however, varies according to the material used in construction. The $40 refers to the ordinary piling.

11. What is the present condition of your docks and piers?

They are in good condition.

12. Are your dock facilities adequate for all demands of the trade at any season of the year?

The present dockage in the inner harbor is barely sufficient for present needs, and will soon have to be enlarged. In the outer harbor, which is now nearing completion and already available for the deepest vessel built, there are no docks, and deep draught vessels coming to this port have to anchor in the outer harbor and discharge enough of the cargo by lighters to reduce their draught to less than 24 feet, so as to enter alongside the docks of the inner harbor. This is one of the great drawbacks to the development of the commercial possibilities and needs of this port, and could be obviated by constructing docks in the outer harbor in 35 to 40 feet of water.

13. What pier improvements are needed in your harbor?

Docking facilities for deep water vessels in the outer harbor is the most immediate need.

14. What would be the approximate cost of such needed improvements?

Two million five hundred thousand dollars would make the needed improvement.

15. What improvements, if any, are expected to be made by the Federal Government; state character and probable cost of same?

The Federal Government engineers have recommended an appropriation of $287,000 to connect the west end of the breakwater with the shore; and an appropriation sufficient to deepen the bar and channel of the inner harbor to an average depth of 30 feet at low water is to be asked from the next Congress.

16. What steps, if any, has the Federal Government taken towards making such improvements?

Surveys have been made and a hearing held by the Government engineers at San Pedro to show the necessity therefor. The Federal Government has already spent nearly five millions here, and has made all the improvements excepting the docks, which are owned by private parties. The State has done nothing for this port excepting to attempt to grant away nineteen twentieths of the tide lands to private parties. The city of San Pedro is now considering the advisability of constructing a tunnel under the city from its northerly limits to the deep water of the outer harbor on the south for the purpose of giving an easier entrance to railroads desiring to reach the outer harbor, where the State could construct wharves in 40 feet of water.

17. What is private enterprise doing toward developing the shipping facilities of your port, and building up its commerce?

The Southern Pacific Railroad Company has just completed a slip 250 feet wide, 1,860 feet long, with a depth of 35 feet of water at low tide. This slip is said to have cost over $500,000.

18. What has been the annual cost of maintenance of your docks and piers?

That depends on the type of construction. It now costs about $50,000 per year to care for all of the present wharves.

19. If wood and piling have been used in the construction of piers and docks, what is the average life of the piling?

Unless protected, about five years.

20. What are your dockage charges?

From $3.50 to $14.75 per day, based on tonnage. Vessels 200 tons and under, $3.50 per day, and 1,200 tons and over $14.75 per day.

21. What is the cost of handling freight per ton?

Fifty cents per ton.

22. What warehouse charges are made on the piers and docks?

No charge at present; there are no warehouses.

23. What are the demurrage charges for the first twenty-four hours?

According to agreement.

24. How many vessels can secure dockage facilities at one time?

About 60 vessels can work at one time at the wharves.

25. Are dockage facilities ample, or nearly so, for the present demands?

The docking facilities have now reached their limit and more are imperatively demanded.

26. Are your tide lands owned by the State or private individuals?

The State has attempted to grant nineteen twentieths of the tide land to private individuals.

27. If portions of your tide lands are owned by individuals, give the area as nearly as possible of private ownership and its location?

Seventy-five acres within the city limits of San Pedro are claimed by private parties under tide land patents from the State. It is claimed, however, that these patents are void in most cases.

28. What are the dockage and shipping charges proposed by owners of private docks and piers?

The county board of supervisors fix these rates, to wit: $1 per ton on crude oil, coke, ores, grains, etc.; 60 cents on fruits, and merchandise $1.25 per ton; on lumber, 75 cents per 1,000 feet.

29. From what ports is freight received, foreign and domestic?

Coast trade with all ports, north and south, and trade with most all the foreign ports.

30. What is the amount of freight in tonnage shipped to domestic and foreign ports? Give aggregate in each case.

31. What is the amount of tonnage annually received?

32. What is the amount of tonnage annually shipped?

Answer to Questions 30, 31, and 32:

Lumber (feet)	466,405,000
Shingles	178,844,000
Shakes	3,951,000
Laths	34,898,000
Ties	329,242
Poles	23,461
Piles	9,877
Posts	52,042
Merchandise (tons)	29,912
Sheep	7,447
Cattle	2,153
Shooks (tons)	2,624
Staves (tons)	619
Grain (tons)	17,727
Flour (tons)	1,864
Cross-arms (tons)	236
Peas (tons)	20
Potatoes (tons)	190
Apples (tons)	6
Paper (tons)	3,947
Beer kegs (empty)	1,788
Pickets	12,000
Windows	636
Doors	1,054
Lumber trucks	65
Coal (tons)	158
Sugar (tons)	344
Beer (kegs)	270
Passengers	101,841
Oil (crude, bbls.)	491,323
Foreign—	
Kopak (tons)	41
Cement (bbls.)	50,596
Mineral water (cases)	500
Liquors (cases)	627
Mustard (cases)	150
Beer (in bottles, bbls.)	110
Merchandise (tons)	19
Oak logs (feet)	1,638,325
OUTWARD.	
Merchandise (tons)	20,315
Cement (tons)	1,996
Oil (bbls.)	28,332
Coal (tons)	30
Passengers	104,491
VESSELS.	
Steamers	1,215
Schooners	277
Barks	11
Barkentines	44
Ships	8
Brig	1
Barges	17
Tugs	19
Dredgers	2
Lighthouse tenders	2
U. S. cruisers	4
Foreign—	
Steamer	1
Ships	2
NET TONNAGE.	
Steam and sail	791,377

33. How many steam vessels entered your port during the year 1907? Give tonnage.

Steamers, 1,217; net tonnage, 573,361.

34. How many sail vessels with tonnage entered your port during the same period?

Sailing vessels, 385; net tonnage, 217,710.

35. What are your leading imports?

Lumber, cement, and general merchandise.

36. What are your leading exports?

Crude oil.

37. Where private parties own the water front land, can the title be secured by the State at reasonable prices without condemnation?

Yes.

38. What railroads have spurs to or on the piers and docks, and to what extent is there interference with the convenience of the public?

Salt Lake railroad on the east side and Southern Pacific and Pacific Electric railroads on the San Pedro side.

39. What interior territory in this or adjoining states may be economically served by shipping to or from your port?

California to Fresno in the interior and San Luis Obispo on the coast, and all of southern California; east to Chicago and El Paso, and all the intervening states and territories.

40. What are the immediate prospects of an increase of the shipping of your port?

Good prospects, owing to dredging operations going on, and reclamation of lands and enlarging wharf facilities.

41. What are your warehouse and railroad facilities for handling freight?

For coasting vessels good; we have no facilities for deep water vessels.

42. What are the prospects of an immediate enlargement of such facilities?

Facilities for deep water vessels can be provided at a moderate cost.

43. What, if any, suggestions have you to make to existing laws regulating harbors?

Wherever possible provide public docks and amend the law regulating railroad commission so that it can do something practical.

44. What, in your opinion, is it practical for the State to do to assist in the building up of commerce at your port?

Make an appropriation for docks in the outer harbor.

45. If improvements are made by the State, should they, in the judgment of your business men, be made by direct appropriation or by the issue of bonds bearing a low rate of interest and covering a period of many years?

A bond issue would be best.

46. What are your pilotage charges?

Five dollars per foot draft for entering inner harbor, and 5 cents per gross ton for entering outer harbor.

47. What obstacles, if any, have shipping interests to contend with in your port?

There are at present no facilities for docking deep water vessels, and San Pedro is not a terminal point.

48. If, in your opinion, any of the fixed charges on shipping can be reduced, please make suggestions as to the best method of accomplishing such reduction.

Municipal docks and a municipal road to Los Angeles would reduce the charges to one fifth of those now charged.

49. Have any private persons or corporations attempted to monopolize the shipping facilities of your port or your water frontage; if so, state what persons or corporations, and what, if anything, has been done to prevent such monopoly?

No one has or can monopolize the harbor of San Pedro, as the city of San Pedro owns over eight miles of its own frontage and can build municipal docks wherever it so desires.

OAKLAND.

From a report made to this committee by the Oakland Chamber of Commerce, dated April 30, 1908, the following has been gleaned:

There is a depth of 25 feet over the bar, and an average depth of 20 feet in the channel in the center of the city, varying from 8 to 25 feet. In what is known as Brooklyn Basin, there is an anchorage area of 300 acres, in addition to the channel, which is two miles in length. There is a great variation of depth at piers or at places where piers may be constructed, varying from practically nothing to 25 feet.

The State owns none of the piers and docks at Oakland, of which there are eighteen owned by corporations and private individuals. As reports of expenses are not required by the State the cost of maintenance of these piers and docks can not be ascertained, this being a matter of private concern and subject to private expenditure. They are constructed entirely of wood, possessing the usual lifetime of wooden piers and piling.

Oakland has about four miles of berth space, counting all the available frontage on piers and wharves. To accommodate shipping the city has expended about $50,000 in docks and $1,000,000 more for dredging, and is contemplating a further expenditure of from $1,000,000 to $2,000,000. Other dock owners have expended over $5,000,000 for docks and dredging. That other improvements are needed is apparent from the present condition of the docks, which are reported to be in only fair condition. There must, in addition to the improvement of the present docks, be new docks added, present facilities for shipping having been found to be inadequate. To remedy the evil of crowded docks and shallow water in the channel and at pierhead lines the city of Oakland has in contemplation an issue of improvement bonds, being but the beginning of improvements estimated to cost $25,000,000 when completed. One of the first steps to be taken is the dredging of the channel to an average depth of 30 feet, a contract having been let for a portion of this work, which will amount to $515,000, the ultimate cost not yet having been determined. The War Department has ordered new surveys in furtherance of this work. Dredging is being done on private property to secure the average channel depth, while the railway companies contemplate projects of great magnitude which will involve the expenditure of millions of dollars.

All dockage charges are regulated by city ordinances, and there seem to be no complaints from vessel owners or consignees regarding overcharges or discriminations. Until the channel can be dredged to the required depth the dockage facilities are reported to be ample for the demands made upon them, but present conditions are not favorable to the prospective increase of business, such as will naturally accrue to those points where commerce centers and transshipment is made from hull to car and from car to hull.

The State owns the tide lands to a little beyond the old city limits, this being one of the few ports in which complete State ownership has not been parted with, although the report of the Oakland Chamber of Commerce, by inference only, indicates that there is a considerable private ownership.

Some conception of the shipping business of Oakland may be obtained from the report of vessels entering that port from January 1, 1905, to December 31, 1907, there having been 4,513 vessels, not including ferries or river steamers, having a total of 2,019,918 tonnage. The leading imports have been lumber and coal, while the exports have been principally manufactured articles and canned goods.

The railroads doing business on the Oakland piers are the Belt Line, the Southern Pacific, the San Francisco, Oakland and San Jose, the Santa Fe, and the Western Pacific. It can be stated that the entire United States seeks this port with a portion of its Pacific Ocean business. The latest of these railways, the Western Pacific, will very materially increase the business of this port, especially from the Middle West and the Southern States. It naturally follows, therefore, that there will soon be demanded an increase of facilities, especially in the accommodation of the greater ocean vessels. The legal rights of the city have been established by favorable court decisions, so that the much needed improvements will be proceeded with without unnecessary delay.

The official utterance of the Chamber of Commerce is to the effect that if improvements should be made by the State direct appropriations might be the proper method of payment, although no arguments have been advanced in support of this position, and possibly a vote of the members of that body would not sustain it.

On one point there is no uncertainty—the one great obstacle that shipping interests have to meet is the lack of depth of water in the channel. On this one point there is no difference of opinion. Not only increased shipping, but constantly increasing size of vessels, demands greater depth in the channel than the average of 25 feet reported, an average that is of little value while there remains the much shallower waters reported.

PORT SAN LUIS.

Port Harford, in San Luis Obispo Bay, is about twelve miles from Port San Luis.

The shipment of 3,000,000 barrels of oil to domestic and foreign ports, with an added export of 3,500 tons of cereals, and 5,000 tons of imports, give evidence of the importance at the present time of the future possibilities to be found in and about San Luis Obispo Bay.

With a depth of 34 feet at the entrance to the channel there is an average depth of 30 feet in the anchorage ground of the ten square miles constituting the available portions of the harbor. The practical utility of this great anchorage area is shown from the average depth, and the mean depth inside at the piers and at the places where docks can be constructed. At the present time there are but two piers, one of these being owned by the county and the other by private parties. They cost $40,000 each, estimated. As the State has no interest in these piers there is naturally no revenue produced for the commonwealth, although the dockage charges are $5 up to 950 tons and $10 for that number and over.

The tide lands are all owned by individuals, as is found to be the case in many other ports. The dockage facilities are deemed to be sufficient for all present purposes. Naturally the demands made upon them are by the oil interests to a very large degree, interests that may be extended in volume, and which may follow the results of continued production, as found in other oil fields.

The Federal Government has taken the preliminary steps toward providing a breakwater, which has been under construction several years, the work being done on its extension. A small appropriation has been made for that purpose. Private enterprise, content with the present facilities in the way of dockage, does not seem to be adding to the present accommodations, there being room at the present time for eight vessels at the piers at one time, possibly a greater provision than has ever been taxed for use.

During the year 1907 the vessels calling at this port were as follows: sailing vessels, 21; steamers, 327; tugs, 65; barges, 85; gasoline schooners, 12.

Mr. Myron Angel, under date of January 25, 1908, wrote this committee a letter dealing with the present advantages and the future possibilities of Port San Luis, from which the following extracts have been made:

"SAN LUIS OBISPO, CAL., January 25, 1908.

"*A. F. Fitzgerald, Esq., President Chamber of Commerce, San Luis Obispo, Cal.*

"The view obtained from the bay by the passing traveler is not impressive of the resources of the country the harbor is to serve; even our own county people seldom contemplate the vast area to be accommodated commercially by the harbor of San Luis Obispo, and to which a perfectly protected harbor, free from monopoly, is a necessity. The area concisely stated, is fully *fifteen thousand square miles* of exceedingly productive country. This is immediate—the area may be greatly enlarged in the future. To be more explicit, the region to be benefited by a good harbor at the bay of San Luis Obispo is bounded on the north by the valley of the Nacimiento extended east to crossing of the Monte Diablo range by a low pass of 1,500 feet, then northerly, including Fresno; east by the Sierra Nevada, and south by the Tehachapi and the Santa Ynez Mountains. All this area used the harbor by wagon transportation before the construction of the Pacific railroad through the San Joaquin Valley.

"In resources for the comfort and wealth of mankind this section as outlined is unsurpassed by any equal area on earth, being of soil and surface elements of great value, and beneath the fertile soil minerals in abundance and variety, explored to a depth of 4,000 feet, finding oil, clays, cement, and other rocks, sand, sulphur, soda, salt and other substances of utility of manufacturing and commercial value.

"The immediate area now using the harbor is that west of the Monte Diablo range and north of the Santa Ynez, equal in extent to that of the states of Connecticut and Rhode Island combined. I have included the county of Fresno in the ultimate area when the harbor is completed and transportation to it perfected. It is not usually understood that the distance from the city of Fresno to the harbor of San Luis Obispo is precisely the same as to the harbor of Monterey, while the mountain passes leading to San Luis Obispo are of less elevation and the route much more feasible for a railroad."

SANTA BARBARA.

There is an average depth of water at Santa Barbara of from 7 to 10 fathoms, with from 4 to 6 fathoms at points where piers may be constructed. There is but one pier, owned by private parties, constructed at a cost of $125,000, this being 2,300 feet in length, and which pays a State license. Some repairs on this pier are needed at the present time, the estimated cost of which is $30,000. This, however, is a private matter. The dock charge is $10 for each steamer taking berth room at the dock. There being room for six vessels at one time, the present dockage facilities are considered ample.

The tide lands at Santa Barbara are partly owned by the State, and as no commercial demands will likely be made upon them the ownership will in all probability remain as at present.

The tonnage, being business principally with San Francisco, Los Angeles, and San Diego, for 1907, amounted to 13,000 tons of incoming and outgoing freight, consisting of general merchandise, grain, lemons, beans, and walnuts. No pretense is made at serving interior points in competition with the ports north or south, owing to lack of railroad and other facilities. There is no immediate prospect of an increase in the shipping at Santa Barbara, local conditions being fully served. The business men of this place have expressed an interest in the conditions at Port San Luis, and expressed a desire that this committee pay especial attention to conditions at that place.

Having nothing to suggest for Santa Barbara in the way of improvements by the State, the Chamber of Commerce of that place indorses the plan of long-time bonds at low rate of interest to secure funds for improvements to be made in harbors where State assistance is required.

NEWPORT BAY.

Newport Bay, a beautiful sheet of water enclosed on three sides by commanding hills and on the ocean side by a sand peninsula that has been utilized by a railroad, an electric line and by town builders, is at the present time a pleasure resort, although with aid from the Federal Government in the way of building twin jetties it can be made a profitable business point. The depth of water over the bar is but 4½ feet at mean low tide, increasing to 10 feet at mean high tide. There was a time when the depth was so much greater that vessels of considerable size entered this bay and passed up the channel two or more miles before unloading. The drift of sand has never been interfered with, until at the present time the entrance to the bay is practically closed. Only twin jetties and much dredging can render the bay serviceable in any degree. Within the bay is a channel three miles long and 600 feet wide, varying in depth from 8 to 12 feet, with some locations showing greater depth. It has been estimated that a depth of 20 feet can be secured over an increased area by dredging, which would bring the same depth to the pierhead line.

There are a number of small piers, built to accommodate the pleasure demands, there being no other call upon them. There are no docks. The Southern Pacific has a pier extending into the ocean on which has been expended much money, and which, affording dockage for two vessels at one time, is deemed adequate for all present demands.

The tide lands in the bay are owned by both the State and by private individuals, the former possessing about 1,000 acres and the latter about 1,500 acres. Should the State ever have need of the lands owned by private parties there will be no trouble in securing title at reasonable figures without condemnation proceedings.

The Pacific Electric Railway Company and the Newport Beach Dredging Company have been granted permission to dredge the channel in the bay covering one and one half miles in length and averaging 500 feet in width. But this improvement is not intended for commercial purposes, nor will there be need for such until the construction of twin jetties by the Federal Government. The business men of Newport express the hope that the State will take some steps whereby the Federal Government will be induced to make the desired appropriation. It is their opinion that whatever improvements may be made by the State at and in harbors should be by a bonded issue of long time bearing low interest.

The following, by Lew H. Wallace, secretary of the Newport Beach Chamber of Commerce, is a comprehensive review of past conditions and suggestions of what may be:

"Records show that in 1873 the steamer at Newport plied between San Francisco and Old Newport wharf, three miles inside of the entrance. This steamer made the trip twice a month, bringing merchandise, which was freighted by team to Santa Ana, San Bernardino, and as far inland as Arizona, and New Mexico. She always returned fully loaded with cargoes of grain, hay, barley, honey, peanuts; in fact, products of every description, as well as ores from the mines. This continued until 1888, when an outside wharf 1,200 feet long and 60 feet wide was constructed. With the increased facilities for handling, commerce increased immediately to two steamers per week which loaded and unloaded full cargoes the full year around until 1891. Commerce increased to such an extent in this year that an extra passenger steamer, with a cargo capacity, was added to the list of regular weekly service, thus making three steamers a week operating on a regular time schedule. Imports consisted of lumber and every known commodity. Exports became so heavy that the three regular steamers could not handle the trade, and many tramp steamers were called to this point to take care of surplus traffic. During this time Newport was the extreme southern port for the steamers Coos Bay, Santa Cruz, Eureka, and Bonita, owned by the Pacific Coast Steamship Company. During this period and the following years large numbers of cattle and sheep were carried from this port. In 1893 the steamer Al Ki carried from this port the largest cargo of grain which up to that time had entered Golden Gate. This cargo consisted of 26,000 sacks of barley or 110 carloads; and in the same year there was landed on this wharf a cargo of 105 carloads of lumber, or nearly one million feet by the four-masted schooner Prosper. Beginning February, 1894, and continuing until June, 1899, the amount of lumber landed at this port would indicate the volume of imports that would be handled if adequate improvements and facilities were established. The figures covering the shipments from one wharf only during this period showed an average of 365 cargoes yearly, or more than one cargo a day, because the owners of the wharf and short railroad line at this time refused to operate on Sunday. These cargoes average 640,000 feet of lumber to the cargo, and records show that this was distributed to practically every commercial center known in the United States. In addition to this the regular three steamers a week unloaded and loaded at this port, with many tramp steamers interspersed. In June, 1899, the wharf and railroad line to the interior passed into the hands of the Southern Pacific Railway Company, which effectually cut off the Santa Fe Railway feeding from this port. Immediately upon the acquisition of this property by the Southern Pacific commerce and trade stopped, and where, within a week or two prior to this transaction, there were as many as five to seven steamers and schooners waiting their turn to discharge their cargo, the week following the change of ownership there was but an occasional vessel that stopped at this port. This data was obtained from the books of the wharf box for the private road and wharf during the years 1888 to 1899."

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SAN DIEGO BAY.

BIENNIAL REPORT

OF THE

BOARD OF STATE HARBOR COMMISSIONERS

FOR THE

BAY OF SAN DIEGO

OCTOBER 1, 1908.

SACRAMENTO
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING
1908

BOARD OF STATE HARBOR COMMISSIONERS FOR THE BAY OF SAN DIEGO.

CHAS. W. OESTING	San Die
EUGENE DeBURN	San Die
CAPT. W. H. PRINGLE	San Die

OFFICERS.

CHAS. W. OESTING	Preside
EUGENE DeBURN	Secreta
CAPT. W. H. PRINGLE	Chief Wharfing
EUGENE DANEY	Attorn
G. A. d'HEMECOURT	Engin

LETTER OF TRANSMITTAL.

SAN DIEGO, CAL., October 1, 1908.

To HON. JAMES N. GILLETT,
Governor of the State of California.

YOUR EXCELLENCY: In accordance with the provisions of Section 2592 of the Political Code, the Board of State Harbor Commissioners for the Bay of San Diego respectfully submits the following report for the two years beginning October 1, 1906, and ending September 30, 1908.

REPORT

OF THE

BOARD OF STATE HARBOR COMMISSIONERS FOR THE BAY OF SAN DIEGO.

FINANCIAL STATEMENT.

Senate Bill No. 774, amending Section 2584 of the Political Code, approved by the Governor, March 20, 1905, went into effect April 1, 1905. The provisions of this law authorize the Board of State Harbor Commissioners for the Bay of San Diego to designate a bank in which shall be deposited all moneys received for the use of the bay and its tide lands, and to draw from the bank and pay the salaries of the members of the Board and all necessary expenses of the Board.

On the 20th day of June, 1905, the American National Bank of San Diego was designated by the Board as the bank of deposit.

RECEIPTS.	
1906—October 1, balance	$359 90
October	547 35
November	299 00
December	341 45
1907—January	297 00
February	441 50
March	374 00
April	344 50
May	351 00
June	431 70
July	719 00
August	324 50
September	506 75
October	340 50
November	368 00
December	437 20
1908—January	332 00
February	366 50
March	338 50
April	379 00
May	535 50
June	523 20
July	525 00
August	467 00
September	420 00
Total	$10,370 05

DISBURSEMENTS.	
1906—October	$375 60
November	661 30
December	428 60
1907—January	69 80
February	350 25
March	379 00
April	375 00
May	380 00
June	537 00
July	455 45
August	525 00
September	578 00
October	350 80
November	353 50
December	350 00
1908—January	354 25
February	327 00
March	350 55
April	353 00
May	501 25
June	425 90
July	352 15
August	475 00
September	646 50
Total	$9,954 90
Balance	$415 15

SALARIES.

Chas. W. Oesting, balance	$325 00
Chas. W. Oesting, as Commissioner, by salary, 24 months at $25	600 00
	$925 00
Chas. W. Oesting, to cash	850 00
Balance	$75 00
W. H. Pringle, as Chief Wharfinger, balance	$982 00
W. H. Pringle, as Chief Wharfinger, by salary, 24 months at $100	2,400 00
W. H. Pringle, as Commissioner, by salary, 24 months at $25	600 00
	$3,982 00
W. H. Pringle, to cash	3,607 00
Balance	$375 00
Eugene DeBurn, balance	$832 00
Eugene DeBurn, as Secretary, by salary, 24 months at $100	2,400 00
Eugene DeBurn, as Commissioner, by salary, 24 months at $25	600 00
	$3,832 00
Eugene DeBurn, to cash	$3,525 00
Balance	$307 00
Victor E. Shaw, as attorney, by salary, 2¼ months at $50	$113 00
Victor E. Shaw, to cash	113 00
Eugene Daney, as attorney, by salary, 22¾ months at $50	$1,133 35
Eugene Daney, to cash	1,083 35
Balance	$50 00

OTHER EXPENSES.

Office rent	$600 00
Account books	5 45
Court expenses	24 85
Express charges	2 65
Stationery, postage, incidentals	143 60
Total	$776 55

RECAPITULATION.

Receipts		$10,370 05
Disbursements:		
Chas. W. Oesting	$850 00	
W. H. Pringle	3,607 00	
Eugene DeBurn	3,525 00	
Victor E. Shaw	113 00	
Eugene Daney	1,083 35	
Other expenses	776 55	
		9,954 90
Balance		$415 15

DISPUTED TITLES, ETC., BAY OF SAN DIEGO.

1907.		
Mar. 11—Appropriation, Statutes 1907, Chap. 193, p. 238		$10,000 00
1907.		
Sept. 3—C. T. Miller, voucher No. 1	$40 00	
Rodney Stokes, voucher No. 2	4 85	
Oct. 1—G. A. d'Hemecourt, voucher No. 3	217 90	
Dec. 3—G. A. d'Hemecourt, voucher No. 5	4 50	
G. A. d'Hemecourt, voucher No. 6	130 00	
1908.		
Jan. 7—G. A. d'Hemecourt, voucher No. 7	26 00	
Aug. 4—John P. Burt, manager, voucher No. 8	100 00	
Aug. 6—Eugene Daney, voucher No. 9	250 00	
		773 25
Balance		$9,226 75

SHIPPING.

Statistics showing the increase of commerce in the Bay of San Diego during the time 1902-1907.

Year.	Vessels Arrived.	Net Tonnage.	Import Values.	Export Values.
1902	233	187,915	$494,761	$159,706
1903	371	265,936	493,572	314,236
1904	354	252,615	398,067	163,359
1905	380	318,856	387,038	415,639
1906	397	319,440	579,982	566,009
1907	503	424,466	830,981	770,566

1907—Coal imported	34,408 tons.
1907—Cement imported	14,058,432 pounds.
1907—Lumber imported	64,688,700 feet.

The principal articles of import are coal, coke, pig iron, cement, domestic animals, copper matte, hides, guano, bran, onyx, firebrick, lumber, flour, feed, bullion, structural iron, iron pipe, machinery, groceries, dry goods, and leather goods.

The leading exports are honey, tallow, hides, pelts, fish, wool, oranges, lemons, raisins, and grain.

LOG RAFTS.

Two years ago a huge raft of saw logs, the property of the Benson Lumber Company, was towed into the harbor. The raft was 600 feet long, 50 feet wide, 35 feet deep, and drew 22 feet of water. It was built in the Columbia River and was towed down the coast to San Diego. The logs were to be sawn into lumber at the Benson mill on the shore of the bay. The raft contained about 3,500,000 feet of lumber. Other rafts followed, and in the past summer five of these huge rafts were brought into the bay, containing an aggregate of 25,000,000 feet of lumber.

TIDE LANDS—BAY OF SAN DIEGO.

Inventory and appraisement of the tide lands in the Bay of San Diego, belonging to the State of California, in charge of the Board of State Harbor Commissioners for the Bay of San Diego, California.

These tide lands lie between the line of mean high tide and the bulkhead or seawall line. They are from 200 to 600 feet in width and extend entirely around the bay.

On the north shore of the bay from the entrance to the coaling station, a distance of about three miles, the tide lands belong to the United States Government.

On the south shore of the bay from the jetty to near Spanish Bight, a distance of about five miles, the tide lands belong to the Coronado Beach Company.

The remainder of the tide lands belong to the State of California.

	Acres.	Valuation per Acre.	Total Value.
Tract No. 1— From the line of the Military Reservation on Point Loma to Hawthorne street in the City of San Diego	435.24	$600 00	$261,144 00
Tract No. 2— From Hawthorne street in the City of San Diego to A street in the City of San Diego	16.50	3,000 00	49,500 00
Tract No. 3— From A street in City of San Diego to the Salt Flat in the City of San Diego	53.60	10,000 00	536,000 00
Tract No. 4— From Salt Flat in City of San Diego to line of National City	57.20	3,000 00	171,600 00
Tract No. 5— From boundary line of National City to Thirty-first street in National City	102.02	2,000 00	204,040 00
Tract No. 6— (Assumed to be 300 feet wide), from Thirty-first street in National City to the south boundary of National Rancho	104.00	500 00	52,000 00
Tract No. 7— (Assumed to be 600 feet wide), from south boundary of National Rancho to Second street, Coronado Heights	171.00	200 00	34,200 00
Tract No. 8— (Assumed to be 300 feet wide), from Second street, Coronado Heights, to Glorietta Bay	218.00	300 00	65,400 00
Tract No. 9— (Assumed to be 200 feet wide), from Glorietta Bay to Spanish Bight	72.00	800 00	57,600 00
Totals	1,229.56		$1,431,484 00
Tide lands which were filled by private individuals, but which are claimed by the Commissioners for the State of California, viz.:			
Tract No. 10— Salt Flat	21.3	$4,000 00	$85,200 00
Tract No. 11— Lands lying between F street and the Salt Flat	14.60	12,000 00	175,200 00
Totals for Tract Nos. 10 and 11	35.90		$260,400 00
Totals for first nine tracts	1,229.56		1,431,484 00
Grand totals	1,265.46		$1,691,884 00

FREIGHTER MASSACHUSETTS.

HARBORS.

Storm-driven, dismantled, almost a wreck, a ship seeks in vain along a rockbound, inhospitable coast a refuge from the fierce fury of the tempestuous waters. To attempt to land on that bleak shore means inevitable destruction. The only safe course is to stand off and on until the storm abates and then to make the landing in small boats, which may be done if a low beach can be found. Without harbors where ships may lie in quiet and safety to receive and discharge cargo, foreign commerce of any considerable amount would be practically impossible.

The principal harbors of the Atlantic coast were early discovered and explored by European navigators, and it was upon their shores that the first colonies were planted. Although the discovery of the Bay of San Diego by Cabrillo in 1542 and of the Bay of San Francisco by Drake in 1579 was not much antedated by the explorations on the Atlantic coast, yet the actual occupation of these western shores and the utilization of the harbors did not begin until the time of Father Junipero Serra in 1769.

The Spanish conquerors of Mexico were desirous of exploring the region to the northwest of that country, thinking they might discover India. They sent Juan Rodrigues Cabrillo with two ships to the northwest on a voyage of discovery and exploration. He left Natividad, on the west coast of Mexico, in June, 1542. His broad-browed, square-sterned, clumsy, ill-sailing vessels rolled and pitched their way along, finally, after a voyage lasting three months, casting anchor in the smooth, placid waters of the Bay of San Diego. Cabrillo remained in the harbor about a week, then continued his voyage to the northwest. His instruments for taking observations were so imperfect that he described the position of the bay as being near the latitude of Santa Barbara instead of in its true location.

Time passed on, and it was sixty years before the eyes of the white man were again gladdened by the sight of the beautiful bay. In 1602 the King of Spain, Philip III, sent Viscaino with a small fleet to explore the California coast with a view to opening the way for settlement. Viscaino sailed from Acapulco, Mexico, in May, and after stopping at several places along the coast, finally entered the bay in November. He surveyed and made a map of the harbor. He also explored the land adjacent to the shores. Cabrillo had named the bay San Miguel, but Viscaino gave it the name which it still bears. The Spaniards remained less than two weeks, and again departed.

Day after day the tide ebbed and flowed twice in twenty-four hours; month after month the moon waxed, fulled, and waned; season after season came and went; year after year rolled by; generation after

SHIPPING WHEAT IN SAN DIEGO HARBOR.

generation of the bronze-hued natives was born, grew to manhood, and passed away; two hundred and twenty-seven years elapsed after the discovery by Cabrillo before the venturous race made their third appearance, this time to establish themselves permanently on the shores of the splendid bay.

The power of England dominated the Atlantic coast to the exclusion of other European nations in the middle of the eighteenth century, and the English began to look longingly toward the shores of the Pacific, where Sir Francis Drake had discovered the Bay of San Francisco. Russia also began to make advances along these shores. The government of Spain now thought it high time to begin to hold by actual settlement such portions of the country as its early explorers had discovered.

The Church wished to plant the Christian religion among the Indians and the Government wished to establish posts and settlements at the harbors on the coast. Expeditions consisting of sailors, soldiers, priests and other civilians, and converted Indians were fitted out. They started from Mexico by land and sea in the early part of the year 1769. Two ships, the San Carlos and the San Antonio, sailed northward, keeping well out to sea until they reached the latitude of 34 degrees 20 minutes north and then made the land, looking for the bay, which, according to the position given it by Cabrillo, should have been easily found. Not finding the harbor they turned southward, and sailing along near the coast, finally rounded Point Loma and found the entrance to the bay. Shortly afterward the expeditions traveling by land arrived, and the site for a post was selected. Houses were erected and the settlement was permanently founded.

The bay was occasionally visited by trading ships, but a hundred years elapsed and the United States had been in possession of the country a quarter of a century before the commerce grew to be of any considerable importance.

THE BAY OF SAN DIEGO.

In the great State of California, with a coast 800 miles in length, the juxtaposition of the Coast Range to the sea leaves room for the formation of but few natural harbors. Of its two large deep-water harbors, the Bay of San Diego lies in the far south. It is the first port in the United States to be reached by a vessel passing around Cape Horn or through the Isthmian Canal from the Atlantic to the Pacific, and it is the initial point in the most direct route from the California coast through Hawaii to the Orient. Latitudinally below the region of the polar, westerly winds, which cause the fierce storms of the tempestuous northern seas, the path of commerce from San Diego westward lies across a stormless ocean.

THE HARBOR.

In the form of a crescent, about 13 miles in length, varying from a half mile to two miles in width, the bay has an area of about 22 square miles. The depth over the bar is never less than 28 feet, and at high tide it is 34 feet.

"White water" is never seen on the bar; there is, in fact, very little perceptible swell. The entrance is straight and easy of access; there are no hidden reefs, sunken rocks, or treacherous currents to guard against. So smooth and placid are the waters of the harbor that ships lying along wharves rarely need fenders to prevent chafing. So quiet and calm is the atmosphere that only on one or two occasions in the year do winds reach so great a velocity as 25 or 30 miles an hour.

Loma Peninsula or Headland, towering 400 feet above the water, its huge bulk looming against the sky, on the northern shore of the bay, wards off the strong northwesterly winds, perfectly shielding the harbor from their force. Completely landlocked, it is secure from storms.

CHANNEL.

The channel is from 25 feet to 60 feet in depth and about 10 miles in length. For the most part it is half a mile wide, but at the eastern end and also at the entrance the width is less. On each side of this channel the water shoals gradually to the shore, being from 6 to 12 feet deep at the bulkhead or seawall line, which is about 250 feet below the shore line.

Near the middle of the northerly side of the bay, where the San Diego River formerly entered, there is an extensive flat, covered at high tide with shallow water, having an area of about 400 acres, and near the upper extremity of the bay there are similar flats.

ANCHORAGE.

The deep water anchorage covers an area of about 6¼ square miles, where the largest vessels that traverse the seas may swing in the stream with immunity from winds or storm. The holding ground is of deep, heavy, tough mud. No vessel has ever dragged her anchor; no marine disaster has ever occurred on account of storm in San Diego Harbor.

DREDGING—JETTY.

In the early days the San Diego River poured its waters into the bay, and there was prospective danger that such a great amount of sand and detritus would be deposited that its value as a harbor would be destroyed. From time to time various ineffectual attempts were made to divert the flow of the water into Mission Bay, but it was not until 1876 that a permanent bulkhead and riprap dam was constructed which effectually shut the river out.

The depth of water over the bar at the mouth of the harbor near the extremity of Point Loma was originally about 22 feet at low tide. In July, 1903, Capt. A. A. Polhemus began the work of deepening the water over the bar for the Government. By February, 1904, he had dredged out a channel across the bar 1,300 feet long and 270 feet wide, with a depth of 28 feet at low water. The middle ground between the entrance and the anchorage was afterward dredged to about the same depth, permitting vessels to steam directly up the harbor instead of making the old circuitous detour. The Government has constructed a jetty 7,500 feet long at the mouth of the harbor which causes the outflowing tide to strike the bar directly, without diffusion, the effect being the scouring of the bottom.

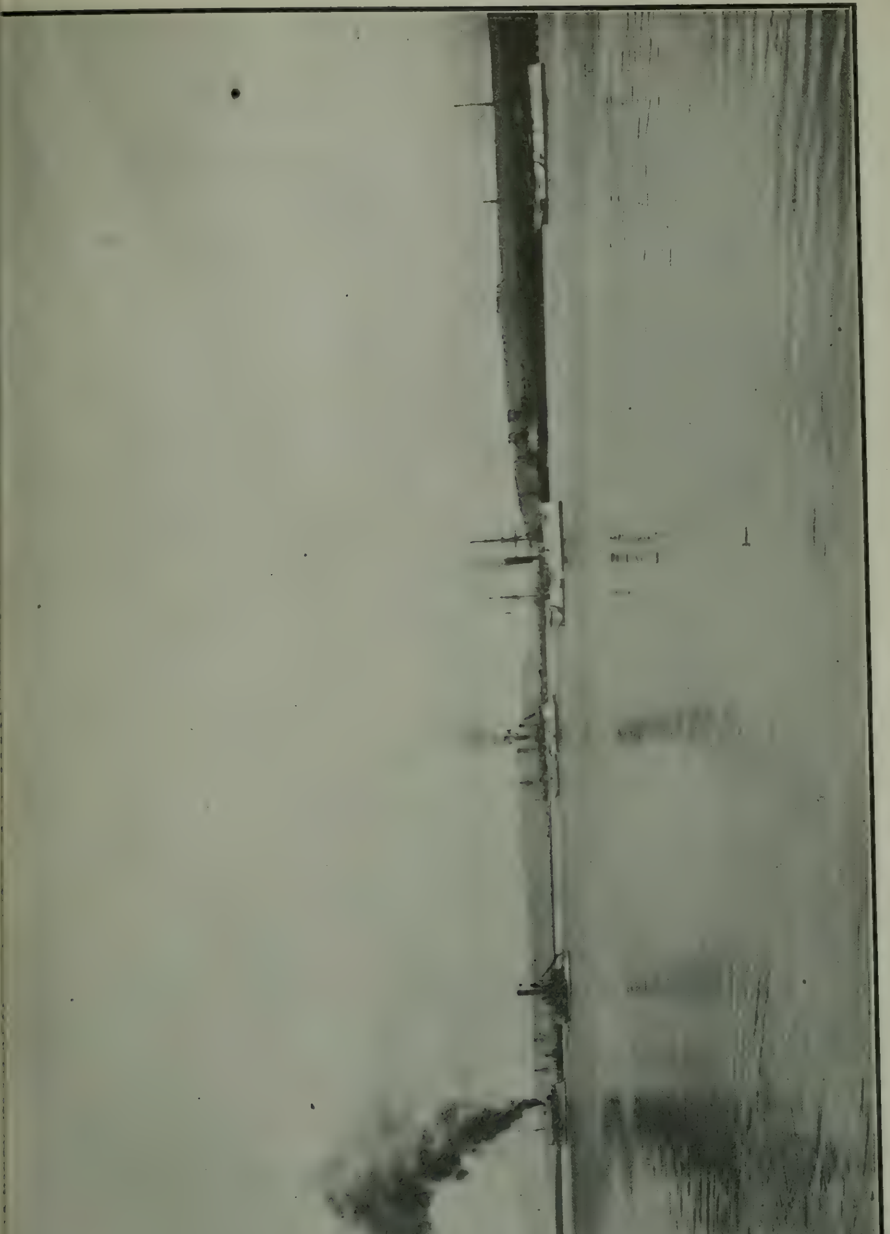
Officers of the Corps of Engineers of the United States Army report that a depth of 30 feet across the bar may be maintained by extending the jetty a distance of 3,500 feet and by constructing another jetty on the opposite side of the channel extending outward from the extremity of Point Loma a distance of 3,000 feet. They, however, conclude that the same object may be attained at a less expense by dredging; and they recommend that a channel 600 feet wide across the bar be deepened to 30 feet, and that a channel 30 feet deep be dredged across the middle ground, with a minimum width of 400 feet, flaring to a greater width at the upper end to facilitate access to the coaling station.

WHARVES.

In the early days before wharves were built vessels used a curiously formed natural pier near the mouth of the harbor for purposes of loading and discharging cargo. This pier consists of a large mass of water-worn or cobblestone rock, extending into the water some 800 feet, and is called Ballast Point. On the inner side the water was over 60 feet deep close in shore, so that vessels might lie to and spar off shore to receive and discharge goods. In those days there was but little commerce, which was carried on by occasional traders, there being no regular lines of ships. The articles of export were mostly hides and tallow, and the imports such goods as are used for domestic purposes and clothing. As the people gained in number and the town grew commerce increased, and it became necessary to have wharves.

At present there are eight large wharves in the bay, besides more than a dozen for small boats, and a franchise has been granted to the San Diego and Arizona Railway Company for the construction of a very large double pier which will be built within two years. The Federal Government has a small wharf at Fort Rosecrans and a quarantine wharf with buildings at La Playa, and at present is building a naval coaling station.

On the Coronado side of the bay there is a marine ways capable of accommodating vessels of large tonnage. On the San Diego side are the



WARSHIPS IN THE BAY.

huge coal bunkers of the Spreckels Brothers Commercial Company. These bunkers are among the largest on the Pacific coast. They are fully equipped for rapidly coaling any steamer lying alongside.

The wharves extend into deep water and are easy of approach. Tugs are not needed to lay vessels alongside, and usually when a vessel is ready to leave the wharf, with the aid of a line it may readily be swung into the stream. The wharves in the bay are all the private property of individuals or corporations. The life of the franchises for all but one of them will expire by the year 1925. The policy of the Board is to restrict to that time all renewals of franchises, with the view of having all wharves conform in the future to a general plan in direction of extension and in plan of construction.

The Government is well aware of the strategic importance of the bay. Modern forts for its defense have been built. The military post has remarkably well-appointed quarters for the officers and men.

The quarantine station has a fine equipment of the most modern fumigating and disinfecting apparatus. The detention quarters are ample and well arranged. With the completion of the coaling station and the construction of a dry dock, urgently needed for the use of the navy as well as for merchant vessels, the Government will have a good basis for a naval station in this port.

WORK OF THE BOARD.

The Board has held twenty-four regular monthly meetings and forty-two special and adjourned meetings in the past two years. Some very important franchises have been granted, especially the franchise to the San Diego and Arizona Railway Company for a double wharf. This wharf will extend from the shore line 1,712 feet to the pierhead line and is 1,358 feet in width, having a slip 308 feet wide and 1,604 feet long between the two piers. There will be freight sheds and eight railroad tracks extending the full length of each pier. There will be sufficient room to moor a large number of vessels at one time for the purpose of receiving and discharging cargo. It will be the greatest structure of its kind on the Pacific coast.

Franchises were granted as follows:

January 21, 1907, to Southwest Packing Company, wharf for fishing and canning purposes; for 18 years.

March 7, 1907, to R. M. Creswell, addition to Roseville Ferry wharf; for 18 years.

March 7, 1907, to R. M. Creswell, wharf for small boats at La Playa; for 18 years.

March 7, 1907, to Russ Lumber and Mill Company, addition to wharf; for 18 years.

April 23, 1907, to San Diego Lumber Company, addition to wharf; for 18 years.

PLEASURE CRAFT ON THE BAY.

June 13, 1907, to South Park and East Side Railway Company, pleasure wharf; for 25 years.

August 7, 1907, to Keller, Kerkhoff Company, right of way for railroad; for 50 years.

August 20, 1907, to the city of National City, wharf for the pleasure of the public; for 18 years.

August 20, 1907, to L. A. Creelman, permit to maintain bath-house; for 10 years.

September 10, 1907, to C. A. Meyer, small marine ways; for 10 years.

February 28, 1908, to Benson Lumber Company, wharf for lumbering purposes; for 17 years.

March 4, 1908, to South San Diego Investment Company, permit to dredge channel for small boats.

March 10, 1908, to San Diego and Arizona Railway Company, wharf for commercial purposes; 25 years.

April 20, 1908, to San Diego and Arizona Railway Company, right of way for railroad; 50 years.

June 24, 1908, to Point Loma Ferry Company, for passenger ferry; for 17 years.

March 16, 1908, the franchise of the Southwest Packing Company was revoked for failure to comply with the terms of the franchise.

The franchise of the South Park and East Side Railway Company was annulled by the refusal of the common council of the City of San Diego to ratify the same, and was afterward formally revoked by the Board.

The Board granted permission for a number of small wharves for fishing and boating purposes; during the pleasure of the Board.

In 1907 the State Legislature appropriated $10,000 to be used in establishing the rights of the State to the tide lands of the Bay of San Diego, the title to which was disputed. The Board has caused surveys and maps to be made of a portion of the bay shore preparatory to regaining the tide lands claimed adversely to the State. In the suit at law brought by the Board against Kerber, Engelbretsen and Nelson to recover possession of tide lands, the trial court held that that portion of the land proven to be tide lands was the property of the State, and the decision was confirmed by the Supreme Court in January, 1908.

Two other suits of like nature were brought by the Board against Carrie A. Dalton and Medora H. Howard on August 4, 1908. The Board has obtained judgment against the defendants. Other such suits will be brought as rapidly as possible until all the tide lands which rightfully belong to the State shall have been surrendered. Through the agitation of this matter by the Board the general public has come to concede the rights of the State to the tide lands of the bay, and when parties at present in possession of such tide lands shall have been dispossessed there will probably be no further trouble in the matter.

RECOMMENDATIONS.

Seawall—The construction of a portion of the seawall or bulkhead should be commenced as soon as possible; and the space between this and the shore line should be filled (a portion of this reclaimed land may be devoted to warehouse and other like purposes). Over and upon this reclaimed land a driveway should be laid out. All piers should begin at the bulkhead line and extend to the pierhead line, and at each side of the piers the bay should be dredged to allow vessels to lie alongside; the earth removed in dredging should be used in filling behind the bulkhead. This work should be continued from year to year until the seawall shall have been constructed along all that portion of the bay front used for commercial purposes.

State Wharf—The commerce of the port of San Diego is greatly increasing, owing to the rapid development of the southern part of the State. When the Isthmian Canal is opened, we anticipate that very great amounts of the products of this section of California will be shipped to the Atlantic coast through this port and the canal; and that great quantities of merchandise from the cities of the Atlantic coast and from Europe, which is destined for Southern California and territory eastward, will be shipped through the Isthmian Canal and will be entered at this port; also that large quantities of the products of the Orient shipped to the United States will be entered at this port. A wharf owned by the State, which might be used by all persons and companies not having wharf facilities of their own in the bay, would greatly increase the value of this port in the minds of shippers and seafaring men as a shipping point.

Belt Railway—The City of San Diego is located upon high ground, which slopes down to the bay. The topography of the country is such that it would not be practicable to construct a railroad through or around the city except on the bay shore. The business district reaches down to the water. Two railroads, the Atchison, Topeka and Santa Fé and the San Diego and Arizona, have rights of way through this section. Another right of way would cover so much business property as to be a detriment to the business growth of the city, and would cost so much as to be almost prohibitive. The better plan would be for any new roads instead of passing through the city to pass around it over the tide lands. The Board has received an application for right of way over the tide lands, and when other railroads are ready to enter the city there will be more demands for right of way. Several roads passing over the tide lands with their spurs and switches would so encumber the water front as to greatly impede traffic and the passage of teams. It would be advantageous for the State to build and operate a belt line railroad over the tide lands and along the water front, permitting all roads to move their through trains around the business part of the city on the belt line, and to have their freight cars moved over the tracks and switched on to wharves for unloading or receiving freight and again returned to their several roads. There is a large tide flat near the business district which would afford ample yards for all switching purposes in connection with the belt line. A plan might be matured for arranging with railroads desiring to enter the city that they should build a large part of this line without cost to the State.

Pleasure Wharf—The Civic Improvement Committee of San Diego desires that a portion of the water front north of D street least adapted, on account of the shallowness of the water, for commercial purposes, shall be devoted to the pleasure of the public and for purposes of recreation.

The plan of the committee is to have the space between the seawall and the belt line of railroad laid off attractively to grass plots, shrubbery and esplanades for walking and a boulevard for driving, which boulevard it is hoped may extend around the northern portion of the bay. A pier for pleasure boats is to extend beyond the seawall, and at another point a children's wharf and various improvements of like nature are contemplated, which will make that portion of the bay front attractive and pleasurable to the citizens.

It is argued that at the present time there is no fitting place where people may go to view and enjoy one of San Diego's choicest possessions, the bay and harbor. The Board commends the plan, and will be glad to further the improvement of a portion of the bay front in this way.

Respectfully submitted.

CHAS. W. OESTING.
EUGENE DEBURN.
CAPT. W. H. PRINGLE.
Board of State Harbor Commissioners
for the Bay of San Diego.

CALIFORNIA STATE MINING BUREAU

LEWIS E. AUBURY, - - State Mineralogist.

REPORT

OF THE

BOARD OF TRUSTEES

AND

STATE MINERALOGIST

COVERING THE

FIFTY-EIGHTH FISCAL YEAR ENDING JUNE 30, 1907, AND FIFTY-NINTH
FISCAL YEAR ENDING JUNE 30, 1908.

SACRAMENTO
W. W. SHANNON, : : : : SUPERINTENDENT STATE PRINTING
1908

REPORT OF THE BOARD OF TRUSTEES OF THE STATE MINING BUREAU.

SAN FRANCISCO, November 1, 1908.

To His Excellency, JAMES N. GILLETT,
Governor of California.

SIR: The trustees of the State Mining Bureau herewith submit their report, in pursuance of the act of the legislature, approved March 23, 1893, entitled "An act to provide for the establishment, maintenance, and support of a Bureau, to be known as the State Mining Bureau, and for the appointment and duties of a board of trustees, to be known as the Board of Trustees of the State Mining Bureau, who shall have the direction, management, and control of said State Mining Bureau, and to provide for the appointment, duties, and compensation of a State Mineralogist, who shall perform the duties of his office under the control; direction, and supervision of the Board of Trustees of the State Mining Bureau."

No reports have been printed since the thirteenth (or third) Biennial, issued September 15, 1896, although numerous bulletins have been issued, as enumerated in the report of the State Mineralogist. The report herewith submitted covers the fifty-eighth and fifty-ninth fiscal years. The Board of Trustees and the State Mineralogist have, however, made biennial reports in accordance with the law above quoted.

[Thirty-seventh session of the Legislature of California, Statutes of California, 1907.]

GENERAL APPROPRIATION ACT PROVIDING FOR THE SUPPORT OF THE STATE GOVERNMENT FOR THE FIFTY-NINTH AND SIXTIETH FISCAL YEARS.

[Approved March 22, 1907.]

The clauses relating to the State Mining Bureau are as follows:

"For salary of State Mineralogist, six thousand dollars.

"For support of the State Mining Bureau, including salaries, forty thousand dollars.

"For printing, binding, ruling, and all other work performed and materials furnished by the State Printing Office, five thousand dollars."

The Board of Trustees, in obedience to the mandate of the legislature and at the request of his Excellency, the Governor, have audited and approved the accounts for traveling, salary, and other incidental expenses incurred by Field Assistants and other employees, as well as all expenses of the State Mining Bureau.

The following new members of the Board of Trustees having been appointed by Your Excellency, viz.: Messrs. Frank W. Griffin and Dr. C. T. Deane of San Francisco, and Mr. A. H. Ward, of Alameda, a meeting of the Board was held on January 15, 1908, for the purpose of reorganization, at which time Mr. Harold T. Power was elected President; Dr. C. T. Deane, Vice President; and Mr. Frank W. Griffin, Secretary.

After a discussion of the financial condition of the Bureau, and the means at hand for the performance of necessary field work and improvements at the Bureau, it was decided to continue field work to its completion on "The Copper Resources of California," and to issue a report (or bulletin) thereon.

It was also decided to revise Bulletin No. 36, "Gold Dredging in California," first edition of which was issued in May, 1905, and to bring the same up to date, as since the issuance of the first bulletin on this subject, many new improvements have been made in dredge construction, and the costs of operation considerably lessened. Field work on this bulletin is to be commenced after the field work on the Copper Bulletin shall have been completed. It is expected that field work on the Dredging Bulletin will begin prior to January 1, 1909.

The available funds for field work being extremely small, it is not possible, under the present appropriation, to continue more than one assistant in the field, otherwise we would consider it advisable to also commence work upon a bulletin giving descriptions of the oil fields of California, with the geological conditions occurring in the different districts. The rapid advancement of petroleum to the first place in the point of mineral production in California makes it essential that the Bureau should place before the public, as soon as possible, an up-to-date bulletin on this subject.

As soon as the field work on the Dredging Bulletin has been completed it is expected to have the work on Petroleum commenced and completed before the end of this fiscal year.

In considering the appropriations for the next two fiscal years, we desire to urge upon Your Excellency the necessity for an adequate appropriation for the support of the Bureau to perform the large amount of field work necessary, and a sufficient fund to be placed in the hands of the State Printer to publish the results of such work.

Much new work should be taken up in certain branches of the mining fields of this State, which have had to be neglected on account of lack of funds, and of which late information is lacking. Among these subjects might be cited "Auriferous Channels," "Placer and Hydraulic Mining," "Industrial Mineral Products and their Occurrence," "Late Methods of Ore Reduction and Concentration," "The Utilization of Waste Mineral Products," "Conservation of Our Mineral Wealth, including Oil, Gas and Coal," "The Mineral Springs of California," "Manufacture of Home Mineral Products," "The Coal and Iron Deposits of California," County Mineral Maps and Registers, etc.

As California is now producing fifty different mineral substances, in order that each of these substances shall receive its fair quota of attention from the Bureau, and so that their occurrences and development may be given proper publicity, we again most respectfully urge that adequate funds be provided for necessary investigations and reports.

The financial statements showing amounts of appropriations for the Bureau for several years past, and the amounts expended, call forth the comment that these appropriations have been inadequate to meet the needs of the Bureau and perform the necessary work, and we wish herein to highly commend State Mineralogist L. E. Aubury for the economy he has practiced and the ability he has displayed in conducting the affairs of the Bureau with the small means at his command.

We wish to further report that there is a need for many new books on mining topics, which books should be added to the Library. As this is the only mining library in the State, and there is constant demand for recent literature, it is to be hoped that sufficient funds will be available from the next appropriation to purchase the necessary books.

We also wish to report that every department of the Bureau is well systematized, and the work of the Bureau is ably conducted. The rooms are clean and well kept. Requests for information are promptly met. During the past two years many thousands of persons registered as visiting the Bureau.

An extraordinarily large number of visitors viewed the exhibits in the Museum during the month of May, 1908, at which time the American fleet was in San Francisco Bay. A large exhibit of a battleship, constructed of borax, which was mined in California, attracted especial attention of the visitors. Special exhibits of rich gold specimens from Tuolumne and Siskiyou counties were also on display in the Museum at that time.

The Bureau is now arranging to supply the advanced grades of the public schools, high schools, and normal schools, as well as the Polytechnic, with mineral collections, showing the more common minerals found in California. Much interest is taken in these collections by the students, particularly those in the physical geography classes.

The Museum is frequently visited by classes from the public schools in and around San Francisco.

MUSEUM.

Since the last report the relabeling of the entire mineral collection, consisting of over 20,000 specimens, has been completed. All the wall cases have been thoroughly cleaned and painted. A large number of framed photographs, illustrative of early mining in California, have been hung throughout the Museum, and the entire exhibit presents a much better appearance than before the fire.

The following is a list of those who, by their kindly interest, have with donations added to the value of the collection, which ranks as one of the most valuable and comprehensive in the world:

American Magnesite Co.
Aubury, Lewis E.
Alaska Graphite Co.
Bruce, Benjamin F.
Bartlett, W. E.
Balser, C. M.
Beer, Samuel
Campton, L. B. & Co.
Clough, Wm. O.
Connelly, M. J.
Cuprite Sulphur Co.
Davis, A. B.
Edman, J. A.
Engels, H.
Finnell, Thomas A.
Felb, B. W.
Frank, B. F.
Forbes, Geo. W.
Gebhardt, Theo.
Gibbons, J. R.
Green, Jesse
Gotsche, Frank
Graves, D.
Hart, Jas. H.
Henderson, James
Horswill, F. A.
Ish, J. T.
Jens, J. C.
Keating, John B.
Lang, John
Marriott, Jas. H.
McMillan, W. M.
McAllister, G. W.
New Pedrara (Mex.) Onyx Co.
Plummer, L. W.
Parsons, W. B.
Premier Diamond Mining Co.
People's Gas and Coke Co.
Rose Fire Brick Co.
Raggis, Wm.
Reed, T. J.
Sehum, A. W.
Smith, Dr. Angus D.
Scott & Hickman
Sigmund, Louis
Topp, T. M.
Thomas, U. M.
Thorpe, B. W.
Vair, Rodger
Walker, J. M. C.
Watson, William
Wood, Homer W.

Special mention should be made of the following rare and interesting specimens: A model of the celebrated "Cullinan Diamond," presented by the Premier Diamond Mining Company, of Johannesburg, South Africa. This great gem when found weighed 3,085 carats; a fine specimen of molybdenite, Yucca, Arizona, G. W. McAllister; two beautiful pieces of crystallized dioptase (a very rare copper silicate), from Globe, Arizona, F. A. Alsdorf; also very fine vanadinite samples by the last mentioned donor.

During the visit of the fleet the Bureau was enabled, through the courtesy of the owners and Messrs. Cæsar Belli and S. H. Smith of Sonora, to place on exhibition a magnificent display of rich gold ore from the celebrated O'Hara mine near Sonora, California. The specimens were valued at over $8,000, and attracted great attention.

The Bureau wishes to acknowledge the assistance rendered by Mr. T. J. Nolton, of the Siskiyou Chamber of Commerce, in securing a fine exhibit of gold specimens from Siskiyou County, which are now on exhibition.

The Board of Trustees wishes to request of all persons who are interested in advancing the welfare of the Bureau that they donate mineral specimens of any kind which would add to the interest of the collection. Due recognition and credit will be given for such donations or loans.

LIBRARY.

The insufficiency of appropriation is nowhere more in evidence than in this department of the Bureau. Since the San Francisco disaster, the Library has greatly enhanced in value as a place for reference. The destruction of numberless library collections, both public and private, has left the Bureau Library practically alone in the task of supplying to those interested the necessary technical literature treating on the varied branches of mining and metallurgy.

The rapid advances which are constantly being made along these lines are well illustrated by the great number of works treating on the same which are published each year. The Library should have such funds as would allow of the purchase from time to time of a number of the most prominent of these.

A new catalogue of the books of the Library is being made, which when completed will considerably enhance its practical value.

JOHN HAYS HAMMOND LIBRARY.

There has been installed in the Library of the State Mining Bureau an independent library known as the John Hays Hammond Mining Library. This library is the gift of Mr. Hammond to the miners of California, and was donated with the understanding that it should remain in San Francisco. This library contains many new and up-to-date works upon mining subjects, and has proved of great value in supplying references which were not contained in the Mining Bureau Library.

This library is also to be catalogued preparatory to the further purchase of important works.

A very complete file of magazines and newspapers devoted to mining and mining news is at all times accessible to those interested. The popularity of this feature is best shown by the great number who daily use the same. The Board wishes to extend thanks to the editors and publishers of the following publications (furnished free to this department) for their kindly interest in the Bureau:

Amador Dispatch, Jackson.
Amador Ledger, Jackson.
American Institute of Mining Engineers, New York.
Angels Camp Record, Angels Camp.
Antelope Valley Gazette, Lancaster.
Australian Mining Standard, Melbourne.
Bee, Sacramento.
Bodie Miner, Bodie.
Bureau of the Census, Washington.
Bureau of Science, Manila, P. I.
Business and Finance, New York.
Calaveras Prospect, San Andreas.
Calaveras Weekly Citizen, San Andreas.
California Derrick, San Francisco.
California Journal of Technology, Berkeley.
Canadian Mining Journal, Toronto.
Chemical Engineer, Chicago.
Chronicle, Goldfield.
Citrograph, Redlands.
Clear Lake Press, Lakeport.
Coal and Coke, Baltimore.
Contra Costa Gazette, Martinez.
Courier-Free Press, Redding.
Daily Enterprise, Chico.
Del Norte Record, Crescent City.
Dispatch-Democrat, Ukiah.
Eldoradoan, Georgetown.
Engineering and Mining Journal, New York.
Enterprise, Healdsburg.
Far Eastern Review, Manila, P. I.
Free Lance, Hollister.
Free Press, Ventura.
Fresno County Republican, Fresno.
Gateway Gazette, Beaumont.
Gazette, Georgetown.
Gazette, Mariposa.
General Electric Review, Schenectady.
Grizzly Bear, Los Angeles.
Herald, Los Angeles.
Humboldt Standard, Eureka.
Imperial Valley Press, El Centro.
Inyo Independent, Independence.
Inyo Register, Bishop.
Institution of Civil Engineers, Westmoreland, S. W., England.
Journal, Salinas.
Lead and Zinc News, Joplin.
Leslie's Weekly, New York.
Mercury, Madera.
Mercury, Oroville.
Mexican Mining Journal, Mexico.
Middletown Independent, Middletown.
Miner-Transcript, Nevada City.
Mineral Wealth, Redding.
Mines and Minerals, Scranton.
Mining Journal, Seattle.
Mining Journal, London.
Mining Record, Denver.
Mining Record, Victoria.
Mining Review and Metallurgist, Chicago.
Mining Review, Los Angeles.
Mining Science, Denver.
Mining World, Chicago.
Mining and Engineering Review, San Francisco.
Mining and Scientific Press, San Francisco.
Morning Times, San Jose.
Mother Lode Banner, Sonora.
Mountain Democrat, Placerville.
Mountain Messenger, Downieville.
New San Franciscan, San Francisco.
New Zealand Mines Record, Wellington.
News, Goldfield.
News, Red Bluff.
News, San Diego.
News Letter, San Francisco.
Northwest Mining Journal, Seattle.
Nugget, Placerville.
Oceanside Blade, Oceanside.
Oil Industry, Los Angeles.
Pacific Miner, San Francisco.
Pacific Outlook, Grants Pass.
Petroleum Review, London.
Placer County Republican, Auburn.
Placer Herald, Auburn.
Plumas National Bulletin, Quincy.
Profit and Loss, Denver.
Queensland Government Mining Journal, Queensland.
Reveille, Cloverdale.
River News, Rio Vista.
Rustler, King City.
Rustler, Rawhide.
Salt Lake Mining Review, Salt Lake.
Scott Valley Advance, Etna.
Searchlight, Redding.
Sierra Daily Times, Sonora.
Siskiyou News.
Stanislaus Weekly News, Modesto.
Stone, New York.
Sunset Magazine, San Francisco.
Sun, Colusa.

Sun, Tonopah.
Telegraph, Folsom.
Times, Los Angeles.
Times, Yerington.
Tribune, Healdsburg.
Transvaal Chamber of Mines, Johannesburg, South Africa.
Union, Sacramento.
Union, San Diego.
Union-Democrat, Sonora.
U. S. Geological Survey, Washington.
U. S. Investor, Boston.
Weekly Courier, Petaluma.
Weekly Herald, Arroyo Grande.
Weekly Trinity Journal, Weaverville.
Willows Journal, Willows.
Wood River Times, Hailey.
Yolo Semi-Weekly Mail, Woodland.

LABORATORY.

During the fiscal years from July 1, 1906, to July 1, 1908, the Laboratory has received by mail for determination 2,567 mineral samples, an average of 107 samples per month, replies to which have been forwarded by mail. In addition to these samples, an average of 112 samples per month have been brought in personally and passed upon.

Information has likewise been sought and replied to by this department, both personally and by mail, as to the occurrences and market values of the rarer minerals and metals, as well as information furnished of the history and location of various mines.

FINANCIAL STATEMENT.

Fifty-eighth Fiscal Year—July 1, 1906, to July 1, 1907.

RECEIPTS.

Balance from fifty-seventh fiscal year	$1,212 12	
State appropriation, fifty-eighth fiscal year	17,500 00	
		$18,712 12

DISBURSEMENTS.

Geological salaries	$926 00	
Bureau	10,375 86	
Traveling expenses of Geological Assistants	829 51	
Rent	1,485 00	
Laboratory	110 00	
Library	3,639 61	
Museum	519 26	
Postage	395 32	
Sundries	424 23	
		$18,704 94
Balance of fund not expended		7 18
		$18,712 12

Fifty-ninth Fiscal Year—July 1, 1907, to July 1, 1908.

RECEIPTS.

Appropriation, fifty-ninth fiscal year		$20,000 00

DISBURSEMENTS.

Geological salaries	$2,620 80	
Bureau	10,692 50	
Traveling expenses of Geological Assistants	2,008 41	
Rent	1,620 00	
Laboratory	92 35	
Library	1,291 12	
Museum	310 17	
Postage	415 95	
Sundries	397 30	
		$19,448 60
Balance		551 40
		$20,000 00

According to the custom of the Board of Trustees, the accounts of the Bureau have been audited by Messrs. McLaren and Goode, expert accountants. Their report shows that the books and accounts are neatly and correctly kept, and that all funds are properly accounted for. This examination is made quarterly.

Respectfully submitted.

HAROLD T. POWER,
C. T. DEANE,
FRANK W. GRIFFIN,
A. H. WARD,
LOUIS JANIN,
Board of Trustees of State Mining Bureau.

BIENNIAL REPORT

OF THE

STATE MINERALOGIST

COVERING THE

Fifty-eighth Fiscal Year ending June 30, 1907, and the
Fifty-ninth Fiscal Year ending June 30, 1908.

LEWIS E. AUBURY,
State Mineralogist.

REPORT OF STATE MINERALOGIST.

To His Excellency, James N. Gillett,
Governor of the State of California.

Sir: In pursuance of "An act to provide for the establishment, maintenance, and support of a Bureau, to be known as the State Mining Bureau," etc., approved March 23, 1893, I herewith present my report of the work performed by the State Mining Bureau from November 1, 1906, to November 1, 1908.

LEWIS E. AUBURY,
State Mineralogist.

San Francisco, November 1, 1908.

From the fifty-second fiscal year up to the present time no regular biennial reports, containing results of all of the work of the State Mining Bureau, have been issued. It has been found that the practice of issuing bulletins or reports on special subjects has proven to be not only the best method of supplying the public with required information, but the data contained in the bulletins can be furnished earlier than was the case with the biennial reports.

In considering the work of the Bureau for the past two fiscal years, I desire to call your attention to the financial statement of the Board of Trustees. From this it is learned that the amount available for field work has been extremely small. In fact, there has not been a sufficient amount available to permit of the employment of *one* Field Assistant continuously.

To indicate the necessity for larger and adequate appropriations, so that the Mining Bureau will be enabled to furnish up-to-date information concerning our mines, I would call your attention to the great advancement which has been made in the mining industry.

In 1887, the total value of all mineral substances produced in California amounted to $19,785,868. In 1897, the total value was $25,142,441. In 1907 the State produced fifty different mineral substances of economic importance, of a valuation of $55,697,949, or an increase of over double that of ten years ago.

California produces a greater variety of mineral substances than any other state in the Union or any country on the globe. These substances are widely distributed over the State, and each of them is annually entitled to consideration from this department. Hence, it can be readily seen that in order to supply the necessary data regarding these fifty different mineral substances, we must have larger appropriations. Our appropriations should permit of the employment of several field assistants, instead of the employment of *one*, to cover a territory the size of California. In my opinion, the granting of a small appropriation to this department is a great injustice to an industry which not only made California what it is to-day but affected the development of this Western country. As the mineral development of California has progressed, so the work of the Bureau has proportionately advanced, yet the appropriations for its support have *decreased*.

For your information, I herewith append the annual amount of appropriations in different years to illustrate this decrease:

July 1, 1889, to July 1, 1890	$50,000 00
July 1, 1899, to July 1, 1900	25,000 00
July 1, 1906, to July 1, 1907	17,500 00

Since July 1, 1906, the appropriations for the Bureau have been particularly small—so small that the field work of the Bureau has been almost prohibited, and therefore but a small amount of literature has been issued. After the San Francisco disaster, what little funds the Bureau had and which would have been available for field work had to be used for the purpose of repairing damages sustained during the earthquake. The last legislature made no provision to rehabilitate the Bureau, although it sustained damage by breakage of cases and other losses to the extent of approximately $1,500.

The most rigid economy has been practiced, and the small amount available has been used to the best advantage. It is to be hoped that the coming legislature will appreciate the conditions under which the Bureau has labored for several years past, and increase the size of the appropriations to a sum commensurate with the Bureau's needs.

Since my last report, the following publications have been issued, or are now in the hands of the Printer:

Bulletin No. 45, "Auriferous Black Sands of California," 22 pages. This bulletin treats of the origin and physical characters, methods of treatment, approximate values, and distribution of black sands in California, and aims particularly at correcting erroneous ideas as to their extent, quantity, and value.

Bulletin No. 46, "Index to Mining Bureau Publications," 54 pages. This bulletin furnishes a complete list of the publications which have been issued by the Bureau since its first publication, December 1, 1880, up to June 30, 1907, together with an arrangement of their publication under the different administrations.

Bulletin No. 47, Statistical sheet, showing the mineral production by counties for the year 1906.

Bulletin No. 48, Statistical sheet, showing the mineral production for the past twenty years, inclusive of 1906.

Bulletin No. 49, "Mines and Minerals of California," 57 pages, with maps and illustrations of the Bureau. This bulletin includes the mineral production for 1906. It also furnishes a list of the different mineral substances produced in California, their quantity and value, and the counties in which they occur. A list of the counties is also given, with the quantity and value of the different mineral substances produced in each county in the year 1906. Statistical tables are also included, showing the annual total value of all minerals produced by each county from 1894 to 1906, inclusive.

Included in this bulletin is a map of each county in the State, showing the railroad lines and post offices, and indicating the distances between points.

A list of available Mining Bureau publications is also included.

Bulletin No. 50 (now in press), "Copper Resources of California." Illustrated. This bulletin is a revision of Bulletin No. 23, "Copper Resources of California," issued in 1902. As there has been much advancement in copper mining since 1902, together with the discovery of new copper deposits and further development in those operating at that time, it was considered advisable to present the latest data obtainable in this bulletin.

Bulletin No. 51, Statistical sheet, showing the mineral production by counties for the year 1907.

Bulletin No. 52, Statistical sheet, showing the mineral production for the past twenty-one years.

Bulletin No. 53 (now in press), showing mineral production for 1907. (Same arrangement as Bulletin No. 49, except that in addition to the regular data, the character, amount produced, and value of all mineral substances are given by county from the year 1900 to 1907, inclusive.)

"Gold Production," Statistical sheet, showing the amount of gold produced in California from 1848 to 1907, inclusive.

MAPS.

"*Map of the Forest Reserves in California,*" 37½ by 31½ inches, in colors, showing the location and extent of the Forest Reserves in California, compiled from data furnished by the United States Forest Service, Washington, D. C.

"*Relief and Mineral Map of California,*" 1906, in colors, and 25½ by 38½ inches.

This map shows a relief map of California, with the location of the principal cities and county seats, railroad lines, rivers, etc. A skeleton map is also shown of California, with county boundaries. This map is shown on the same scale as the relief map, and on it are indicated the approximate location of the different mineral deposits.

The amount and value of the principal minerals produced are also indicated on the map.

"*Map of Minaret Mining District.*" A prospector's map of the Minaret District, in Madera County, was issued in 1907. Much of the territory covered by this map is unsurveyed, but the data supplied by this map, it is hoped, will meet all present requirements.

IN PREPARATION.

"*Gold Dredging in California.*" The advancement which has been made in the gold dredging industry in California since the publication of Bulletin No. 36 makes it advisable to revise the latter publication, and bring the same up to date. It is anticipated that the collection of additional data will be commenced at an early date, and as the funds of the Bureau will permit.

PETROLEUM.

Owing to the prominence the petroleum industry has assumed in California, it having taken the lead in value of production over that of gold in 1907, and amounting to a production of 40,311,171 barrels, valued at $16,783,943, it is my opinion that field work should be commenced at the earliest possible date (after the data on gold dredging has been collected) on a bulletin which will furnish a description of the different fields in which petroleum has been found, and maps should be compiled showing the location and extent of such fields. All possible information should then be furnished in a bulletin which will assist the prospector, investor, and operator in the petroleum fields of the State.

STRUCTURAL AND INDUSTRIAL MATERIALS.

A greater proportionate development of our structural and industrial materials has taken place in the past two years than ever before in our State's history. Bulletin No. 38, which treated on these subjects, was issued early in 1906, and after the San Francisco fire a great demand was made for this report. It has proven of considerable value to California producers and consumers, and has been the means of leading to the development of several new industries in this State. An early revision of this bulletin would be of benefit to the industry of structural and industrial materials.

STATISTICAL BULLETINS.

During the year 1907 a more thorough system was inaugurated in the statistical department of the Bureau, and which brings it within closer touch with the producers. The results of this system are apparent, as the information gained from producers is now furnished in our annual printed sheets earlier in the year than formerly.

MAPS AND REGISTERS.

The system of issuing maps and registers of mines of the different counties has met with general approval. So far, maps and registers of twenty counties have been issued. On the maps are indicated the location of the different mineral deposits, which are also numbered. In the registers general descriptions of them are given, together with the name and address of the superintendent or owner. It is advisable to continue the work of compiling additional maps and registers of the counties not as yet included, and to revise the work already performed.

REVENUE.

As a source of revenue for the partial support of the State Mining Bureau, permit me to suggest that if the same is consistent with our State law, the whole or a portion of the State license tax now paid to the Secretary of State by mining corporations be diverted to a fund towards the support of the State Mining Bureau.

PROSECUTION AND EXPOSURE OF "WILDCAT" MINING SCHEMES.

During the past two years, as well as prior to that time, the attention of the State Mineralogist was called to certain stock swindling schemes in which the name of the Bureau had been wrongfully used. The promoters of these companies were exposed by me in the press, and in some instances prosecution and conviction in the courts followed. Owing to the California law regarding willful misrepresentation of mining properties, and its rigorous enforcement, the "wildcat" operators are being driven from the State.

PROTECTION OF MINERAL LANDS.

For many years large areas of the mineral lands of California have been illegally absorbed by interests other than mining, principally under the timber act, scrip and homestead entry. In the enormous acreage of mineral lands thus far acquired by these interests, there is just cause for alarm that unless a halt is called the mineral industry of California will be materially affected.

If the Government would take the proper means to suppress the frauds which are continually being perpetrated in this State upon the mineral lands, results would have been obtained a long time since. During the past eight years I have continually brought before the proper departments at Washington, the complaints of miners throughout the State of the injustice practiced upon them. In some instances, the Government took action after a lapse of from *five to six years.* Appeals were not only made by letter, but in person, for the proper protection of our mineral lands. Many promises have been made by Government officials that the wrongs to which the miner has been subjected in the past would be righted. So far as I am informed the miner is still waiting for the fulfillment of most of these promises.

CONDITION OF THE INDUSTRY.

Some figures of production have been previously given to illustrate the growth of the mining industry in California during recent years. A better idea of the present mining conditions in California can probably be gained by reference to the following data of production during the year 1907. To this might be added the large growth of the gold dredging industry, which is now becoming a prominent factor in gold production in this State.

I would also respectfully call your attention to the immense production of petroleum, which is to-day, and probably will be for years to come, the leading mineral product of California.

Other mineral substances, with quantity and value, are herewith appended:

Production of California Minerals in 1907.

These figures are based on the returns that have been made by producers, in response to inquiries sent to them on blanks. The total mineral output of California last year was $55,697,949, or a gain in total value of $8,921,864, as compared with the grand total for 1906. Production by substances and by values is reported by the producers to have been as follows:

	Quantity.		Value.
Asbestos	70	tons	$3,500 00
Asphalt	79,718	tons	1,058,400 00
Bituminous rock	24,122	tons	72,835 00
Borax	106,825,000	lbs.	1,200,913 00
Cement	1,613,563	bbls.	2,585,577 00
Chrome	302	tons	6,040 00
Clay-brick	362,167	M	3,438,951 00
Clay-pottery	160,385	tons	254,454 00
Coal	23,734	tons	55,849 00
Copper	32,602,945	lbs.	6,341,387 00
Fuller's earth	100	tons	1,000 00
Gems			232,642 00
Gold	809,213.52	ounces	16,727,928 00
Granite	399,431	cu. ft.	373,376 00

	Quantity.	Value
Gypsum	8,900 tons	$57,700 00
Infusorial earth	2,531 tons	28,948 00
Iron ore	400 tons	400 00
Lead	164 tons	16,690 00
Lime	684,218 bbls.	756,376 00
Limestone	230,985 tons	406,041 00
Macadam	1,544,617 tons	1,082,302 00
Magnesite	6,405 tons	57,720 00
Manganese	1 ton	25 00
Marble	37,512 cu. ft.	118,066 00
Mineral paint	250 tons	1,720 00
Mineral water	2,924,269 gals.	544,016 00
Natural gas	169,991 cu. ft.	114,759 00
Paving blocks	4,604 M	199,347 00
Petroleum	40,311,171 bbls.	16,783,943 00
Platinum	300.07 ounces	6,255 00
Pyrites	82,270 tons	251,774 00
Quartz crystals	4,000 lbs.	10,000 00
Quicksilver	17,379 flasks	663,178 00
Rubble	744,271 tons	832,713 00
Salt	88,063 tons	310,967 00
Sand, glass	11,065 tons	8,178 00
Sandstone	159,573 cu. ft.	148,148 00
Serpentine	1,000 cu. ft.	3,000 00
Silver	1,138,858 ounces	751,646 00
Slate	7,000 squares	60,000 00
Tungsten		120,587 00
Zinc		10,598 00
Total		$55,697,949 00

The feature of the year, as disclosed by the returns, was the advancement of petroleum to the first place, surpassing gold in the value of output for the first time. The production of gold and silver fell off $2,070,708 in 1907, as compared with the preceding year. Petroleum, owing to the increase in price, was more largely produced and was brought up to the first rank in aggregate values.

Metallic substances, including precious metals, represent $24,896,083 in the grand total for 1907. The metallic substances include gold, silver, quicksilver, copper, lead, tungsten, zinc, platinum, and chrome. The production of zinc, which was first reported in 1906, continued in 1907. In metallic substances the figures for 1907, compared with 1906, show a falling off that amounts to $1,206,619. As the decrease in the precious minerals amounted to $2,070,708, the other metallic substances are seen to have been more largely produced than in 1906.

The gains are in copper, pyrites, chrome, and platinum. As usual, the value of silver is given at the commercial average rating in New York.

The nonmetallic substances were produced in 1907 to the value of

$2,495,000. Under this heading are included coal, mineral waters, borax, infusorial earth, salt, magnesite, manganese, gypsum, mineral paint, fuller's earth, and gems. The production of the nonmetallic substances in 1906 was $2,589,984.

The great increase for 1907 was in hydrocarbons and gases. The combined values of these substances was $18,029,937, a gain for the year over the total value for 1906 of $7,859,664. The hydrocarbons are asphalt, bituminous rock, and petroleum. Values are estimated for the several grades of petroleum on the basis of f.o.b. in the various fields, the barrel prices on unexpired contracts being also taken into account. There were produced 7,687,171 more barrels of petroleum in 1907 than in 1906. The production of asphalt rose from 77,756 tons to 79,718 tons, and the value from $777,560 to $1,058,400.

Structural materials made a record of production for 1907 of $8,011,810, as against $7,859,126 in 1906. The list of California structural materials includes bricks, pottery clays, cement, lime, limestone, rubble, macadam, concrete rock, marble, granite, sandstone, slate, glass-sand, and serpentine. The largest gain in any branch of the structural material industries must be credited to the brick and pottery clays, taken together.

The minerals in 1907 took the following order in values: Petroleum, gold, copper, clays and their products, cement, borax, silver. This is the same order as in 1906, with the exception that petroleum succeeds to the first place and gold takes the second place.

The productions of the several counties are summarized as follows: Placer County produced the asbestos. Asphalt was produced in Alameda, Contra Costa, Kern, Los Angeles, Santa Barbara, San Luis Obispo, and San Francisco counties. The bituminous rock all came from Santa Cruz and San Luis Obispo counties.

Borax is credited to Inyo, San Bernardino and Ventura counties; cement to Napa, San Bernardino, and Solano counties; chrome to Calaveras and Shasta counties.

Brick clays were utilized in Alameda, Contra Costa, Fresno, Humboldt, Imperial, Kern, Kings, Los Angeles, Marin, Merced, Madera, Mendocino, Orange, Riverside, Sonoma, Santa Clara, San Joaquin, San Mateo, San Diego, Santa Barbara, San Bernardino, Sacramento, San Francisco, San Luis Obispo, Shasta, Solano, Tehama, Tulare, and Ventura counties.

Pottery clays are credited to Alameda, Amador, Calaveras, Los Angeles, Placer, Riverside, and Sonoma counties.

Coal was mined in Alameda, Amador, and Monterey counties.

The great bulk of the copper was produced in Shasta County, the copper output of that county alone being more than 27,000,000 pounds.

Calaveras produced 3,941,883 pounds. Fresno stood third in copper production, with 250,000 pounds to its credit. The other copper producing counties in 1906 were Amador, El Dorado, Inyo, Los Angeles, Madera, Nevada, Orange, Riverside, San Diego, San Bernardino, and Siskiyou.

Kings County produced fuller's earth. San Diego, Riverside, Sonoma and Tulare counties reported production of gems. The negligence of producers in making reports is responsible for the relatively small showing for gems.

Nevada, Placer, Riverside, Sacramento, San Bernardino, and San Diego counties were granite producers, and Colusa, Los Angeles, Santa Barbara, Siskiyou, and Yolo the sandstone producers. Some serpentine was quarried in Los Angeles County. Alameda, Colusa, Contra Costa, Los Angeles, Riverside, Sacramento, San Benito, San Bernardino, San Francisco, Santa Cruz, San Luis Obispo, San Mateo, Solano, and Sonoma are entitled to credit for the production of macadam. Marble was quarried in Inyo, Los Angeles, Riverside, San Bernardino, San Diego, and Tuolumne counties, and rubble in Alameda, Los Angeles, Marin, Napa, Placer, Riverside, San Diego, San Bernardino, Santa Barbara, Sacramento, San Francisco, Solano, and Ventura counties. Glass-sand was produced in Monterey County; paving blocks in Riverside, San Bernardino, Solano, and Sonoma.

The sole producer of iron ore was Shasta County. Santa Barbara was alone in the production of infusorial earth. Kern, Los Angeles, and Tulare counties were gypsum producers. Madera, Mariposa, Orange, San Bernardino, Inyo, and Riverside were lead producing counties. The zinc came from Inyo and Orange counties.

Lime or limestone were in the mineral output of Amador, El Dorado, Kern, Los Angeles, Monterey, Placer, Riverside, Santa Clara, Siskiyou, Santa Cruz, Shasta, San Luis Obispo, San Bernardino, Sonoma, San Benito, Tuolumne, Calaveras, Santa Barbara, and Plumas counties.

Four counties brought forth magnesite, namely: Alameda, Riverside, Sonoma, and Tulare counties. Plumas alone produced manganese. Stanislaus is credited with the mineral paint. Mineral waters were produced for market in the counties of Butte, Colusa, Lake, Los Angeles, Mendocino, Monterey, Napa, San Benito, Santa Barbara, San Luis Obispo, Santa Clara, San Diego, Shasta, Sonoma, Sierra, Siskiyou, Solano, and Tehama. The natural gas producers were the counties of Sacramento, San Joaquin, Santa Barbara, Ventura, and Solano.

The petroleum producing counties included Fresno, Kern, Los Angeles, Orange, Santa Clara, San Luis Obispo, Santa Barbara, and Ventura. Quicksilver was mined in Colusa, Lake, Napa, Santa Clara, San Benito, Santa Barbara, Solano, San Luis Obispo, and Sonoma counties. Pyrites came from Alameda and Shasta counties. Calaveras alone produced quartz crystals.

The salt production of the State was due to Alameda, Colusa, Los Angeles, San Diego, San Mateo, and Solano counties, the largest producer being Alameda County. All the slate was produced in El Dorado County. Tungsten is credited to Kern and San Bernardino counties.

The counties that reported gold production are Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Humboldt, Inyo, Kern, Los Angeles, Orange, Ventura, Madera, Mariposa, Merced, Monterey, Mono, Nevada, Placer, Plumas, Riverside, Sacramento, San Bernardino, San Diego, San Luis Obispo, Shasta, Sierra, Siskiyou, Stanislaus, Trinity, Tuolumne, and Yuba. Silver was also mined in each of the gold producing counties with one exception.

With this report, copies of all bulletins and maps which have been issued since November, 1906, and which have herein been described, are presented.

Respectfully submitted.

LEWIS E. AUBURY,
State Mineralogist.

MINING BUREAU ACT.

CHAPTER CLXIII.

An act to provide for the establishment, maintenance, and support of a bureau, to be known as the State Mining Bureau, and for the appointment and duties of a board of trustees, to be known as the Board of Trustees of the State Mining Bureau, who shall have the direction, management, and control of said State Mining Bureau, and to provide for the appointment, duties, and compensation of a State Mineralogist, who shall perform the duties of his office, under the control, direction, and supervision of the Board of Trustees of the State Mining Bureau.

[Approved March 23, 1893.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. There shall be and there is hereby established in the State of California a Mining Bureau, the principal office of which shall be maintained in the city of San Francisco, which said Mining Bureau shall be under the supervision of a Board of Trustees, to be known as the Board of Trustees of the State Mining Bureau, and it shall be the duty of, and the Governor of the State of California is hereby authorized and empowered, to appoint five residents and citizens of the State to be such Trustees.

SEC. 2. The appointees shall take the same oath of office as other State officers, and when duly qualified and assembled shall constitute the Board of Trustees of the State Mining Bureau. They shall hold office for four years from the date of their appointment, or until the qualification of their successors, and shall receive no compensation for their services. They shall receive their necessary traveling expenses when attending regular meetings of said Board, said traveling expenses to be approved and audited by the State Board of Examiners. The said expenses shall be paid out of the Mining Bureau Fund and not otherwise. They shall have control of all properties and funds of said Bureau, and shall have the power by the name of said Board to sue and defend. Three of them shall constitute a quorum for the transaction of business. They shall elect one of their number to be President of said Board, and shall keep a record of their proceedings. They shall adopt rules and regulations for their government not in conflict with the laws of the State.

SEC. 3. It shall be the duty of the Governor of the State of California, and he is hereby empowered to appoint a citizen and resident of this State, having a practical and scientific knowledge of mining and mineralogy, to the office of State Mineralogist, which office is hereby created. Said State Mineralogist shall hold his office for the term of four years from the date of his appointment, or until the qualification of his successor. He shall take and subscribe the same oath of office as the other State officers, and shall give bond for the faithful performance of his duties in the sum of twenty-five thousand dollars, said bond to be approved by the Governor of the State of California. He shall receive for his services a salary of two hundred and fifty dollars per month, to be paid in the same manner as the salaries of other State officers, and shall also receive his necessary traveling expenses when traveling on the business of his office, said expenses, when approved by the Board of Trustees of the Mining Bureau, to be allowed and audited by the State Board of Examiners. The said salary and expenses shall be paid out of the Mining Bureau Fund, herein provided for, and not otherwise.

SEC. 4. It shall be the duty of said State Mineralogist to make, facilitate, and encourage special studies of the mineral resources and mineral industries of the State. It shall be his duty: To collect statistics concerning the occurrence of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make a collection of typical geological and mineralogical specimens, especially those of economic or commercial importance, such collection constituting the museum of the State Mining Bureau; to provide a library of books, reports, drawings, bearing upon the mineral industries, the sciences of mineralogy and geology, and the arts of mining and metallurgy, such library constituting the Library of the State Mining Bureau; to make a collection of models, drawings and descriptions of the mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections and library as to make them available for reference and examination, and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of this State, to consist of such collections and library, and to arrange, classify, catalogue, and index the data therein contained, in a manner to make the information available to those desiring it, and to provide a custodian specially qualified to promote this purpose; to make a biennial report to the Board of Trustees of the Mining Bureau, setting forth the important results of his work, and to issue from time to time such bulletins as he may deem advisable concerning the statistics and technology of the mineral industries of this State.

SEC. 5. Said State Mineralogist shall have the right to appoint competent assistants and qualified specialists when necessary in the execution of his plans, and fix their compensation, but all such appointments and compensations shall be subject to the approval and confirmation of said Board of Trustees, and shall not become effective unless so confirmed and approved. And it shall be the duty of the State Mineralogist to consult the said Board of Trustees upon all matters appertaining to his official duties, and he shall at all times perform such duties subject to the supervision and approval of said Board of Trustees.

SEC. 6. It shall be the duty of the Board of Trustees of the State Mining Bureau, when the funds of said Mining Bureau will permit, to procure and maintain the necessary rooms and furniture for the offices and uses of the said Board of Trustees and the State Mineralogist, and the museum and library of the Mining Bureau in San Francisco; *provided, however*, that the entire expenses of the State Mining Bureau for salaries, assistance, light, rent, fuel, furniture, and all other things pertaining to said Bureau must not, in any one year, be greater than can be paid out of the Mining Bureau Fund herein provided.

SEC. 7. The Board of Trustees of the State Mining Bureau shall manage and control all the finances of said Mining Bureau, and shall make rules regulating the custody and disbursement of the funds of the State Mining Bureau, and the mode of drawing the same from the state treasury.

SEC. 8. The Board of Trustees of the State Mining Bureau shall biennially report to the Governor of the State the condition of the Bureau, with a statement of the receipts and disbursements in detail, and with said report shall be incorporated the biennial report of the State Mineralogist, and the report of said Board of Trustees and State Mineralogist shall be printed as are the reports of the other State officers. The Board of Trustees is hereby empowered to fix a price upon, and to dispose of to the public, at such prices, any and all publications of the Bureau, including reports, bulletins, maps, registers, etc. The sum derived from such disposition must be accounted for and used as a revolving printing and publishing fund for other reports, bulletins, maps, registers, etc. The prices fixed must approximate the actual cost of printing and issuing the respective reports, bulletins, maps, registers, etc., without reference to the cost of obtaining and preparing the information embraced therein.

SEC. 9. The Board of Trustees of the State Mining Bureau are hereby empowered and authorized to receive, on behalf of the State, for the use and benefit of the State Mining Bureau, gifts, bequests, devises, and legacies of real or other property, and to use the same in accordance with the wishes of the donors; and if no instructions are given, by said donors, to manage, use, and dispose of the said gifts, bequests, and legacies for the best interests of the said Mining Bureau in the manner they may deem proper.

Sec. 10. The State Mineralogist may, with the approval of the Board of Trustees of the State Mining Bureau, prepare a special collection of ores and minerals of California, to be sent to any world's fair or exposition at which they may deem it advisable or desirable to display the mineral wealth of the State.

Sec. 11. The Mining Bureau Fund herein mentioned, and out of which all the expenses of the State Mining Bureau shall be paid, shall consist of such property or moneys as may come into the hands of the Board of Trustees of said Bureau by gift, bequest, devise, or legacy; of such moneys as may, from time to time, be appropriated by the legislature of the State for the use of said Bureau, and of such moneys as shall be paid into the state treasury for the use and benefit of said Bureau.

Sec. 12. Repealed.

Sec. 13. Repealed.

Sec. 14. The Board of Trustees, now known as the Board of Trustees of the State Mining Bureau, shall perform the duties of the Board of Trustees of the State Mining Bureau, as in this act provided, and administer the affairs of the State Mining Bureau, as in this act provided, until the appointment and qualification of their successors, as in this act provided, and the State Mineralogist, now performing the duties of the office of State Mineralogist, shall perform the duties of the office of State Mineralogist, as in this act provided, until the appointment and qualification of his successor, as in this act provided.

Sec. 15. The act entitled "An act to provide for the establishment and maintenance of a Mining Bureau," approved April sixteenth, eighteen hundred and eighty, and the act entitled "An act supplementary to an act entitled 'An act for the establishment and maintenance of a Mining Bureau,' approved April sixteenth, eighteen hundred and eighty, approved March twenty-first, eighteen hundred and eighty-five," and all acts and parts of acts in conflict with the provisions of this act are hereby repealed.

Sec. 16. This act shall take effect and be in force from and after its passage. GB

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